

ORIGINAL STUDY

Female sexuality and vaginal health across the menopausal age

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Abstract

Objective: The primary aim was to evaluate changes in female sexuality across the menopausal period, and the secondary objective was to test the associations of female sexuality domains with vaginal atrophy and its symptoms.

Methods: A cross-sectional multicenter study was performed involving 518 women, 40 to 55 years of age, consulting outpatient gynecological services at 30 centers across Italy. Vaginal atrophy was identified by the contemporaneous presence of a pH >5, subjective vaginal dryness, and an objective sign. The relationships between vaginal atrophy and its main symptoms (vaginal dryness and dyspareunia), and Female Sexual Function Index (FSFI) score and its domains (desire, arousal, orgasm, dyspareunia, lubrication, and sexual satisfaction) were analyzed.

Results: The prevalence of sexual dysfunction, as defined by a FSFI score <26.55, was 70.6%, increasing from 55% in the years 40 to 45, to 82.8% ($P < 0.01$) in the years 52 to 55 of age. Mean FSFI score decreased from 40 to 45, to 46 to 48 years of age (23.13 ± 9.76 vs 19.49 ± 9.88 ; $P < 0.05$), and from 48 to 51, to 52 to 55 years of age (21.3 ± 8.06 to 17.59 ± 9.11 ; $P < 0.01$). Independent determinants of FSFI were age, vaginal atrophy, and the presence of vaginal dryness and dyspareunia (R2 0.208; $P = 0.011$). FSFI score was independently correlated (R2 0.116) with weight (CR -0.067 ; 95% confidence interval [CI] $-0.126, -0.006$; $P < 0.032$), menopausal status (CR -2.406 ; 95% CI $-4.180, -0.63$; $P < 0.008$), and vaginal dryness (CR -5.647 ; 95% CI $-7.677, -3.618$; $P < 0.0001$). Vaginal dryness was the only variable correlated independently with each FSFI domain, including desire (also correlated with menopausal status), arousal (with age and menopausal status), lubrication (with age), orgasm (with age), satisfaction (with vaginal atrophy and being an ex-smoker), and dyspareunia (with age and spontaneously referred dyspareunia).

Conclusions: In the perimenopausal years, FSFI score decreases and sexual dysfunction increases by about 30%. Vaginal dryness is the symptom of vaginal atrophy most closely related to all domains of female sexuality.

Key Words: Sexuality – FSFI – Vaginal atrophy – Vaginal dryness – Menopause – Perimenopause.

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There are various factors involved in female sexual health, including desire, arousal, satisfaction, lubrication, orgasm, and dyspareunia. Conditions that affect one or more of these domains may induce female sexual dysfunction (FSD). However, as the definition and diagnostic criteria of FSD are still being debated, its prevalence in postmenopausal women is still unclear, and figures between 35.9% and 86.5% have been reported in different countries.¹⁻⁶

Factors negatively impacting sexual function are mental and emotional status, aging, chronic medical problems, metabolic syndrome and its components, and menopausal status.^{3,7-12} Endocrinological changes during the menopause induce climacteric symptoms and biological modifications leading to vaginal atrophy (VA). The intensity of menopausal symptoms^{13,14} and VA are associated with sexual dysfunction.^{15,16}

Although only limited data are available for perimenopausal women, evidence indicates that sexual dysfunction increases during this period of life.^{12,17,18} Indeed, risk factors for sexual dysfunction such as climacteric symptoms¹⁹ and VA²⁰ are known to increase in this period. Interestingly, the rise in isolated but bothersome symptoms of VA such as

vaginal dryness or dyspareunia is much more prevalent than VA in women undergoing the menopause transition.²⁰ However, whether it is these symptoms or VA itself that has a greater effect on sexual function and its different aspects²¹ is still unclear, and we set out to investigate this issue in women undergoing the menopause transition. The primary aim was to evaluate changes in female sexuality across the menopausal period, and the secondary objective was to test the association of female sexuality with vaginal atrophy and its symptoms.

METHODS

In all, 518 healthy Italian women of 40 to 55 years of age who had had at least one sexual encounter in the month before enrollment were included in a cross-sectional multicenter observational study conducted between March, 2015 and September, 2017 in 30 Italian outpatient gynecological clinics. Exclusion criteria were virginity, vulvovaginal infections, sexual intercourse in the last 24 hours, application of local medication within 12 hours, presence of menstrual blood, diagnosis of lichen sclerosus, and positive anamnesis for vaginism or vulvodinia.

For each participant, the following information was collected: weight, height, basic demographic information, personal and family medical history, comorbidities, use of systemic or vaginal hormonal therapy, lifestyle habits (smoking, alcohol, physical activity), pre/postmenopausal status, presence of menstrual irregularities, presence of vasomotor symptoms, presence of urinary disturbances, recurrent urinary infections, and referred sexual disturbances.

The study was approved by the ethics committee of each center, and all enrolled women signed informed consent. No deviation from routine clinical practice occurred. The examinations were provided by the public health service, and no financial incentive was offered to the participants.

Instruments

The self-administered Female Sexual Function Index (FSFI), which has been validated in the Italian population, was used²² to measure the level of sexual functioning. The FSFI is composed of 19 questions grouped into six domains: desire (items 1 and 2), arousal (items 3-6), lubrication (items 7-10), orgasm (items 11-13), satisfaction (items 14-16), and dyspareunia (items 17-19). Each question is scored on a Likert scale from 0 to 6, in which 0 corresponds to a lack of sexual function in that domain, and 6 corresponds to full sexual function. The global FSFI score, from 0 to 36, is the sum of scores for each domain.

The presence of VA was determined by the coexistence of a vaginal pH >5, a sensation of vaginal dryness, and an objective sign of VA, as assessed by a medical doctor. As previously reported,^{20,23} signs of VA considered were mucosal pallor and dryness, thinning of vaginal rugae, mucosal fragility, and presence of petechiae. Subjective symptoms also taken into account were dyspareunia, itching, burning, and dysuria.

Statistical analysis

Enrolled participants were divided into four age groups, as previously reported.²⁰ In Italian women, menopause seems to

occur in the range between 49 and 50 years of age. On this basis, women were categorized into four groups: women in the late fertile period (40-45 years of age); women in the years preceding the menopause (46-48 years of age); women in the menopausal years (49-51 years of age); and women in the early post-menopausal years (52-55 years of age). Descriptive statistics were performed, and the prevalence of sexual dysfunction was evaluated across the entire sample and for each age group by assessing the number of women below the FSFI cut-off of 26.55.²⁴ Contingency tables with the chi-square test were used to compare prevalence among age groups, and Student's *t* test and analysis of variance, followed by the Fisher's post hoc test, were used to compare the means of two or multiple groups, respectively.

Factors independently related to total FSFI score and its single domains (desire, arousal, orgasm, dyspareunia, lubrication, and sexual satisfaction) were evaluated by means of linear regression analysis. To assess those factors that were independently linked to total or single domains of FSFI score, factors found to be statistically significant were entered into a multiple regression model. Factors included as independent variables were age, body weight, body mass index (BMI, kg/m²), and nominal values, which were entered as dummy variables, namely previous and present smoking habits (yes/no), use of alcoholic beverages (yes/no), sedentary lifestyle (yes/no), postmenopausal status (yes/no), menstrual irregularities (yes/no), presence of vasomotor symptoms (yes/no), vaginal dryness (yes/no), dyspareunia (yes/no), diagnosis of VA (yes/no), referred urinary disturbances (yes/no), recurrent urinary infections (yes/no), current use of systemic hormonal therapy (yes/no), and current use of vaginal medications (yes/no).

All analyses were performed using the statistical software package StatView 5.01 (SAS Institute Inc., Cary, NC). All results are expressed as means and standard deviations. A *P* value of <0.05 was considered as statistically significant.

RESULTS

Enrolled women were divided into four age groups: 40 to 45 (n = 105, 20.2%); 46 to 48 (n = 99, 19.1%); 49 to 51

TABLE 1. Characteristics of enrolled women

Age (y)	49.4 ± 4.3
Body mass index (kg/m ²)	25.6 ± 5.3
Ex-smokers (%)	17.5
Smokers (%)	18.1
Use of alcohol (%)	17.2
Sedentary (%)	43.6
Menopause (%)	49.8
Menstrual irregularities (%)	26.4
Vasomotor symptoms (%)	36.7
Vaginal dryness (%)	65.4
Dyspareunia (%)	55.7
Vaginal atrophy (%)	38.4
Urinary disturbances (%)	28.0
Urinary infections (%)	17.9
Sexual disturbances (%)	34.6
Sexual dysfunction (%)	72.7
Female Sexual Function Index score	19.9 ± 9.4
Systemic hormonal therapy (%)	11.2
Vaginal therapies (%) (%hormonal)	17.9 (33%)

TABLE 2. Mean (\pm SD) score of Female Sexual Function Index (FSFI) and of its single domains stratified by four age groups

	Group 1 (40-45 y; n = 105)	Group 2 (46-48 y; n = 99)	Group 3 (49-51 y; n = 123)	Group 4 (52-55 y; n = 191)	P
Desire	3.54 \pm 1.27 ^b vs 3, 4	3.33 \pm 1.15 ^b vs 4	3.12 \pm 1.17 ^a vs 4	2.85 \pm 1.13	<0.0001
Arousal	3.78 \pm 1.85 ^b vs 2, 4	3.11 \pm 1.86	3.54 \pm 1.50 ^b vs 4	2.76 \pm 1.69	<0.0001
Lubrication	3.93 \pm 1.91 ^b vs 2, 4	3.25 \pm 1.96	3.58 \pm 1.58 ^b vs 4	2.93 \pm 1.83	0.0002
Orgasm	3.95 \pm 1.9 ^b vs 2, 4	3.16 \pm 2.08 ^a vs 3	3.65 \pm 1.60 ^b vs 4	2.91 \pm 1.67	<0.0001
Satisfaction	4.08 \pm 1.77 ^b vs 2, 4	3.37 \pm 1.86 ^a vs 3	3.87 \pm 1.59 ^b vs 4	3.21 \pm 1.68	0.0003
Dyspareunia	3.83 \pm 2.01 ^a vs 2, ^b vs 4	3.26 \pm 2.20	3.50 \pm 1.86 ^b vs 4	2.91 \pm 1.96	0.004
FSFI total	23.13 \pm 9.76 ^a vs 2, ^b vs 4	19.49 \pm 9.88	21.3 \pm 8.06 ^b vs. 4	17.59 \pm 9.11	<0.0001

^a $P < 0.05$.^b $P < 0.01$.

(n = 123, 23.7%); and 52 to 55 (n = 191, 36.9%) years of age. The characteristics of the women are reported in Table 1.

The mean FSFI score declined from 40 to 45 years, to 46 to 48 years of age, partially increased in the years 49 to 51, and further declined in the years 52 to 55 ($P < 0.0001$). Even in the youngest group, the mean FSFI score was below the cut-off of 26.55 (Table 2). As defined by an FSFI value of <26.55 , the prevalence of sexual dysfunction was 72.6% overall, but sexual dysfunction varied by age group. Its prevalence increased from 55% in the age range 40 to 45 years, to 72.7% (+13%; $P < 0.01$) in the age range 46 to 48 years, then remained roughly stable at 71.5% in the age range 49 to 51 years, and then increased again to 82.8% (+10%; $P < 0.02$) in the age range 52 to 55 years (Fig. 1).

The FSFI score was inversely related to age, weight, ex-smoking status, sedentary lifestyle, menopausal status, subjective vaginal dryness, dyspareunia, and VA (Table 3). However, when all these parameters were included in the multiple regression analysis, only vaginal dryness, being in the menopause, and weight were independently associated with FSFI score (R^2 0.116; $P < 0.0001$) (Table 3). By performing similar analyses for each FSFI domain, the following

inverse relations emerged: desire with subjective vaginal dryness and menopause status (R^2 0.079; $P < 0.0001$); arousal with subjective vaginal dryness, menopause status, and age (R^2 0.087; $P < 0.0001$); lubrication with subjective vaginal dryness and age (R^2 0.096 $P < 0.0001$); orgasm with subjective vaginal dryness and age (R^2 0.077; $P < 0.0001$); satisfaction with subjective vaginal dryness, VA, and being an ex-smoker (R^2 0.108; $P < 0.0001$); and dyspareunia with subjective vaginal dryness, referred dyspareunia, and age (R^2 0.128; $P < 0.0001$) (Table 3). Factors independently related to female sexual dysfunction were VA, subjective vaginal dryness, dyspareunia, and age (Table 4).

DISCUSSION

Our results show a marked decline in FSFI score in the ages spanning the menopause. It has already been reported that menopause transition has a negative effect on sexuality,^{10,25-27} probably as the consequence of central and peripheral sex hormones depletion.²⁶⁻²⁸ Indeed, in our data, menopausal status was independently related to domains such as desire and arousal, which are likely influenced by hormone levels. In confirmation of this hypothesis, higher FSFI scores of desire

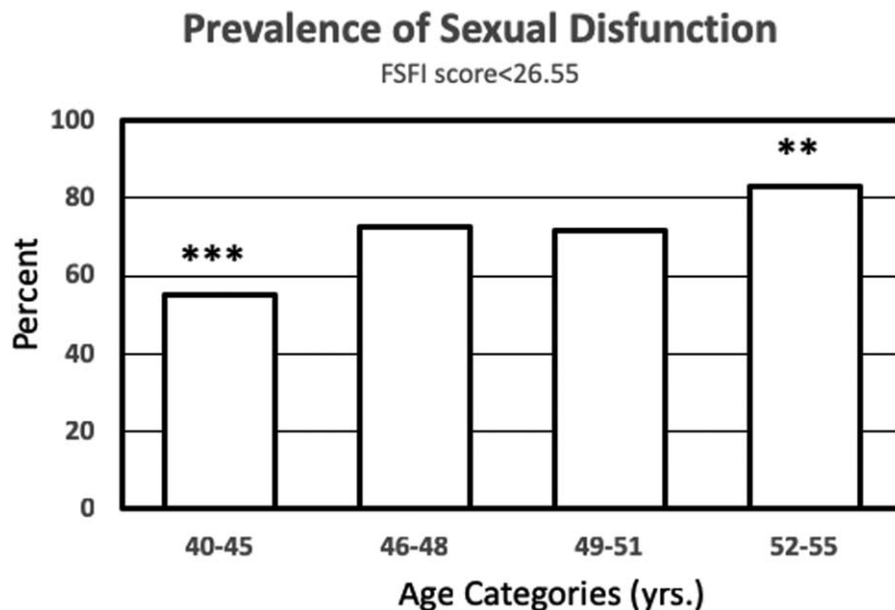


FIG. 1. Prevalence of sexual dysfunction, identified by a Female Sexual Function Index (FSFI) score cut-off of <26.55 , stratified by age group; ** $P < 0.02$ versus 49 to 51 years of age; *** $P < 0.0001$ versus the other three age groups.

TABLE 3. Simple and multiple regression models between Female Sexual Function Index (FSFI) score or its domains with significantly related factors

	Simple regression CR (95% CI)	R ² ; P	Multiple regression CR (95% CI)	R ² ; P
FSFI score				
Age	-0.522 (-0.707; -0.338)	0.057; 0.0001	NS	NS
Weight	-0.068 (-0.130; -0.005)	0.010; 0.033	-0.067 (-0.126; -0.006)	0.116; 0.032
Systemic hormones	+2.742 (+0.18; +5.30)	0.095; 0.06	NS	NS
Sedentary	-2.549 (-4.18; -0.916)	0.018; 0.002	NS	NS
Vaginal dryness	-6.290 (-8.17; -4.41)	0.084; 0.0001	-5.647 (-7.677; -3.618)	0.116; 0.0001
Referred dyspareunia	-4.301 (-5.90; -2.70)	0.106; 0.0001	NS	NS
Vaginal atrophy	-5.174 (-6.79; -3.56)	0.074; 0.0001	NS	NS
Menopausal status	-3.287 (-4.69; -1.68)	0.030; 0.0001	-2.406 (-4.180; -0.632)	0.116; 0.008
Desire				
Age	-0.0588 (-0.082; -0.034)	0.043; 0.0001	NS	NS
Sedentary	-0.306 (-0.513; -0.098)	0.016; 0.0001	NS	NS
Systemic hormones	+0.521 (+0.192; +0.851)	0.019; 0.002	NS	NS
Vaginal dryness	-0.694 (-0.938; -0.451)	0.065; 0.001	-0.636 (-0.879; -0.392)	0.079; 0.0001
Referred dyspareunia	-0.510 (-0.715; -0.304)	0.044; 0.0001	NS	NS
Vaginal atrophy	-0.598 (-0.807; -0.389)	0.060; 0.0001	NS	NS
Menopausal status	-0.457 (-0.660; -0.254)	0.037; 0.0001	-0.266 (-0.497; -0.074)	0.079; 0.0082
Arousal				
Age	-0.096 (-0.131; -0.062)	0.055; 0.0001	-0.058 (-0.097; -0.020)	0.087; 0.0033
Weight	-0.014 (-0.026; -0.003)	0.013; 0.016	NS	NS
Body mass index	-0.030 (-0.061; -0.0003)	0.009; 0.049	NS	NS
Sedentary	-0.445 (-0.752; -0.139)	0.016; 0.0045	NS	NS
Vaginal dryness	-0.847 (-1.208; -0.487)	0.045; 0.0001	-0.697 (-1.06; -0.333)	0.087; 0.0002
Referred dyspareunia	-0.455 (-0.760; -0.151)	0.017; 0.0035	NS	NS
Vaginal atrophy	-0.765 (-1.071; -0.459)	0.046; 0.0001	NS	NS
Menopausal status	-0.661 (-0.961; -0.362)	0.035; 0.0001	-0.352 (-0.677; -0.027)	0.087; 0.0339
Lubrication				
Age	-0.099 (-0.135; -0.062)	0.052; 0.0001	-0.070 (-0.109; -0.031)	0.096; 0.0004
Weight	-0.012 (-0.025; -0.0001)	0.009; 0.047	NS	NS
Sedentary	-0.428 (-0.744; -0.098)	0.013; 0.0108	NS	NS
Vaginal dryness	-1.114 (-1.49; -0.740)	0.071; 0.0001	-0.962 (-1.341; -0.584)	0.096; 0.0001
Referred dyspareunia	-0.694 (-1.013; -0.375)	0.034; 0.0001	NS	NS
Vaginal atrophy	-0.955 (-1.275; -0.635)	0.064; 0.0001	NS	NS
Menopausal status	-0.563 (-0.881; -0.245)	0.023; 0.0005	NS	NS
Orgasm				
Age	-0.096 (-0.133; -0.059)	0.047; 0.0001	-0.067 (-0.108; -0.027)	0.077; 0.0001
Weight	-0.013 (-0.026; -0.001)	0.010; 0.0386	NS	NS
Sedentary	-0.464 (-0.794; -0.135)	0.015; 0.0058	NS	NS
Vaginal dryness	-1.017 (-1.41; -0.628)	0.043; 0.0001	-0.872 (-1.266; -0.477)	0.077; 0.0001
Referred dyspareunia	-0.611 (-0.936; -0.286)	0.026; 0.0002	NS	NS
Vaginal atrophy	-0.859 (-1.189; -0.529)	0.048; 0.0001	NS	NS
Menopausal status	-0.575 (-0.899; -0.252)	0.023; 0.0001	NS	NS
Satisfaction				
Age	-0.078 (-0.112; -0.044)	0.038; 0.0001	NS	NS
Weight	-0.012 (-0.024; -0.001)	0.010; 0.036	NS	NS
Ex-smoker	-0.503 (-0.894; -0.112)	0.012; 0.0118	-0.468 (-0.863; -0.058)	0.108; 0.0249
Systemic hormones	+0.480 (+0.012; +0.948)	0.008; 0.0444	NS	NS
Sedentary	-0.439 (-0.740; -0.139)	0.016; 0.0043	NS	NS
Vaginal dryness	-1.157 (-1.51; -0.804)	0.085; 0.0001	-0.887 (-1.296; -0.479)	0.108; 0.0001
Referred dyspareunia	-0.776 (-1.07; -0.482)	0.050; 0.0001	NS	NS
Vaginal atrophy	-0.859 (-1.159; -0.560)	0.060; 0.0001	-0.419 (-0.773; -0.065)	0.108; 0.0206
Menopausal status	-0.452 (-0.748; -0.156)	0.017; 0.0001	NS	NS
Dyspareunia				
Age	-0.095 (-0.135; -0.055)	0.040; 0.0001	-0.057 (-0.099; -0.015)	0.128; 0.0081
Ex-smoker	-0.584 (-1.046; -0.123)	0.012; 0.0132	NS	NS
Sedentary	-0.474 (-0.829; -0.119)	0.013; 0.0090	NS	NS
Vaginal dryness	-1.461 (-1.86; -1.06)	0.101; 0.0001	-0.985 (-1.469; -0.500)	0.128; 0.0001
Referred dyspareunia	-1.255 (-1.59; -0.917)	0.093; 0.0001	-0.539 (-0.975; -0.104)	0.128; 0.0001
Vaginal atrophy	-1.138 (-1.49; -0.787)	0.075; 0.0001	NS	NS

Data are reported as coefficient of regression (CR) and standard error (SE).

NS, not significant.

were found among users of systemic hormones, but not among those using local vaginal medication. It may be that the effect of vaginal medications was mediated by alterations in the local conditions.

Sexual dysfunction is highly prevalent among women globally from a minimum of 35.9% to a maximum of

86.5%.²⁻⁵ It is interesting to note the striking difference between the prevalence of sexual dysfunction identified by the FSFI questionnaire, and self-reported sexual disturbances, whose prevalence (about 25%) was much lower. This may be the consequence of the embarrassment produced in women discussing sexuality issues.²⁹ When using a FSFI cut-off of

TABLE 4. Simple logistic and multiple logistic regression models on presence of sexual dysfunction, identified by a Female Sexual Function Index score <26.55, and significantly related factors

	Crude OR (95% CI)	R ² ; P	Adjusted OR (95% CI)	R ² ; P
Sexual dysfunction				
Age	1.13 (1.071; 1.190)	0.044; 0.0001	1.086 (1.006; 1.174)	0.208; 0.011
Body mass index	1.048 (1.000; 1.098)	0.009; 0.049	1.021 (0.964; 1.082)	0.208; 0.473
Hot flashes	2.434 (1.559; 3.801)	0.028; 0.0001	1.578 (0.822; 3.029)	0.208; 0.177
Ex-smoker	1.973 (1.106; 3.519)	0.010; 0.0214	1.750 (0.701; 4.369)	0.208; 0.230
Sedentary	1.598 (1.069; 2.389)	0.009; 0.0221	1.006 (0.552; 1.833)	0.208; 0.985
Vaginal dryness	5.647 (3.520; 0.060)	0.105; 0.0001	2.156 (1.042; 4.460)	0.208; 0.038
Referred dyspareunia	5.320 (3.475; 8.159)	0.108; 0.0001	2.400 (1.206; 4.776)	0.208; 0.013
Vaginal atrophy	6.435 (3.716; 11.144)	0.102; 0.0001	2.602 (1.172; 5.777)	0.208; 0.019
Menopausal status	2.338 (1.563; 3.498)	0.029; 0.0001	1.151 (0.606; 2.186)	0.208; 0.668

Data are reported as odds ratio (OR) and 95% confidence interval (CI).

26.55,²⁴ 72% of women between 40 and 55 years of age could be classified as having sexual dysfunction. Interestingly, dysfunction increased by 30% in the years spanning the menopause, with major related factors being subjective vaginal dryness, dyspareunia, age, and the presence of VA.

There is some disagreement in the literature that age is an independent variable in determining female sexuality.³⁰⁻³³ However, in our study, although age was not an independent determinant of total FSFI score, it was independently associated with arousal, lubrication, orgasm, and dyspareunia, and was, in fact, an independent determinant of sexual dysfunction. We found that arousal, lubrication, orgasm, sexual satisfaction, and dyspareunia showed a steep decline in women 46 to 48 years of age, partially increased in the 49 to 51-age group, and subsequently declined in women aged 52 to 55 years. It may be that improvement in the FSFI score observed in women of 49 to 51 years of age is related to the hyper-estrogenism often associated with perimenopausal ovarian dysfunction.³⁴ Unfortunately, however, we are unable to draw firm conclusions on the above issues as no systematic endocrine evaluation was performed due to lack of funding. Nevertheless, when necessary, follicle-stimulating hormone was measured to clinically evaluate menopausal status.

Previous studies have reported that the severity of menopausal symptoms can negatively influence sex life and sexual satisfaction,^{11-14,35} but according to our results, the major determinant of total FSFI score and all its domains is not the presence of vasomotor symptoms, but rather vaginal dryness, which precedes vaginal atrophy by a variable period of time. Although some authors have reported a relationship between FSFI score and the presence of VA in postmenopausal women,^{36,37} by including premenopausal women in our study, we show that vaginal dryness is likely more important than VA in determining the total FSFI score. Indeed, vaginal dryness is more prevalent than VA in premenopausal and menopausal women,²⁰ whereas the two coincide after the menopause.^{38,39} The fact that our sample contained women with vaginal dryness, but not VA, enabled us to separate the respective effects of the two factors and therefore to better identify, which had a stronger influence on sexual function. We show that, overall, the major determinant of all FSFI domains was, in fact, vaginal dryness.

A longitudinal evaluation of FSFI score performed in pre and postmenopausal women indicated that initial values of the FSFI domains of desire and arousal were the main predictors of changes in sexual function.⁴⁰ Hence, factors related to these domains may be key players in determining female sexuality. Based on our data, both desire and arousal are inversely related to vaginal dryness. This, together with the above, highlights the major role of this factor in influencing all aspects of female sexuality. It also suggests that preventive treatments for vaginal dryness may be beneficial for premenopausal, and also menopausal women.

This study has certain limitations. First and foremost, it was performed only on white women attending different gynecological outpatient services. It is also possible that there was some variability in how physicians from the different centers assessed signs of VA, even though they were trained to be as uniform as possible, and to diagnose VA according to the parameters of the AGATA study²³; this found a prevalence of VA in the Italian population similar to that reported for another study in which the vaginal health index³⁹ was used. Moreover, menopause was considered as a dichotomous variable (yes/no), but data on the years since the menopause were not collected. Although, based on the age range selected, it is likely that the postmenopausal women included were in the initial years after menopause. Based on our data, we are unable to determine whether or not the years since the menopause play an independent role in FSFI. Furthermore, the Female Sexual Distress Scale (FSD-S) was not used to measure sexual distress, but a strict diagnosis of sexual dysfunction implies that the condition causes significant personal distress.⁴¹ In addition, an FSFI cut-off score of 26.55 was used to define sexual dysfunction across a broad age range. This cut-off is probably excessive for menopausal and postmenopausal women, whose sexuality is likely diminished with respect to that of younger women. We intend to investigate this issue in future studies. Finally, the cross-sectional design of the study did not enable longitudinal evaluations, and multiple testing was performed on a relatively small sample size. Accordingly, some results that our analysis found to be significant may have been chance events.

Nevertheless, the concordance between the associations we reveal and biological plausibility indicates the credibility of our results. Despite its limitations, our study has the advantage

of being a nationwide multicenter investigation giving a wider perspective on FSFI, at least in women attending gynecological outpatient services.

CONCLUSIONS

The data seem to suggest that vaginal dryness may be the main player in determining female sexuality in the perimenopausal period. It suggests the need for prospective studies to investigate whether selective treatment of vaginal dryness improves female sexual function in this age range.

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