# Cross-sectional study of the association between regular sexual activity and sexual function and genitourinary syndrome of menopause–related symptoms

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**Abstract**

**Objectives:** We assessed sexual symptoms and function in perimenopausal and postmenopausal Japanese women and examined the association between sexual regularity and their symptoms.

**Methods:** Sexually active women aged 40-79 (n = 911) were selected from the genitourinary syndrome of menopause (GSM) in Japanese Women study (n = 4,134) and then divided into 2 groups: regular sexual activity group, which comprised women with sexual activity in the past 3 months (n = 716), and lower sexual activity group, which comprised women with sexual activity in the past year but not in the past 3 months (n = 195). We evaluated sexual function and symptoms in the regular sexual activity group using the Female Sexual Function Index and compared GSM-related symptoms between the two groups.

**Results:** Sexual desire, arousal, and lubrication ability declined significantly with age. Sexual pain increases with age. However, orgasm and satisfaction did not decline significantly with age. Regular and lower sexual activity groups did not differ significantly in sexual symptoms; however, vulvar symptoms in daily life were significantly lower in the regular sexual activity group than in the lower activity group. Sexual activity in the past 3 months was associated with lower odds of vulvar pain, dryness, and irritation.

**Conclusions:** This study reveals an association between regular sexual activity and low prevalence of GSM-related symptoms in daily life. The direction of this relationship could not be evaluated in this study and needs to be explored using prospective studies.

**Key Words:** Female sexual dysfunction, Genitourinary syndrome of menopause, Japanese women, Quality of life, Sexual activity, Sexual function.

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The importance of good health care, a healthy life expectancy, and longevity cannot be overemphasized in an aging global population. Deficiencies in sex hormones are a high-profile issue, and particularly, estrogen deficiency during and after menopause may reduce the life expectancy of women[1,2] and impair their quality of life (QOL) through a condition called genitourinary syndrome of menopause (GSM).[1,3] In 2014, GSM was defined as a collection of symptoms and signs associated with decreased estrogen and sex steroid levels. GSM may show genital, sexual, and urinary symptoms.[3] The authors have already published 2 reports on GSM: one on ongoing GSM in Japanese Women (GENJA) study in combination with etiological research[4] and the other on the association between lower urinary tract symptoms, female sexual dysfunction (FSD), and GSM.[5] As a follow-up to the 2 published studies,[4,5] the present study, which is a further study from the GENJA project, seeks to elucidate some arising issues of GSM as they relate to frequency of sexual activity and clarify the symptoms and functions in sexually active Japanese women in their 40s-70s. Therefore, we investigated specific female sexual functions and symptoms in sexually active women in their 40s-70s to reveal the relationship between sexual activity and GSM-related symptoms.

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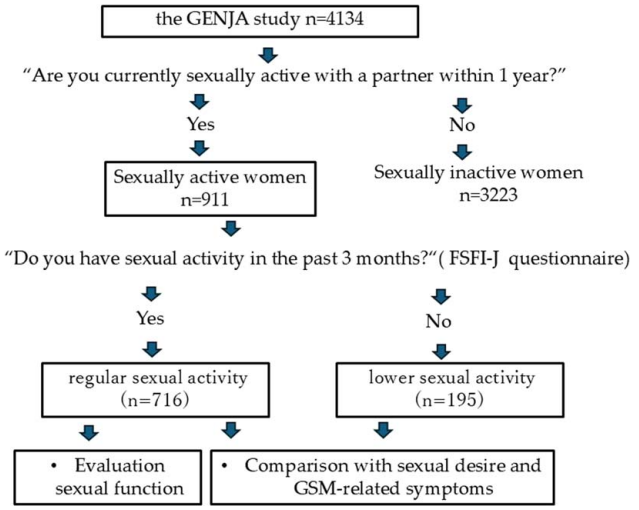


**FIG. 1.** Flowchart of enrolled participants and evaluation items. FSFI, Female Sexual Function Index; GSM, genitourinary syndrome of menopause.

## METHODS

### Study design and participants

- GENJA study: To achieve the aim of the study, we selected sexually active women from those enrolled in the GENJA study. The GENJA study comprised a web-based cross-sectional study conducted in December 2019 to investigate the prevalence and characteristics of GSM in Japan using the online research company Macromill. Participants were recruited from among preregistered women in their 30s, 40s, 50s, 60s, and 70s, with 1,000 respondents in each of these age groups. A total of 4,134 women aged 40-79 years provided informed consent and were enrolled in the GENJA study, which has been described in previous reports.[4,5] The procedures followed were in accordance with the Declaration of Helsinki guidelines. The Ethical Committee of Tokai Central Hospital approved the study (Kakamigahara, Japan; approval 2022091201).
- Questionnaire: All GENJA participants completed the vulvovaginal symptoms questionnaire (VSQ)[6,7] and the questionnaires for calculating Female Sexual Function Index (FSFI) modified for Japanese conditions (FSFI-J) [8,9] and core lower urinary tract symptom score.[10] This study focused on female sexual function and GSM-related symptoms using the FSFI-J and VSQ data. The VSQ is a self-administered 21-item questionnaire and comprises 4 subscales: vulvovaginal symptoms and emotional, lifestyle, and sexual impacts.[6,7] Each question requires a "Yes" or "No" answer. A "Yes" response indicates the presence of vulvovaginal symptoms and emotional, lifestyle, and sexual impacts. The scores are calculated by summing the number of "Yes" responses in each category. Higher scores indicate a greater presence and impact of vulvovaginal symptoms. The FSFI[8] consists of 19 questions on female sexual function under 6 domains. These domains are desire, arousal, lubrication, orgasm, satisfaction, and pain; each domain is scored on a scale of 0 (or1) to 5, with higher scores indicating better sexual function. The individual domain scores and full-scale (overall) scores of the FSFI were derived using a computational formula. For individual domain scores, the scores of the individual domain items were added, and the sum was multiplied by the domain factor. The 6 domain scores were added to obtain the full-scale score. The full-scale score range of FSFI is 2.0-36.0. FSFI covers sexual function for the past 1 month, whereas FSFI-J asks respondents about their sexual activities over the past 3 months, instead of the original 1 month. FSFI-J would provide better information on the sexual activity of Japanese women.
- Classification according to frequency of sexual activity: In the GENJA study, all participants were asked the question "Are you currently sexually active with a partner within 1 year?" Participants who answered "Yes" to the question were considered sexually active (n = 911) and were divided into 2 groups based on intercourse frequency, depending on their answers to the FSFI-J question, "Do you have sexual activity in the past 3 months?" Regular sexual activity group comprised women who had sexual activity in the past 3 months (n = 716), whereas lower sexual activity group consisted of women who had sexual activity in the past year but not in the past 3 months (n = 195; Fig. 1).

**TABLE 1.** Demographic data of the study participants

| | Sexually active women (n = 911) | | | |
|---|---|---|---|---|
| | **Total (n = 911)** | **Regular sexual activity (n = 716)** | **Lower sexual activity (n = 195)** | ***P* (regular vs lower)** |
| Age (y), mean (SD) | 53.7 (10.7) | 52.4 (10.3) | 58.2 (11.0) | < 0.0001 |
| Menstrual status, n (%) | | | | |
| Regular period | 380 (41.7) | 329 (46.0) | 50 (26.2) | < 0.0001 |
| Irregular period | 86 (9.4) | 71 (9.9) | 15 (7.6) | — |
| No periods | 445 (48.8) | 316 (44.1) | 129 (66.2) | — |
| Having sexual partner | 878 (96.4) | 702 (98.6) | 176 (90.2) | 0.008 |
| Hormone therapy, n (%) | 26 (2.9) | 22 (3.1) | 4 (2.2) | 0.343 |

**TABLE 2.** Numbers and proportion of sexual activity in the GENJA study

| Age (n) | 40s | 50s | 60s | 70s | Total | *P* |
|---|---|---|---|---|---|---|
| GENJA studyTotal cases (n = 4,134) | 1,034 | 1,033 | 1,033 | 1,034 | 4,134 | — |
| No sexual activity in the past 1y, n (%) | 639 (61.8) | 796 (77.1) | 870 (84.2) | 918 (88.8) | 3,223 (77.9) | NS |
| Sexually active in the past 1y, n (%) | 395 (38.2) | 237 (22.9) | 163 (15.8) | 116 (11.2) | 911 (22.1) | *P* for trend < 0.001 |
| Regular sexual activity:Sexually active in the past 3 mo, n (%) | 342 (33.1) | 190 (18.4) | 114 (11.0) | 70 (6.8) | 716 (17.3) | *P* for trend < 0.001 |
| Lower sexual activity:Sexually inactive in the past 3 mo, n (%) | 53 (5.1) | 47 (4.5) | 49 (4.8) | 46 (4.4) | 195 (4.8) | NS |

NS, not significant.

## Evaluation items

- Proportion and number of sexual activity in the GENJA study: The proportion and number of participants in the GENJA study with no sexual activity and those with regular and lower sexual activity were calculated for each age decade.
- Sexual function and symptoms: The cumulative score obtained for each of the 6 FSFI-J domains and the rate of answers for each question of FSFI-J were evaluated for only the regular sexual activity group because participants who did not have sexual activity in the last 3 months were unable to answer specific questions about sexual function (except sexual desire). We compared scores of the sexual desire domain between both groups because women with lower sexual activity were able to answer questions related to sexual desire (Fig. 1). The questions covered the following topics across the 6 domains:

Desire—frequency and degree.
Arousal—frequency, level, associated confidence, and satisfaction.
Lubrication—frequency of being lubricated, difficulty of being lubricated, frequency of maintaining lubrication, and difficulty in maintaining lubrication.
Orgasm—frequency, difficulty, and satisfaction.
Satisfaction—emotional intimacy, relationship with partner, and overall satisfaction (women with partners were able to answer all questions; n = 702).
Pain: frequency during vaginal penetration, frequency following vaginal penetration, and pain level (participants actively engaged in penetrative sexual activity were able to answer all questions about pain; n = 664).

- Relationship between GSM-related symptoms and sexual frequency: Positive rates of sexual and vulvar GSM-related symptoms were compared between women with regular and lower sexual activities using VSQ.[6,7] Furthermore, we assessed the relationship between each GSM-related symptom—sexual (dyspareunia and lubrication problems) and vulvar (pain, dryness, irritation, and burning sensation in daily life)—and independent clinical variables (age in decades, menstrual status, hormone therapy, and the presence or absence of sexual activity in the past 3 mo).

## Statistical analysis

Descriptive data are expressed as means and SDs or percentages. The Cochran-Armitage test was applied to detect trends in the rate of sexual activity over time (per decade). Differences in mean values of FSFI domain scores with age were analyzed using analysis of variance. The positive rate of GSM-related symptoms among regular and lower sexual activity groups was compared using the $\chi^2$ test. The sample size was determined based on a power analysis conducted before the study. We aimed to achieve a statistical power of 80% ($\beta = 0.20$) to detect a clinically significant difference of 0.1 between the groups, with a significance level ($\alpha$) set at 0.05. The estimated sample size required was 44 participants per group. This

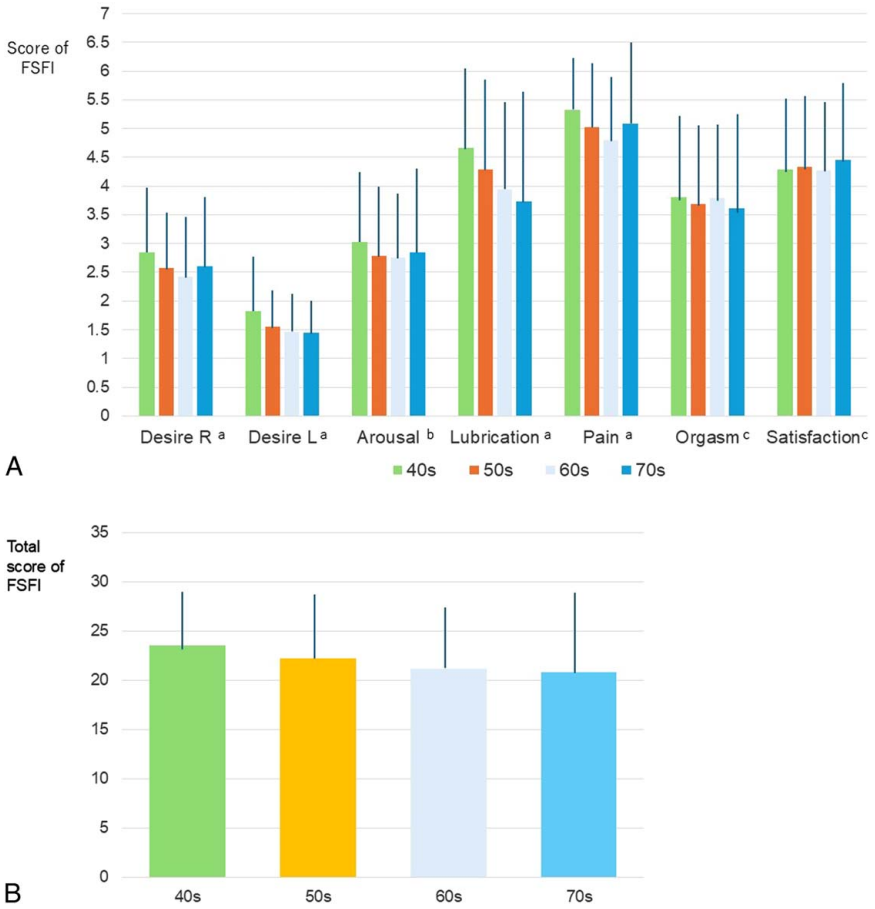


**FIG. 2.** (**A**) Age distribution of FSFI score in each domain. Column and bar indicate mean ± SD. Desire R: Sexual desire score in the regular sexual activity. Desire L: Sexual desire score in the lower sexual activity. [a]FSFI score decreased significantly with age $P < 0.01$. [b]FSFI score decreased significantly with age $P < 0.05$. [c]FSFI score did not change significantly with age. **(B)** Age distribution of total FSFI score. [a]FSFI score decreased significantly with age $P < 0.01$. FSFI, Female Sexual Function Index.

calculation was based on previous studies and the expected variability in the data.

Multiple logistic regression was performed to determine the relationship between each GSM-related symptom and independent clinical variables: age in decades, menstrual status, hormone therapy, and the presence or absence of sexual activity in the past 3 months. All statistical analyses were performed using EZR version 1.61 (Saitama Medical Center, Jichi Medical University, Saitama, Japan) and a graphical user interface for R version 4.2.2 (The R Foundation for Statistical Computing).[11] All $P$ values were 2-sided, with $P < 0.05$ being considered statistically significant.

## RESULTS

### Demographic data

The demographic data of the participants are presented in Table 1. All participants were women who had been sexually active within the past year (n = 911). The mean age was 53.7 ± 10.7: 96.4% had a sexual partner, 41.7% were premenopausal, and 2.9% received hormone therapy. Participants in the regular sexual activity group were significantly younger than those in the lower sexual activity group. The rate of having a sexual partner and premenopausal status was significantly higher in the regular sexual activity group.

### Proportion of sexually active women in the GENJA study

Of the 4,134 women enrolled in the GENJA study, 911 (22.0%) had sexual activity in the past year, among which 716 (17.3%) had engaged in sexual activity in the past 3 months, defined as regular sexual activity, whereas 195 (4.7%) had engaged in sexual activity in the past year but not in the past 3 month, defined as lower sexual activity (Fig. 1 and Table 2). The age distribution of sexual activity in the GENJA study is described in Table 2. The proportion of women with regular sexual activity decreased significantly with age ($P$ for trend $< 0.001$, Table 2).

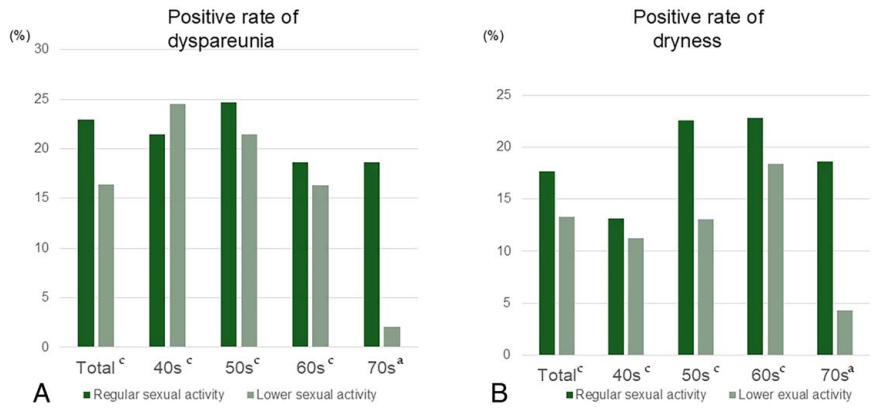


**FIG. 3.** Comparisons of rate of GSM-related symptoms. **(A)** Positive rate of dyspareunia $^{a}P < 0.01$; $^{c}$not significant. **(B)** Positive rate of dryness at sexual activity $^{a}P < 0.01$; $^{c}$not significant. GSM, genitourinary syndrome of menopause.

### Change in female sexual function index scores according to age in decades (Fig. 2A, B)

The scores for sexual desire, arousal, lubrication, and pain among participants significantly decreased with age (Fig. 2A). The lower sexual activity group exhibited significantly lower scores for sexual desire than the regular sexual activity group across all corresponding ages in decades (Fig. 2A). The scores for orgasm and satisfaction did not change with age. Overall, the total FSFI score significantly decreased with age (Fig. 2B).

### Sexual symptoms and function ratings for each topic of female sexual function index domains (Table 3)

The majority of participants (~90%) reported none to moderate levels of sexual desire and arousal, which was experienced sparingly or less frequently; however, women with frequent and high levels of sexual desire and arousal accounted for only a small proportion of the participants. In terms of lubrication, ~30% of all the participants experienced less frequent (almost never/never or a few times) lubrication and its maintenance. In addition, 20%-30% of the women had difficulty (ranked as extremely difficult or impossible, very difficult, or difficult) in producing and maintaining lubrication. Conversely, over 50% of the women experienced lubrication more than half the time. Approximately 60% of the participants experienced orgasm less than half the time, and ~35% of them had difficult to extreme difficulty in reaching orgasm. However, half of the participants experienced satisfaction with an orgasm. Concerning pain, 12.7% and 6.3% of the participants experienced pain during and after vaginal penetration more than half the time, respectively. Approximately 18% of participants reported very high to moderate levels of pain. Conversely, 63% of the participants reported very low levels or no pain. Regarding satisfaction, more than half of the participants were satisfied with emotional intimacy during sexual activity, with their sexual partners, and overall sex life.

### Relationship between sexual frequency (regularity) and genitourinary syndrome of menopause–related symptoms

In terms of sexual symptoms, the positive rate of dyspareunia and lack of lubrication during sexual activity were higher in the regular sexual activity group than in the lower sexual activity group, but they were not significant (Fig. 3A, B). As for vulvar symptoms in daily life, the positive rates of pain, irritation, and dryness were significantly lower in the regular sexual activity group than in the lower sexual activity group in all cases (Fig. 4A-C). Multiple logistic regressions, after adjusting for the covariates, revealed that, among all the model covariables (age in decades, menstrual status, hormone therapy, and the presence or absence of sexual activity in the past 3 months), sexual activity in the past 3 months was associated with lower odds of vulvar pain, dryness, and irritation (Table 4.).

## DISCUSSION

Following 2 reports on the GENJA study,[4,5] the authors focused on sexual symptoms, function, and the relationship between sexual activity and GSM-related symptoms in sexually active Japanese women in this study. It has been reported that Japanese women have low levels of sexual activity, function, and satisfaction,[12-14] and our results followed this trend and showed that, of the 4,134 GENJA participants, only 21% and 17% had sexual activity in the past year and past 3 months, respectively. The proportion of Japanese women with "no sexual activity" increased by 10% from 2012 to 2019.[15] Japanese men have been reported to display similar low sexual frequency and function, with only 29.6% engaging in sexual activity more than once a month.[16] Thus, cumulative evidence points to a low and declining sexual frequency in Japan, which could pose social and clinical repercussions, for instance, general well-being and QOL in an aging society.[1] GSM is strongly associated with QOL and general health.[1,3,17] Thus, an analysis of GSM-specific symptoms in premenopausal, perimenopausal, and postmenopausal wom-

**TABLE 3.** Sexual symptoms and function for each topic of FSFI domains

| | | | | | |
|---|---|---|---|---|---|
| Sexual desire | | | | | |
| Frequency (%) | Almost never or never | A few times | Sometimes | Most times | Almost always or always |
| | 31.7 | 31.0 | 33.8 | 2.3 | 1.2 |
| Level (%) | Very low or none | Low | Moderate | High | Very high |
| | 39.3 | 34.2 | 20.7 | 3.1 | 2.7 |
| Arousal | | | | | |
| Frequency (%) | Almost never or never | A few times | Sometimes | Most times | Almost always or always |
| | 30.7 | 40.2 | 13.3 | 8.9 | 6.8 |
| Level (%) | Very low or none | Low | Moderate | High | Very high |
| | 15.2 | 25.7 | 48.6 | 7.8 | 2.7 |
| Confidence (%) | Very low or none | Low | Moderate | High | Very high |
| | 25.3 | 31.3 | 34.6 | 6.7 | 2.1 |
| Frequency of Satisfaction (%) | Almost never or never | A few times | Sometimes | Most times | Almost always or always |
| | 22.1 | 30.6 | 19.3 | 21.4 | 6.7 |
| Lubrication | | | | | |
| Frequency of becoming lubricated (%) | Almost never or never | A few times | Sometimes | Most times | Almost always or always |
| | 14.2 | 28.6 | 10.8 | 28.1 | 18.3 |
| Difficulty of becoming lubricated (%) | Extremely difficult or impossible | Very difficult | Difficult | Slightly difficult | Not difficult |
| | 9.9 | 9.8 | 11.0 | 23.0 | 46.4 |
| Frequency of maintain lubrication (%) | Almost never or never | A few times | Sometimes | Most times | Almost always or always |
| | 11.5 | 18.9 | 12.3 | 30.4 | 27.0 |
| Difficulty of maintain lubrication (%) | Extremely difficult or impossible | Very difficult | Difficult | Slightly difficult | Not difficult |
| | 9.1 | 6.3 | 6.3 | 20.8 | 58.5 |
| Orgasm | | | | | |
| Frequency (%) | Almost never or never | A few times | Sometimes | Most times | Almost always or always |
| | 29.2 | 33.0 | 11.8 | 14.1 | 11.8 |
| Difficulty of achieving orgasm (%) | Extremely difficult or impossible | Very difficult | Difficult | Slightly difficult | Not difficult |
| | 14.2 | 9.9 | 11.5 | 28.1 | 37.3 |
| Satisfaction (%) | Very dissatisfied | Moderately dissatisfied | Equally satisfied and dissatisfied | Moderately satisfied | Very satisfied |
| | 12.5 | 12.5 | 22.9 | 33.8 | 18.3 |
| Satisfaction | | | | | |
| Emotional closeness with partner (%) | Very dissatisfied | Moderately dissatisfied | Equally satisfied and dissatisfied | Moderately satisfied | Very satisfied |
| | 6.4 | 11.0 | 25.5 | 33.8 | 23.4 |
| Relationship with partner (%) | Very dissatisfied | Moderately dissatisfied | Equally satisfied and dissatisfied | Moderately satisfied | Very satisfied |
| | 4.7 | 9.9 | 27.1 | 35.3 | 23.4 |
| Overall sex life (%) | Very dissatisfied | Moderately dissatisfied | Equally satisfied and dissatisfied | Moderately satisfied | Very satisfied |
| | 5.0 | 10.5 | 26.2 | 33.9 | 24.4 |
| Pain | | | | | |
| Frequency of pain during penetration (%) | Almost always or always | Most times | Sometimes | A few times | Almost never or never |
| | 6.7 | 6.0 | 15.6 | 14.0 | 57.6 |
| Frequency of pain following penetration (%) | Almost always or always | Most times | Sometimes | A few times | Almost never or never |
| | 3.1 | 3.2 | 10.8 | 15.3 | 67.6 |
| Level (%) | Very high | High | Moderate | Low | Very low or none at all |
| | 1.4 | 3.2 | 13.2 | 19.2 | 62.9 |

FSFI, Female Sexual Function Index.

Participant and number of participants that responded to each set of questions: (1) Sexual desire: All sexually active women (regular and lower sexual activities) who were able to answer the question on sexual desire (n = 911). (2) Arousal: Women with regular sexual activitywho answered (n = 716). (3) Lubrication: Women with regular sexual activity who answered (n = 716). (4) Orgasm: Women with regular sexual activity who answered (n = 716). (5). Satisfaction: Women with partners who were able to answer all questions (n = 702). (6) Pain: Women actively engaged in penetrative sexual activity who were able to answer all questions about pain (n = 664).

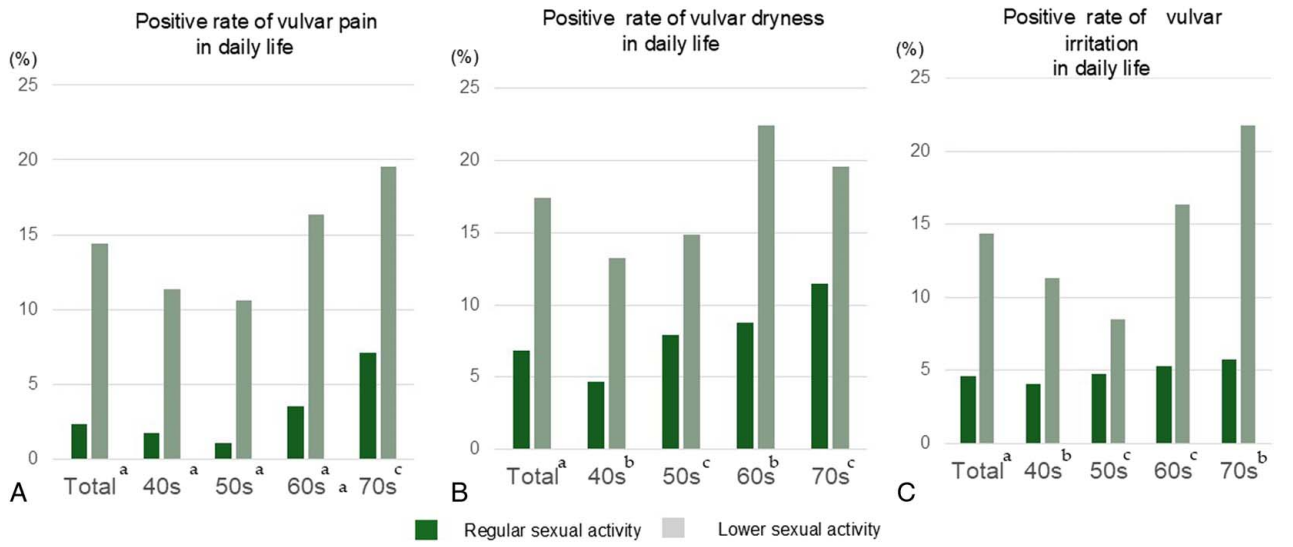


**FIG. 4.** Comparisons of rate of GSM-related symptoms. **(A)** Positive rate of vulvar pain in daily life $^{a}P < 0.01$; $^{c}$not significant. **(B)** Positive rate of vulvar dryness in daily life $^{a}P < 0.01$; $^{b}P < 0.05$; $^{c}$not significant. **(C)** Positive rate of vulvar irritation in daily life $^{a}P < 0.01$; $^{b}P < 0.05$; $^{c}$not significant. GSM, genitourinary syndrome of menopause.

en is essential for ameliorating impaired QOL. Although both FSD[18,19] and GSM[20] were investigated in Japan, accurate reports on GSM-related symptoms (particularly sexual symptoms) are still lacking. The FSFI is a standard questionnaire used to analyze female sexual function/dysfunction, and it is capable of providing a sexual function score and cutoff value for FSD.[8,9,21] However, the details of specific sexual functions and symptoms have not been well-evaluated to suit the original purpose of FSFI.[8,22] Furthermore, a high percentage of participants without sexual activity may result in a low overall FSFI score.[22] In this study, we attempted to use the FSFI system to evaluate and report specific sexual functions and symptoms and actual rates of sexual activity. To avoid data skew, women with no sexual activity in the past 3 months were excluded from the analysis, with the exception of sexual desire questions. Our FSFI scores suggest that sexual desire, arousal, and lubrication ability declined significantly with age, whereas sexual pain generally increased (excluding women in their 70s). These findings are consistent with the fact that FSD and GSM are conditions that progressively worsen with age.[1,3,23] However, there was no significant decline in FSFI scores with age in terms of orgasm capacity and satisfaction in participants with regular sexual activity. Although most of the participants reported low levels of sexual desire and arousal (Table 3), women who engaged in regular sexual activity maintained their orgasms and overall satisfaction status to some extent, corroborating the results of previous reports that state that not all sexual functions necessarily decline linearly with age.[1,24] Genital pain and dryness are recognized symptoms linked to physiological changes influenced by menopausal status and age; however, orgasm and satisfaction are associated with factors such as relationship quality and frequency of sexual intercourse.[1,24-26] Furthermore, most middle-aged Japanese women do not have high expectations of their own sexual life and pleasure.[27] These factors may also contribute to the maintenance of satisfaction despite the decline in sexual function. Our findings suggest a positive association between regular sexual activity and the maintenance of sexual function, but the causal factors remain unknown. Our results also suggest the proportion of women who may need medical treatment for their sexual symptoms. Regarding the relationship between regular sexual activity and sexual and vulvar GSM-related symptoms, we observed that participants with regular sexual activity tended to report an increased rate of pain and dryness compared with those participants with low sexual activity; however, no significant differences were observed in sexual symptoms between these two groups. One possible explanation is that higher sexual activity may result in a higher chance of experiencing sexually related symptoms. Women with regular sexual activity showed significantly fewer vulvar symptoms than those with lower sexual activity, and this

**TABLE 4.** Relationship between GSM-related symptoms and sexual activity in the past 3 months as an independent clinical variable

| | Sexual activity in the past 3 mo | |
|---|---|---|
| **Outcome** | **aOR (95% CI)** | ***P*** |
| Dyspareunia | 1.46 (0.95-2.24) | 0.082 |
| Dryness in sexual activity | 1.54 (0.97-2.47) | 0.069 |
| Vulvar pain in daily life | 0.18 (0.10-0.35) | <0.001 |
| Dryness in daily life | 0.40 (0.25-0.66) | <0.001 |
| Irritation in daily life | 0.34 (0.19-0.58) | <0.001 |

aOR, adjusted odds ratio; GSM, genitourinary syndrome of menopause.
Model covariables: age in decades, menstrual status, hormone therapy, and the presence or absence of sexual activity in the past 3 months.

may be attributable to several reasons. First, women with good vulvar health or fewer vulvar symptoms are more likely to engage in regular sexual activity. Second, women who engage in regular sexual activity may have greater awareness of maintaining healthy vulvar conditions, and thus show greater care for vulvar health and experience less vulvar symptoms. Third, the physical, emotional, and mental effects of regular sexual activity may positively impact vulvar symptoms.[1,24] Our study has some limitations. First, the regularity of sexual activity was not confirmed accurately in this study. We assume that sexual activity is somewhat regular, given that it occurred within the past 3 months. "Regular sexual activity" and "low sexual activity" groups were defined by relative comparison of the 2 groups. From a global standard perspective, sexual activity in the past 3 months may be lower or considered irregular. The definition of the 2 groups was based on the current situation of sexual activity in Japan. Second, women with regular sexual activity showed a low prevalence of vulvar symptoms in their daily lives. This study is cross-sectional in design. A prospective study is required to clarify the direction of the association between sexual activity and GSM-related symptoms. Third, 41.7% of the participants were premenopausal women, but we aimed to evaluate sexual function and symptoms in sexually active women aged 40-79. Thus, the high proportion of premenopausal women did not interfere with our objectives. Fourth, an internet survey may introduce selection bias: participants were self-selected rather than randomly sampled. Therefore, participants may only represent women who are more health-conscious, more familiar with the Internet or have ample free time to complete questionnaires. Nevertheless, we accepted some selection bias giving the possible benefits of the survey benefits. Despite these limitations, our study was able to explore the details of sexual function and symptoms in sexually active Japanese women aged 40-79. These findings showed the actual state of sexual problems that may need attention and treatment in Japan. Furthermore, there was a positive relationship between regularity (frequency) of sexual activity and GSM-related symptoms. These findings suggest that clinical strategies for FSD and GSM may be used to identify a potential risk group that needs specialized treatment for FSD and GSM.[28,29]

## CONCLUSION

Our study suggests that some sexual functions and symptoms change with age but may be maintained in women who engage in more regular sexual activity. This study also revealed that women with regular sexual activity showed a low prevalence of GSM-related symptoms. Prospective studies are required to determine if regular sexual activity may exert positive effects on sexual and vulvar symptoms.

## ACKNOWLEDGMENTS

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