Prevalence of the Sexual Dysfunction and the Associated Factors in Postmenopausal Women

Orawin Vallibhakara MD[1,2], Phusanaphan Phanthong MD[2], Rujira Wattanayingcharoenchai MD[2,3], Areepan Sophonsritsuk MD, PhD[1,2], Sakda Arj-Ong Vallibhakara MD, PhD[4,5]

[1] Reproductive, Endocrinology and Infertility Unit, Faculty of Medicine, Ramathibodi Hospital, Mahidol University, Bangkok, Thailand

[2] Department of Obstetrics and Gynecology, Faculty of Medicine, Ramathibodi Hospital, Mahidol University, Bangkok, Thailand.

[3] Female Pelvic Medicine and Reconstructive Surgery Unit, Department of Obstetrics and Gynecology, Faculty of Medicine, Ramathibodi Hospital, Mahidol University, Bangkok, Thailand

[4] Faculty of Medicine, Bangkokthonburi University, Bangkok, Thailand

[5] Child Safety Promotion and Injury Prevention Research Center, Faculty of Medicine, Ramathibodi Hospital, Mahidol University, Bangkok, Thailand

Background: Female sexual dysfunction (FSD) is a heterogeneous group of disorders characterized by clinical, significant disturbances in sexual response, or the experience of sexual pleasure that cause significant personal distress. Although FSD among postmenopausal women is highly prevalent, healthcare providers and women are unlikely to discuss it.

Objective: To study prevalence of FSD and factor associated with FSD in postmenopausal women.

Materials and Methods: A cross-sectional self-reported questionnaire about socio-demographic and general health status, attitude, and perception about sexuality and the Thai validated version of the Female Sexual Function Index (FSFI) was used among 241 postmenopausal women. Data analysis was done through descriptive and inferential statistics. The univariate analysis was done. The factors that had statistical significance (p<0.10) were included in the multiple logistic regression analysis to evaluate the factors related to FSD (p<0.05).

Results: The prevalence of FSD was 84.23%. In multivariate analysis, the authors found the significant risk factors of FSD among postmenopausal women consisted of the attitude toward unnecessary sex after menopause (odds ratio [OR] 11.98, 95% confidence interval [CI] 3.41 to 41.20, p<0.001), partner's social factor of retirement (OR 4.39, 95% CI 1.57 to 12.32, p<0.005), and partner's underlying medical condition (OR 2.58, 95% CI 1.17 to 5.69, p<0.02) (area under ROC=0.8835).

Conclusion: There was a high prevalence of FSD among Thai postmenopausal women, and the associated factors came from the couple and cultural values of unnecessary sex after menopause.

Keywords: Menopausal woman; Sexual dysfunction; Sexuality; Risk factor; Female sexual dysfunction; Prevalence

Sexual health, as described by the World Health Organization (WHO) in 2002, is a state of overall health such as physical, emotional, mental health, and social well-being related to sexuality. Good sexual health requires a positive and respectful approach to sexuality and sexual relationships and the possibility of having pleasurable and safe sexual experiences, free of coercion, discrimination, and violence. Sexual health is not only an essential part of women's health but also a basic human right[1]. Sexuality, especially for women, depends on multiple factors including physical health, psychological health, socio-economic status, the couple's relationship, and sociocultural factors[2]. Nowadays, the normal female sexual response is heterogeneous. It encompasses a variety of sequences during the four stages of sexual response, excitement, plateau, orgasm, and resolution, as postulated by Masters and Johnson[2,3].

Basson et al described the female sexual response cycle as overlapping phases in a variable sequence and influenced by various physical, psychological, and emotional factors. Thus, women may participate in sexual activities for other reasons than desire[4]. The coordination of the brain and central neuroendocrine

Correspondence to:

Vallibhakara SA.

Research Center, Faculty of Medicine, Bangkokthonburi University, 16/10 Moo 2 Liapkhlong Thawiwatthana Road, Thawi Watthana Subdistrict, Thawi Watthana District, Bangkok 10170, Thailand.

Phone: +66-2-8006800, **Fax**: +66-2-8006806

Email: dr.sakda@gmail.com

system regulates a dynamic female sexual response by balancing excitatory and inhibitory factors and hormones such as estrogen, androgen, serotonin, and dopamine[5].

Definition of female sexual dysfunction (FSD), defined in the Diagnostic and Statistical Manual of Mental Disorders (DSM-V), is a heterogeneous group of disorders characterized by clinical and significant disturbances in sexual response, or the experience of sexual pleasure, which cause significant personal distress. There are three types of FSD, female sexual interest and arousal dysfunction (FSIAD), female orgasmic disorder, and genito-pelvic pain or penetration disorder[6]. FSD is diagnosed by clinical diagnosis. It needs experienced history-taking skills to explore the cause of dysfunction. Moreover, treatments are varied and depend on individual concerns and sexual preferences.

Menopause, which spans one-third of a woman's life, results from a decline in ovarian functions and the loss of sex hormones, especially estrogen. This leads to undesirable menopausal symptoms such as vasomotor symptoms (VMS), muscle and joint aches, sleep disorder, deteriorating body image, and genitourinary syndrome of menopause (GSM), especially atrophic vaginitis, pelvic organ prolapse, and urinary incontinence. Along with those physical changes, there is also an increased risk of psychological problems such as depression, anxiety, poor memory, lack of concentration, and loss of sexual desire, which affect the couple's relationship[7-9]. The menopausal changes aggravate the risk of FSD, especially FSIAD, hypoactive sexual desire disorder, and genito-pelvic pain or penetration disorder, associated with vulvovaginal atrophy. There are reports of an increase in the prevalence of all domains of sexual dysfunction, including sexual interest or desire, arousal, orgasm, and pain or dyspareunia, among women aged over 50.

Moreover, there is a prevailing myth about the menopausal transition signaling the end of a woman's sex life. The prevalence of FSD among women of all ages is 25% to 63%, while the prevalence among postmenopausal women is higher at 68% to 86.5%[10]. In Asia, the prevalence of FSD is estimated at around 30%. However, this could be underreported due to sampling methods and non-validated questionnaires. The sexual problems, based on questionnaires on "avoiding intimacy" and "change in sexual desire or loss of interest in sex" among Asian menopausal women, is as high as 53.5% to 76.9% and 70.8% to 91.4%, respectively[11]. FSD affects the quality of life for women, as good sexual health has been proven to have positive effects on overall health in middle age and later life. The associated factors of FSD vary from study to study. Still, they primarily include biological factors, such as age, hormonal therapy, general health status, emotional and social factors, such as depression and anxiety, the quality of relationship with the husband, partner's loyalty, sexual knowledge, access to health care, education, occupation, and socio-economic status[12,13].

As Thailand has become an aging society, sexual health is one of the crucial factors for postmenopausal woman's health care. The present study aimed to find the prevalence of FSD and the associated factors of sexual dysfunction among postmenopausal women. The results would also be beneficial for the holistic management of menopausal women.

Materials and Methods
Participants
The authors enrolled the participants from all postmenopausal women who visited the outpatient clinic and menopause clinic at the Obstetrics and Gynecology Department, Ramathibodi Hospital, Mahidol University, Thailand, between November 16, 2019 and July 31, 2020. The inclusion criteria were age 41 to 70 years, sexually active or have had sexual intercourse within the last four weeks, and able to provide informed consent. The exclusion criteria were history of any malignancy, an underlying psychological condition such as depression, anxiety, or schizophrenia, or a serious medical condition such as myocardial infarction or cerebrovascular disease. This study was approved by the Ethical Clearance Committee on Human Rights Related to Research Involving Human Subjects, Faculty of Medicine, Ramathibodi Hospital, Mahidol University (MURA2019/1098). All participants provided written informed consents for study participation.

Study design and data collection
A cross-sectional study was conducted. The primary purpose was to identify prevalence of FSD in postmenopausal women, while the secondary purpose was to identify associated factors that affect FSD among postmenopausal women. The multi-purpose questionnaire was used in the present study comprised three parts, 1) socio-demographic and general health status, 2) attitude and perception towards sexuality in menopausal life, and 3) the Thai validated version of the Female Sexual Function Index (FSFI). The socio-demographic and general health

included age, educational level, occupation, income, underlying disease, menopausal status, history of taking menopausal hormonal therapy, exercise, and lifestyle. The attitude and perception about sexuality in menopausal life recorded form aimed to obtain information on marital status, including the partner's age and partner's demographic data, duration of the marriage, quality of the sexual relationship, attitude towards the sexual relationship, and history of bad experiences in the coupled life or sexuality. All participants must also answer the validated Thai version of the FSFI questionnaire by Oranratanaphan et al[14], which included six evaluation domains that are desire, arousal, lubrication, orgasm, satisfaction, and pain. The FSFI has been known as a good questionnaire to discriminate the validity, reliability, and appropriate correlation between the domains of sexual dysfunction[15]. From cross-validation of 568 women with mixed sexual dysfunctions, Wiegel et al proposed that participants with a total score ≤26.5 on the FSFI should be considered at risk for sexual dysfunction. The internal reliability for the total FSFI and six domain scores is above 0.8, which suggests that the criteria are good or excellent for sexually dysfunctional and non-dysfunctional samples[16]. Therefore, in the present study, the women with the FSFI score ≤26.5 were defined as experiencing sexual dysfunction, while women with higher scores were implied to have good sexual health.

Statistical analysis

Baseline characteristics were reported as descriptive data. All quantitative variables were tested for normal distribution, and mean ± standard deviation (SD), and median (range) were used when data showed normal and non-normal distribution, respectively. The statistical analyses were performed by Stata Statistical Software, version 15.0 (StataCorp LLC, College Station, TX, USA). The associated factors for sexual dysfunction, as determined by the FSFI score, were analyzed with univariate analysis. If significant associations of the factors (p<0.10) are found, the multiple logistic regression will be used to evaluate an independent factor effect. The statistical significance of the present study was defined when the p-value less than 0.05 was reported with 95% confidence intervals (CI).

Results

A flow chart of patient selection is shown in Figure 1. Two hundred forty-one postmenopausal women were enrolled in the present study, and
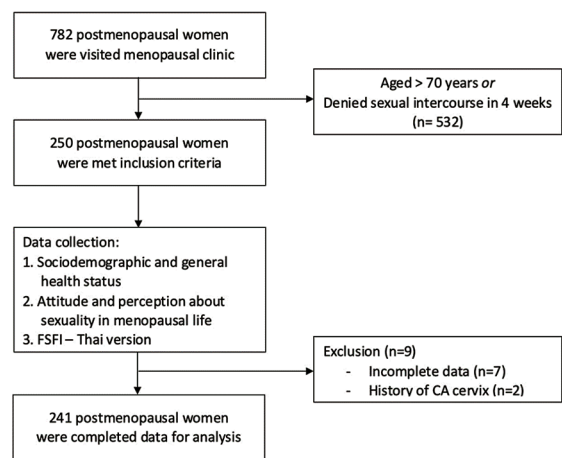

Figure 1. Participants flow chart.

participants and their partner's baseline characteristics are shown in Table 1. Participants' mean age (±SD) and body mass index (BMI) were 56.82±6.35 years, and 24.51±3.58 kg/m². One-third of participants were surgical menopause and the mean (±SD) of their menopausal age was 43.56±4.53 years, while two-thirds of participants were natural menopause and the mean (±SD) of their menopausal age was 49.34±3.38 years. Most participants were multiparous and had no history of menopausal hormonal therapy. However, around two-thirds of the participants had underlying diseases such as dyslipidemia (31%), hypertension (24%), and diabetes mellitus (7.9%). The present study found that more than 50% of both participants and their partners were still working, especially more than half of their partners were still active working (59.75%). The mean age of the partners was 59.85±6.35 years, which is a little higher than the women's mean age. Likewise, their partners also had underlying diseases such as hypertension (41%), dyslipidemia (28.2%), and diabetes mellitus (11.2%).

Prevalence of FSDs in postmenopausal women

From the present study, the prevalence of FSD determined by scoring ≤26.5 on the FSFI was 84.23%. The most common domain shared among postmenopausal women with sexual dysfunction was pain or dyspareunia. In contrast, the arousal domain strongly correlates with the higher FSFI score according to the inter-domain correlation analysis. The strong correlation in the arousal domain implied good sexual functions, while pain during intercourse is the critical problem of postmenopausal women with FSD.

Table 1. Participants' and partner's baseline characteristics

Characteristics	Total (n=241); n (%)
Age (years); mean±SD	56.82±6.35
41 to 50	36 (14.94)
51 to 60	128 (53.11)
61 to 70	77 (31.95)
BMI (kg/m²); mean±SD	24.51±3.58
Mode of menopause	
Natural	173 (71.78)
Surgical	68 (28.22)
Menopausal aged (years); mean±SD	
Natural	49.34±3.38
Surgical	43.56±4.53
Marital status	
Married	224 (92.95)
Separate	17 (7.05)
Parity	
Nulliparous	32 (13.28)
Multiparous	209 (86.72)
Education status	
Primary	28 (11.62)
Secondary	57 (23.65)
College or university	156 (64.73)
Religious	
Buddhism	225 (93.36)
Christian	6 (2.49)
Islam	10 (4.15)
Occupation	
Retired	97 (40.25)
On working	144 (59.75)
Medical illness	
Present	175 (72.61)
Absent	66 (27.39)
Hormonal replacement therapy	
Previous or current used	71 (29.46)
Never	170 (70.54)
Exercise activity	
Regular (>150 minutes/week)	61 (25.31)
Sometimes	142 (58.92)
Never	38 (15.77)
Partner education status	
Primary	13 (5.40)
Secondary	49 (20.33)
College or university	179 (74.27)
Age of partners (years); mean±SD	59.85±6.35
Partner occupation	
Retired	92 (38.17)
On working	149 (61.83)
Partner medical illness	
Present	185 (76.76)
Absent	56 (23.24)

SD=standard deviation; BMI=body mass index

Associated factors for FSD in postmenopausal women

From the univariate analysis, the significant associated factors of FSD among postmenopausal women were increasing age, multi-parity, obesity with a BMI greater than 27.5 kg/m², current medical illness, lower education, being employed, and the attitude that sex was not necessary for menopausal women, while the regular exercise of more than 150 minutes per week seemed to be a significant protective factor. On the other hand, the partner's significant associated factors of FSD were lower educational status, retirement status, and the presence of medical illness, as shown in Table 2. The authors performed multiple logistic regression analyses among significant factors with a significant p-value below 0.10. The authors found that the strongest association was between FSD and the attitude toward unnecessary sex in menopause (OR 11.98, 95% CI 3.41 to 41.20). The other two significant factors were linked to the partner's factors, the partner's retirement status (OR 4.39, 95% CI 1.57 to 12.32) and underlying medical condition (OR 2.58, 95% CI 1.17 to 5.69), as shown in Table 3.

Discussion

In the present study, the prevalence of FSD among postmenopausal women was 84.23%. The result was similar to the previous hospital-based survey among Southern Thai menopausal women by Peeyananjarassri et al[17] in 2008, which excluded women who used hormonal therapy. They reported the prevalence of FSD by using FSFI, at 82%. Although the average age of the participants in the present study was slightly higher than the previously studied at 57 years compared to 52 years, this high FSD prevalence in postmenopausal women matches other reports conducted in Asia such as Malaysia (85.2%) and India (80.9%)[18,19]. Likewise, in a recent national epidemiological survey in China, FSD prevalence measured by FSFI was approximately 68% among 7,835 postmenopausal women, with the lowest scores in sexual desire and arousal domains[20].

In contrast, the prevalence of FSD in Western countries such as Australia, Europe, and South America varied from 35% to 70% in postmenopausal women[21-23]. One of the significant reasons for the different FSD prevalence among ethnic groups is the "type of sexual regime," as defined by the Global Study of Sexual Attitudes and Behaviors[24]. This includes "gender-equal sexual regimes," that are typically found in Western countries. This contrasts with the "male-centered sexual regimes" that are

Table 2. Factors associated with female sexual dysfunction (FSD) among menopausal women from FSFI score: univariate analysis

Factors	Good sexual health (total=38); n (%)	Sexual dysfunction (total=203); n (%)	OR	p-value
Age (years)				<0.001*
41 to 50	14 (38.88)	22 (61.11)	1	
51 to 60	21 (16.40)	107 (83.59)	3.22	
61 to 70	3 (3.90)	74 (96.10)	4.84	
Cause of menopause				0.628
Natural	26 (15.12)	146 (84.88)	1.20	
Surgical	12 (17.65)	56 (82.35)	1	
Marital status				0.639
Married	26 (12.15)	188 (87.85)	1	
Separated	12 (44.44)	15 (55.56)	1.44	
Parity				0.039*
Nulliparous	9 (28.13)	23 (71.87)	1	
Multiparous	29 (13.88)	180 (86.12)	2.43	
BMI (kg/m^2)				0.038*
<18.5	0 (0.00)	8 (100)	1	
18.5 to 22.9	19 (24.05)	60 (75.95)	0.45	
23 to 27.5	16 (14.95)	91 (85.05)	0.81	
>27.5	3 (6.38)	44 (93.62)	2.09	
Medical illness				<0.001*
Present	17 (9.66)	159 (90.34)	4.46	
Absent	21 (32.31)	44 (67.69)	1	
MHT history				0.337
Used	13 (19.40)	54 (80.60)	1	
Not used	25 (14.37)	149 (85.63)	1.43	
Exercise				0.021*
Regular	15 (24.59)	46 (75.41)	1	
Not regular	23 (12.78)	157 (87.22)	2.23	
Education status				0.007*
Primary	1 (3.57)	27 (96.43)	7.24	
Secondary	4 (7.02)	53 (92.98)	3.55	
Collage or above	33 (21.15)	123 (78.85)	1	
Occupation				0.003*
Retired	31 (18.90)	133 (81.10)	1	
Working	7 (7.22)	90 (92.78)	3.53	
Sexual attitude				<0.001*
Necessary	35 (27.13)	94 (72.87)	1	
Not necessary	3 (2.68)	109 (97.32)	13.53	
Bad sexual experience				1
Present	4 (15.38)	22 (84.62)	1	
Absent	34 (15.81)	181 (84.19)	1.03	
Partner's medical illness				0.001*
Present	18 (10.59)	152 (89.41)	3.31	
Absent	20 (28.17)	51 (71.83)	1	
Partner's education				0.046*
Primary	0 (0.00)	13 (100.00)	2.86	
Secondary	4 (8.16)	45 (91.84)	2.64	
Collage or above	34 (19.00)	145 (81.00)	1	
Partner's occupation				<0.001*
Retired	5 (5.38)	88 (94.62)	5.05	
On working	33 (22.30)	115 (77.70)	1	

BMI=body mass index; MHT=menopausal hormone therapy

Fisher's exact test was used instead of the Pearson's chi-square test when more than 20% of cells have expected frequencies <5. In univariated analysis, the statistically significant factors (p<0.10) will later keep to multiple logistic regression analysis.

Table 3. Factors associated with female sexual dysfunction among menopausal women from FSFI score: multivariate logistic regression analysis

Factors	Adjusted OR (95% CI)	p-value
Attitude of unnecessary of sex in menopause	11.98 (3.48 to 41.20)	<0.001*
Partner's retirement	4.39 (1.57 to 12.32)	0.005*
Partner's medical illness	2.58 (1.17 to 5.69)	0.02*

OR=odds ratio; CI=confidence interval

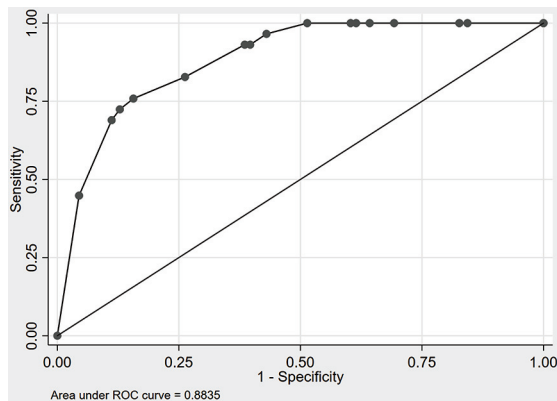* Statistically significant p<0.05, ROC=0.8835 (Figure 2)

Figure 2. Receiver operating characteristic (ROC) curve of multiple logistic regression=0.88 for significant factors (attitude of unnecessary of sex in menopause, partner's retirement and medical illness).

mostly present in Asian countries. This is one of the contextual factors affecting the prevalence of FSD, which is higher among Asian women than European or North American women.

The present study found the lowest FSFI scores in the desire and arousal domains in cases of FSD in postmenopausal women, similar to the national survey results among peri-menopausal of Chinese women[20] and reported from Brazil[21]. A decrease in sex hormone levels such as estrogen and testosterone, which is a result of physiological changes of menopause, is one of the direct causes of low sexual desire and arousal. This is in line with a comparative study that found that the prevalence of sexual dysfunction among women after surgical menopause, which was 65.7%, was more significant than in natural menopause, which was 44.6%, linking it to serum testosterone levels[25]. Moreover, a decline in the function of many organ systems leads to low sexual desire and arousal. For instance, an affected neurological system means decreased sensory perception and central and peripheral nerves. Other examples include attenuated peripheral blood flow in the cardiovascular system,

muscle tension, and joint pain in the musculoskeletal system. On top of the Eastern social belief that sex stops at menopause, psychological factors such as poorer self-image, mood changes, poor sleep hygiene, and a decline in cognitive functions can also lead to low sexual desire and arousal[26,27].

As for the associated factors of FSD among Thai menopausal women, the authors discovered the strongest associated factor is a negative attitude towards sex in menopause or the myth that sex is unnecessary after menopause, which is common in Eastern countries. The previous large-scale survey study in the Pakistani community by Nisar and Ahmed Sohoo[28] established that the severity of menopausal symptoms was related to the quality of life during menopause. Moreover, postmenopausal women were less sexually active, as cultural traditions make women carry the burden of caring for their family members and performing religious activities such as prayers and other rituals. Beyond the attitude toward sexual health among menopausal women, the present study also found that increasing age affects FSD. Table 2 shows that increased age affected the odds ratio of FSD in a dose-response relationship in univariate analysis (OR 1.0, 3.22, and 4.84 relevant with age groups 41 to 50, 51 to 60, and 61 to 70, respectively). Aging is an independent factor of FSD, as reported by a prospective, longitudinal cohort study of midlife women aged 42 to 52 years in the Study of Women's Health Across the Nation[29]. This is supported in a review article by Nazarpour et al and Heidari et al, which explain the decrease in sex hormone levels in reverse relation to age[12,13]. In addition to age, a person's general health also has implications for sexual health. The present findings suggest that exercising more than 150 minutes per week is beneficial against FSD. This is in line as reported by Cornellana et al and supported by Korean national survey by Park et al, which found healthy habits were effective indicators of good sexual health[30,31].

Meanwhile, the underlying medical condition and obesity directly affected sexual health and indirectly lead to deterioration of self-esteem and psychological consequences. This matches the present study findings, which identify underlying medical conditions and obesity as associated factors of FSD among postmenopausal women[32,33]. Maseroli et al suggested that cardio-metabolic diseases, including hypertension and diabetes but not dyslipidemia, affect the deteriorated endothelial functions of peripheral sexual response in women[34]. There was also evidence

of the effects of obesity on FSD, as the prevalence of FSD among severely obese women dramatically decreased from 62 to 19% six months after weight reduction resulting from bariatric surgery[35].

The authors' results show that socio-economic factors also affect FSD, including low educational levels, low income, whether the person is still working after middle age, and high parity. Worldwide survey studies also support these present findings. The level of education and the family income reflect the quality of life. The women with low quality of life have lower sexual attraction, decreasing their sexual activities. Moreover, low quality of life is associated with low self-esteem and overall satisfaction, affecting sexual functions and health[12,30,36,37].

The underlying psychological diseases, such as depression and anxiety, and their pharmacologic treatment are established risk factors of FSD[38], with the psychological aspects relating to well-being in menopausal women. A good relationship with their partner is also a factor in sexual health, as shown in the authors' multiple logistic regression analysis results. Apart from a negative attitude towards sex among menopausal women, the authors confirm that the partner's general health and socio-economic status are significantly associated with FSD. The "couple pause" concept, recently introduced by Jannini and Nappi, suggests that couple-oriented treatments and counseling about menopause and andropause can improve the couples' sexual satisfaction and intimacy[39]. Related to the latest systematic review and meta-analysis by Chew et al confirms the risk of FSD increases three-fold in correlation with male sexual dysfunction, especially erectile dysfunction, and premature ejaculation[40]. FSD is a significant problem among postmenopausal women. The associated factors can vary, covering the physical aspects and the mental and the partner's health and socio-economic status. The most vital element of FSD remains the attitude towards sexuality in menopause.

Limitation

The present study is limited to an urban university hospital-based setting. Therefore, further studies are needed, primarily community-based studies that might reflect differences in environments and participants' characteristics or qualitative research on the reasons behind the attitude toward a sexual relationship in menopause. However, the present study did not cover the association between menopausal symptoms, including VMS, GSM, pelvic organ prolapses, and urinary incontinence, and FSD. It should be helpful to explore how these symptoms might affect sexual function among postmenopausal women in a future study.

Conclusion

FSD is a common issue among Thai post-menopausal women. The significant associated factors include biological factors such as increasing age, obesity, and underlying medical conditions, and socio-economic factors such as lower educational level and working status. In contrast, regular exercise benefit overall sexual health. The couple factors, including the partner's health and working status or retirement, also affect FSD. However, the strongest significant factor associated with FSD is the attitude that sex is unnecessary among menopausal women.

What is already known on this topic?

FSD is common among postmenopausal women. The prevalence of FSD is underreported due to confidentiality perspectives and individual information. The previous evidence showed that changes in physiologic reasons explain the aging process and a decrease in sex hormones and affect female sexual function.

What this study adds?

The most common female sexual function among postmenopausal women is the genito-pelvic pain domain. The most associated factor is the negative attitude toward a sexual relationship in menopause sex after menopause.

Funding disclosure

Conflicts of interest

The authors have no conflict of interest to disclose.

References

1. Edwards WM, Coleman E. Defining sexual health: a descriptive overview. Arch Sex Behav 2004;33:189-95.
2. Clayton AH, Hamilton DV. Female sexual dysfunction. Psychiatr Clin North Am 2010;33:323-38.
3. Masters WH, Johnson VE. The human female: anatomy of sexual response. Minn Med 1960;43:31-6.
4. Basson R. Women's sexual function and dysfunction: current uncertainties, future directions. Int J Impot Res 2008;20:466-78.

5. Salonia A, Giraldi A, Chivers ML, Georgiadis JR, Levin R, Maravilla KR, et al. Physiology of women's sexual function: basic knowledge and new findings. J Sex Med 2010;7:2637-60.

6. American Psychiatric Association. Diagnostic and statistical manual of mental disorders: DSM-5. 5th ed. Washington, DC: American Psychiatric Association Publishing; 2013.

7. Dennerstein L, Dudley EC, Hopper JL, Guthrie JR, Burger HG. A prospective population-based study of menopausal symptoms. Obstet Gynecol 2000;96:351-8.

8. Sherman S, Miller H, Nerurkar L, Schiff I. Research opportunities for reducing the burden of menopause-related symptoms. Am J Med 2005;118 Suppl 12B:166-71.

9. Cohen LS, Soares CN, Vitonis AF, Otto MW, Harlow BL. Risk for new onset of depression during the menopausal transition: the Harvard study of moods and cycles. Arch Gen Psychiatry 2006;63:385-90.

10. McCabe MP, Sharlip ID, Lewis R, Atalla E, Balon R, Fisher AD, et al. Incidence and prevalence of sexual dysfunction in women and men: A consensus statement from the Fourth International Consultation on Sexual Medicine 2015. J Sex Med 2016;13:144-52.

11. Islam RM, Bell RJ, Davis SR. Prevalence of sexual symptoms in relation to menopause in women in Asia: a systematic review. Menopause 2018;25:231-8.

12. Nazarpour S, Simbar M, Tehrani FR. Factors affecting sexual function in menopause: A review article. Taiwan J Obstet Gynecol 2016;55:480-7.

13. Heidari M, Ghodusi M, Rezaei P, Kabirian Abyaneh S, Sureshjani EH, Sheikhi RA. Sexual function and factors affecting menopause: A systematic review. J Menopausal Med 2019;25:15-27.

14. Oranratanaphan S, Taneepanichskul S. A double blind randomized control trial, comparing effect of drospirenone and gestodene to sexual desire and libido. J Med Assoc Thai 2006;89 Suppl 4:S17-22.

15. Rosen R, Brown C, Heiman J, Leiblum S, Meston C, Shabsigh R, et al. The Female Sexual Function Index (FSFI): a multidimensional self-report instrument for the assessment of female sexual function. J Sex Marital Ther 2000;26:191-208.

16. Wiegel M, Meston C, Rosen R. The female sexual function index (FSFI): cross-validation and development of clinical cutoff scores. J Sex Marital Ther 2005;31:1-20.

17. Peeyananjarassri K, Liabsuetrakul T, Soonthornpun K, Choobun T, Manopsilp P. Sexual functioning in postmenopausal women not taking hormone therapy in the Gynecological and Menopause Clinic, Songklanagarind Hospital measured by Female Sexual Function Index questionnaire. J Med Assoc Thai 2008;91:625-32.

18. Masliza W, Daud W, Yazid Bajuri M, Shuhaila A, Hatta S, Rohaizat Hassan M, et al. Sexual dysfunction among postmenopausal women. Clin Ter 2014;165:83-9.

19. Jain N, Mehra R, Goel P, Chavan BS. Sexual health of postmenopausal women in North India. J Midlife Health 2019;10:70-4.

20. Tong J, Zhang C, Zhu L, Zhang L, Jinghe L. Sexual dysfunction in perimenopausal women based on a national epidemiological survey in China. Climacteric 2019;22:190-4.

21. Dombek K, Capistrano EJ, Costa AC, Marinheiro LP. Risk factors associated with sexual dysfunction in Brazilian postmenopausal women. Int J Impot Res 2016;28:62-7.

22. Jonusiene G, Zilaitiene B, Adomaitiene V, Aniuliene R, Bancroft J. Sexual function, mood and menopause symptoms in Lithuanian postmenopausal women. Climacteric 2013;16:185-93.

23. Nappi RE, Nijland EA. Women's perception of sexuality around the menopause: outcomes of a European telephone survey. Eur J Obstet Gynecol Reprod Biol 2008;137:10-6.

24. McCool-Myers M, Theurich M, Zuelke A, Knuettel H, Apfelbacher C. Predictors of female sexual dysfunction: a systematic review and qualitative analysis through gender inequality paradigms. BMC Womens Health 2018;18:108.

25. Alarslan D, Sarandol A, Cengiz C, Develioglu OH. Androgens and sexual dysfunction in naturally and surgically menopausal women. J Obstet Gynaecol Res 2011;37:1027-34.

26. Dennerstein L, Lehert P, Burger H, Dudley E. Factors affecting sexual functioning of women in the mid-life years. Climacteric 1999;2:254-62.

27. Llaneza P, Fernández-Iñarrea JM, Arnott B, García-Portilla MP, Chedraui P, Pérez-López FR. Sexual function assessment in postmenopausal women with the 14-item changes in sexual functioning questionnaire. J Sex Med 2011;8:2144-51.

28. Nisar N, Ahmed Sohoo N. Severity of Menopausal symptoms and the quality of life at different status of Menopause: a community based survey from rural Sindh, Pakistan. Int J Collab Res Intern Med Public Health 2010;2:118-30.

29. Avis NE, Brockwell S, Randolph JF Jr, Shen S, Cain VS, Ory M, et al. Longitudinal changes in sexual functioning as women transition through menopause: results from the Study of Women's Health Across the Nation. Menopause 2009;16:442-52.

30. Cornellana MJ, Harvey X, Carballo A, Khartchenko E, Llaneza P, Palacios S, et al. Sexual health in Spanish postmenopausal women presenting at outpatient clinics. Climacteric 2017;20:164-70.

31. Park YJ, Kim HS, Chang SO, Kang HC, Chun SH. Sexuality and related factors of postmenopausal Korean women. Taehan Kanho Hakhoe Chi 2003;33:457-63.

32. American College of Obstetricians and Gynecologists. Female sexual dysfunction: ACOG practice bulletin summary, NUMBER 213. Obstet Gynecol 2019;134:203-5.

33. Silva G, Lima S, Reis BFD, Macruz CF, Postigo S.

Evaluation of obesity influence in the sexual function of postmenopausal women: A cross-sectional study. Rev Bras Ginecol Obstet 2019;41:660-7.

34. Maseroli E, Scavello I, Vignozzi L. Cardiometabolic risk and female sexuality-Part I. Risk factors and potential pathophysiological underpinnings for female vasculogenic sexual dysfunction syndromes. Sex Med Rev 2018;6:508-24.

35. Oliveira CFA, Dos Santos PO, de Oliveira RA, Leite-Filho H, de Almeida Oliveira AF, Bagano GO, et al. Changes in sexual function and positions in women with severe obesity after bariatric surgery. Sex Med 2019;7:80-5.

36. Verit FF, Verit A, Billurcu N. Low sexual function and its associated risk factors in pre- and postmenopausal women without clinically significant depression. Maturitas 2009;64:38-42.

37. Mernone L, Fiacco S, Ehlert U. Psychobiological factors of sexual functioning in aging women - findings from the women 40+ healthy aging study. Front Psychol 2019;10:546.

38. Laurent SM, Simons AD. Sexual dysfunction in depression and anxiety: conceptualizing sexual dysfunction as part of an internalizing dimension. Clin Psychol Rev 2009;29:573-85.

39. Jannini EA, Nappi RE. Couplepause: A new paradigm in treating sexual dysfunction during menopause and andropause. Sex Med Rev 2018;6:384-95.

40. Chew PY, Choy CL, Sidi HB, Abdullah N, Che Roos NA, Salleh Sahimi HM, et al. The association between female sexual dysfunction and sexual dysfunction in the male partner: A systematic review and meta-analysis. J Sex Med 2021;18:99-112.