ORIGINAL

Prevalence of genitourinary syndrome of menopause in Japanese women based on symptoms and vulval findings

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Abstract : Background : Genitourinary Syndrome of Menopause (GSM) is a chronic condition in postmenopausal women characterized by vulvovaginal and urinary symptoms due to estrogen deficiency. Purpose : We aimed to investigate the prevalence of GSM in Japanese women based on symptoms and vulvar findings. Methods : We enrolled 71 women aged 50–75 years who visited the gynecology outpatient clinics of Tokushima University Hospital and Tsurugi Municipal Handa Hospital in 2023. GSM symptoms were assessed using the Vulvovaginal Symptoms Questionnaire and Core Lower Urinary Tract Symptom Score. Gynecologists evaluated the vulvar findings and measured vaginal pH. GSM was diagnosed when symptoms and objective findings were present. Results : Among the 62 postmenopausal women, 17 met the symptom and objective criteria for GSM. The prevalence was 35%, 36.4%, and 10% among those in their 50s, 60s, and 70s, respectively. GSM prevalence was significantly higher in postmenopausal women than in premenopausal women and in sexually active women than in inactive women. Conclusion : Among postmenopausal Japanese women, GSM prevalence was lower than that reported internationally ; however, it was higher in sexually active women and increased with time since menopause. Early diagnosis and management are essential to preserve the quality of life of women. J. Med. Invest. 73 : 229-233, February, 2026

Keywords **:** *Genitourinary Syndrome of Menopause (GSM), Vulvovaginal symptoms, Vaginal pH, Japanese women, Menopause*

INTRODUCTION

The decline in estrogen and other sex hormones associated with menopause leads to various symptoms and disorders in women, including changes in the genitourinary tract. These hormonal changes result in morphological alterations, including atrophy, discomfort, and functional impairments. Historically, terms such as "vulvovaginal atrophy" and "atrophic vaginitis" have been used ; however, these focus solely on genital symptoms and do not include lower urinary tract symptoms. To address this and adopt more inclusive and widely accepted terminology, the term Genitourinary Syndrome of Menopause (GSM) was introduced and approved in 2014 (1).

GSM is a collective term for morphological changes in the genitourinary tract caused by decreased sex hormone secretion due to menopause, along with associated discomfort and functional disorders (2, 3). The clinical findings include vaginal dryness, urethral meatus rounding, labia majora laxity, and elevated vaginal pH (2). The three main symptom categories are as follows :

1. Urinary symptoms such as incontinence and frequency
2. Vulvar symptoms such as dryness and discomfort
3. Sexual symptoms such as coital pain

The treatment options include vulvar moisturizers, estrogen therapy, dehydroepiandrosterone (DHEA) preparations, selective estrogen receptor modulators, and laser therapy (2-4). GSM is a chronic, progressive condition that worsens over time (3). Spontaneous resolution is unlikely, and improvement is expected only through appropriate treatment (3). Therefore, accurate evaluation and diagnosis of GSM are essential.

GSM affects approximately half of the postmenopausal women. International surveys have reported GSM prevalence rates of 50–70% among postmenopausal women (5-7). Despite its clinical significance, no standardized diagnostic criteria have been established (1, 8). Therefore, it is important to investigate GSM prevalence, particularly focusing on its characteristic symptoms and vulvar findings. Hence, we aimed to investigate the prevalence of GSM in Japanese women based on symptoms and vulvar findings.

PATIENTS AND METHODS

Participants

In this study, we included 71 women aged 50–75 years who visited gynecology outpatient clinics at Tokushima University Hospital and Tsurugi Municipal Handa Hospital in 2023. Participants were recruited during routine consultations for benign gynecologic conditions (e.g., pelvic organ prolapse, ovarian tumors, or uterine fibroids). The study protocol was explained to the attending gynecologists, and written informed consent was obtained from all participants prior to their participation.

Inclusion criteria were :

1. Women aged 50–70 years
2. Willingness to provide informed consent for interviews regarding vulvar, urinary, and sexual symptoms and to undergo a physical examination

Exclusion criteria included :

1. Use of hormone therapy, including hormone replacement

Received for publication November 20, 2025 ; accepted January 28, 2026.

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therapy, within the past year
2. Bilateral oophorectomy prior to menopause
3. History of vaginal or pelvic organ prolapse surgery

This study was conducted in accordance with the Declaration of Helsinki and approved by the ethics committee of Tokushima university hospital (approval number : 4374-2).

Questionnaire assessment

At enrollment, participants completed two validated questionnaires to assess subjective GSM symptoms :

- The Vulvovaginal Symptoms Questionnaire (VSQ) for vulvovaginal and sexual symptoms
- The Core Lower urinary tract symptom score (CLSS) for urinary symptoms

The VSQ is a validated tool for evaluating GSM-related symptoms, including vulvar dryness, burning, itching, irritation, coital pain, and postcoital bleeding (9). The CLSS assesses daytime and nighttime urinary frequency, incontinence, residual urine sensation, and pain in the lower abdomen or urethra. CLSS responses were scored from 0 (none) to 3 (severe), with a score of ≥1 considered symptom-positive for GSM diagnosis.

Objective Findings

Gynecologists performed pelvic examinations using the same standardized checklist to evaluate the following seven findings. No formal pre-study training or calibration was performed beyond the use of the standardized checklist.

- Clitoral tenderness and phimosis
- Urethral meatus clarity and rounding.
- Presence of urethral caruncles
- Vaginal rugae reduction or loss
- Redness and dryness of the vaginal vestibules
- Labia minora shortening or atrophy
- labia majora tenderness or atrophy

Vaginal pH was measured using a pH test paper applied to the vaginal wall and compared using a color chart. Normal vaginal pH is approximately 3–4. During menopause, estrogen deficiency leads to a decrease in lactobacilli and a shift toward alkalinity (10).

Diagnostic Criteria for GSM

GSM was diagnosed based on the following criteria :

1. Presence of at least one of the vulvovaginal findings during pelvic examination, and vaginal pH was ≥5.
2. Presence of specific questions on the CLSS (Q1, Q2, Q4, Q5, Q8, Q9, and Q10) and VSQ (Q2–5 and Q18–21). GSM symptoms were defined as having at least one positive item on the VSQ and at least one positive item on the CLSS, according to this threshold.

Participants who met both criteria were diagnosed with GSM.

Stratification Variables

In addition to age-based categories (50s, 60s, 70s), postmenopausal women were stratified by years since menopause into three groups : within 10 years, 10–20 years, and ≥20 years. This stratification was performed to examine the association between GSM prevalence and duration of menopause.

Statistical Analysis

Data from 62 postmenopausal women were analyzed to identify characteristic symptoms and findings associated with GSM. Participants were grouped according to age (50s, 60s, and 70s), menopausal status (premenopausal/postmenopausal in their 50s), sexual activity (active/inactive), and years since menopause (<5 years, 5–<10 years, ≥10 years). GSM prevalence was compared across these groups.

Statistical analyses were performed using the Mann–Whitney U test and chi-square test in Microsoft Excel (version 16.102.2, Microsoft 365). A p-value of <0.05 was considered statistically significant.

RESULTS

Study Population

A total of 71 women aged 50–75 years were included in this study : 29 in their 50s, 22 in their 60s, and 20 in their 70s. Nine women (all in their 50s) were premenopausal, and 62 were postmenopausal.

Symptoms and findings in postmenopausal women

Among the 62 postmenopausal women, subjective symptoms such as urinary complaints, vulvar dryness or pain, and coital pain or post-coital bleeding were compared between those with GSM-related findings (n = 52) and those without (n = 10). No specific symptoms were significantly associated with GSM-related findings (Table 1).

Vulvar findings — including clitoral tenderness, clarity and

Table 1. Relationship between subjective symptoms and objective findings of GSM in postmenopausal women

Subjective symptoms	**Patients with GSM findings (n = 52)**	**Patients without GSM findings (n = 10)**	**Total (n = 62)**
Urinary symptoms	51 (96.6%)	10 (100%)	61 (98.4%)
Vulvovaginal dryness/pain	15 (28.8%)	3 (30.0%)	18 (29.0%)
Coital pain/bleeding	6 /11 (54.4%)	1 /1 (100%)	7 /12 (58.3%)
Objective findings	**Patients with GSM symptoms (n = 21)**	**Patients without GSM symptoms (n = 41)**	**Total (n = 62)**
Clitoris pressure pain/phimosis	0 (0%)	1 (2.4%)	1 (1.6%)
Urethral opening clear/circle	10 (47.6%)	25 (61.0%)	35 (56.5%)
Urethral caruncle	1 (4.8%)	5 (12.2%)	6 (9.7%)
Vaginal vestibule/redness	12 (57.1%)	20 (48.8%)	32 (51.6%)
Decrease or disappear of vaginal folds	10 (47.6%)	25 (61.0%)	35 (56.5%)
Labia minora reduction or atrophy	11 (52.4%)	19 (46.3%)	30 (48.4%)
Labia majora pressure pain or atrophy	8 (38.1%)	9 (22.0%)	17 (22.6%)
Vaginal pH ≧ 5.0	19 (90.5%)	40 (97.6%)	59 (95.2%)

rounding of the urethral meatus and urethral caruncle, vestibular dryness and redness, vaginal rugae reduction or loss, labia minora shortening or atrophy, and tenderness or atrophy of the labia majora — were compared between women with (n = 21) and those without (n = 41) GSM symptoms. No significant differences were observed in any of these parameters (Table 1).

Age-group descriptive data

Urinary symptoms were highly prevalent across all age groups : 95% in women in their 50s, and 100% in those in their 60s and 70s. Vestibular dryness was reported by 35% of the women in their 50s, 41% in their 60s, and 10% in their 70s. Coital pain or post-coital bleeding was observed in 67% and 60% of women in their 50s and 60s, respectively (Figure 1A).

Among the vulvar findings, clarity of the urethral meatus was the most common, observed in 50%, 46%, and 75% of women in their 50s, 60s, and 70s, respectively. The urethral caruncle was not observed in the 50s group ; however, it was present in 9% and 20% of the 60s and 70s groups, respectively. Other findings, including vestibular dryness/redness, reduction or loss of vaginal rugae, shortening or atrophy of the labia minora, and tenderness or atrophy of the labia majora, were observed in 25–60% of the participants, with a tendency to increase with age. Clitoral tenderness was observed in 5% of women in their 70s but not in other age groups. Vaginal pH ≥ 5 was found in over 90% of women across all age groups (Figure 1B).

GSM prevalence

Seventeen (27.4%) of the 62 postmenopausal women met both criteria for GSM. GSM prevalence was 35% (7/20), 36.4% (8/20), and 10% (2/20) in those in their 50s, 60s, and 70s, respectively (Table 2). The prevalence was significantly higher in the 50s and 60s age groups than in the 70s age group ($p < 0.05$), whereas no significant difference was found between the 50s and 60s age groups ($p = 0.927$) (Table 2).

Among 29 women in their 50s, GSM prevalence was significantly higher in postmenopausal women (7/20) than in premenopausal women (0/9) ($p = 0.035$).

Of the 62 postmenopausal women, 12 reported sexual activity. GSM prevalence was significantly higher in the sexually active group (n = 12) than in the sexually inactive group (n = 50) ($p = 0.00069$).

When stratified by years since menopause, 25% (3/12) were within 5 years, 41.6% (5/12) were between 5 and <10 years, and 23.6% (9/38) were ≥10 years. No significant differences were observed among these groups.

DISCUSSION

In this study, no specific vulvar findings or symptoms were significantly associated with GSM. Previous international studies have consistently identified vaginal dryness as the most common symptom of GSM, with prevalence rates of 57% among postmenopausal women and nearly 100% among those clinically diagnosed with GSM (5, 6). In contrast, this study revealed slightly lower rates—51.6% among postmenopausal women and 57.1% among those diagnosed with GSM.

This discrepancy may be partly explained by differences in the study populations, diagnostic criteria, and subjective nature of symptom assessment (8). Our diagnostic criteria required both subjective symptoms and objective findings, including a vaginal pH ≥5, which is not internationally standardized. This approach was adopted to enhance specificity and avoid overdiagnosis in a clinical setting, although it may have contributed to the lower prevalence observed than that in international reports. In addition, examinations were performed by multiple clinicians across two institutions ; inter-rater variability cannot be excluded, and no formal reliability assessment was conducted. This should be considered a limitation of the study. Additionally, the relatively small sample size and inclusion of women in the menopausal transition may have limited statistical power and generalizability. Larger, population-based studies are needed to confirm and extend these findings.

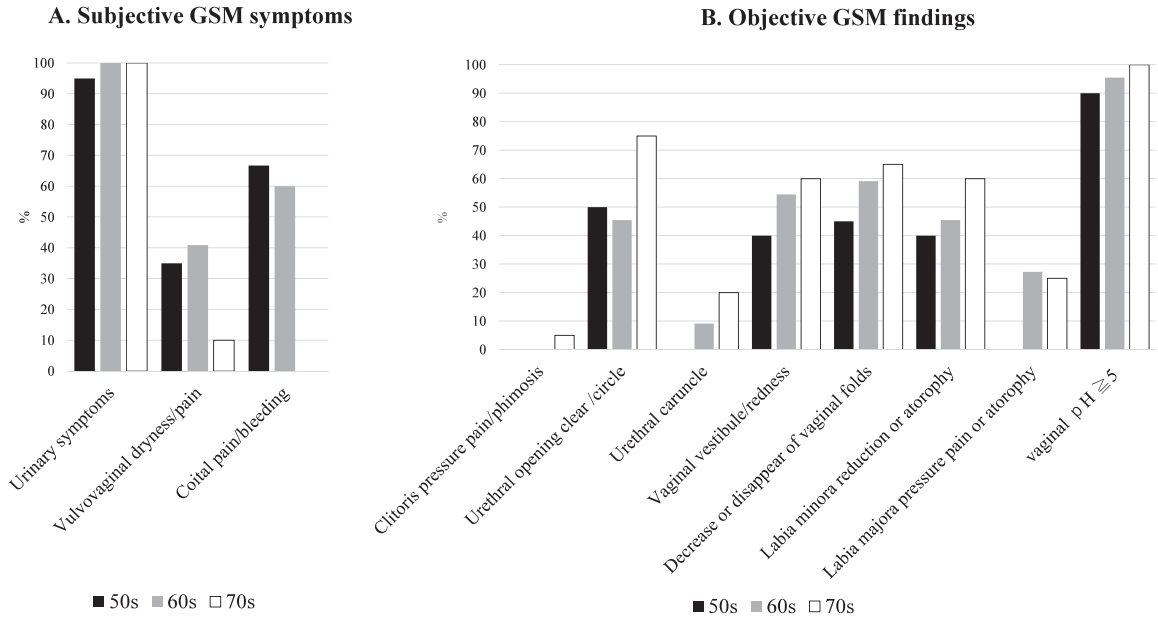

Fig 1. Prevalence rate of subjective symptoms and objective findings of Genitourinary Syndrome of Menopause (GSM) in postmenopausal women in each age group. A : Subjective GSM symptoms, B : Objective GSM findings.

Table 2. Relationship between subjective symptoms and objective findings of GSM in pre- and postmenopausal women

Post menopausal women		GSM symptom (+)	GSM symptom (−)
<5 years postmenopause	GSM findings (+)	3	5
	GSM findings (−)	3	1
5−<10 years postmenopause	GSM findings (+)	5	7
	GSM findings (−)	0	0
≥10 years postmenopause	GSM findings (+)	9	23
	GSM findings (−)	1	5
50s	GSM findings (+)	7[a] *	9
	GSM findings (−)	3	1
60s	GSM findings (+)	8[a]	10
	GSM findings (−)	1	3
70s	GSM findings (+)	2[b]	16
	GSM findings (−)	0	2
All ages	GSM findings (+)	17	35
	GSM findings (−)	4	6
With sexual activity	GSM findings (+)	8[a]	3
	GSM findings (−)	1	0
Without sexual activity	GSM findings (+)	9[b]	32
	GSM findings (−)	3	6
Premenopausal women	GSM findings (+)	0	5
50s	GSM findings (−)	2	2

a, b : different letters indicate significant differences ($P < 0.05$) among the same categories of age and sexual activity.
* $P < 0.05$ vs Premenopausal women with both GSM symptoms and findings.

Future research should aim to standardize assessment methods, specify anatomical sites, and quantify symptom severity to establish more objective correlations between physical findings and clinical symptoms.

The prevalence of GSM among postmenopausal women aged 50–75 years in our cohort was 27.4%, lower than the 62–84% reported in international studies (3, 5-7). A recent large-scale Japanese study reported the prevalence of GSM-related vulvovaginal symptoms as 11.6% among women aged ≥40 years and 31.7% among sexually active women (11). Several factors may account for this discrepancy. Our study population comprised women attending gynecological clinics for general checkups, rather than for GSM-related complaints. In addition, many patients perceive GSM symptoms as a normal part of aging and are unaware of available treatment options, which often makes them hesitant or embarrassed to seek medical advice. This awareness and healthcare-seeking behavior are likely lower than in Europe and the United States, which may have led to an underestimation and insufficient treatment.

Additionally, cultural and lifestyle factors influencing sexual activity and health-seeking behaviors among Japanese women may have contributed to the lower prevalence observed. Reporting of sexual activity may be influenced by cultural norms and privacy concerns in Japan, potentially leading to underreporting. This should be considered when interpreting the observed association between sexual activity and GSM prevalence. A nationwide web-based survey in Japan revealed that although many women reported genital or urinary symptoms likely due to GSM, more than one-third had never consulted a physician, and many relied on non-hormonal or self-managed treatments (12). Although the difference was not significant, consistent with prior studies, we found that GSM prevalence increased with time since menopause : 25% within 5 years and 41.6% beyond 5 years—supporting the notion that GSM develops around menopause and persists for many years (3).

These findings emphasize the importance of early diagnosis and intervention to prevent progressive deterioration of quality of life (3, 13, 14).

Sexual activity was another key factor associated with GSM. GSM prevalence was significantly higher among sexually active women (66.8%) than among sexually inactive women (18%). This aligns with previous international findings that sexually active women are more likely to experience and report GSM symptoms (5, 13, 14). A recent cross-sectional study of Japanese women revealed that less frequent sexual activity was associated with higher odds of vulvar symptoms and GSM-related complaints (15). Moreover, earlier research has suggested that the negative impact of GSM on quality of life is particularly pronounced among sexually active women (3, 13, 14). Our results reinforce these findings and highlight the need for proactive counseling and individualized treatment strategies for women who remain sexually active after menopause. Early diagnosis and appropriate GSM management are essential for maintaining women's sexual health and overall well-being (16, 17).

In conclusion, GSM prevalence among postmenopausal Japanese women was lower than that reported in international studies, possibly reflecting the population characteristics and cultural factors. Nevertheless, GSM was more common in sexually active women and increased with time since menopause, consistent with prior findings that GSM develops around menopause and persists for a long time. Standardized assessment methods and early recognition are essential to improve GSM management and diagnosis. Proactive counseling and individualized treatment, especially for sexually active women, may help preserve their quality of life and overall well-being.

CONFLICTS OF INTEREST

The authors declare no conflict of interest.

ACKNOWLEDGEMENTS

We extend our sincere gratitude to all of those who assisted us in conducting this study.

REFERENCE LIST

1. Portman DJ, Gass ML : Vulvovaginal atrophy terminology consensus conference panel. Genitourinary syndrome of menopause : new terminology for vulvovaginal atrophy from the International Society for the Study of Women's Sexual Health and The North American Menopause Society. Maturitas 79 : 349-354, 2014
2. Palacios S, Castelo-Branco C, Currie H, Mijatovic V, Nappi RE, Simon J, Rees M : Update on management of genitourinary syndrome of menopause : a practical guide. Maturitas 82 : 307-312, 2015
3. Angelou K, Grigoriadis T, Diakosavvas M, Zacharakis D, Athanasiou S : The genitourinary syndrome of menopause : an overview of recent data. Cureus 12 : e7586, 2020
4. Labrie F, Archer DF, Koltun W, Vachon A, Young D, Frenette L, Portman D, Montesino M, Côté I, Parent J, Lavoie L : Efficacy of intravaginal DHEA on moderate to severe dyspareunia, the most bothersome symptom of vulvovaginal atrophy. Menopause 23 : 243-256, 2016
5. Moral E, Delgado JL, Carmona F, Caballero B, Guillén C, González PM, Suarez Almarza J, Velasco-Ortega S, Nieto C : Genitourinary syndrome of menopause : prevalence and quality of life in Spanish postmenopausal women. The GENISSE study. Climacteric 21 : 167-173, 2018
6. Kingsberg SA, Wysocki S, Magnus L, Krychman ML : Vulvar and vaginal atrophy in postmenopausal women : findings from the REVIVE survey. J Sex Med 10 : 1790-1799, 2013
7. Nappi RE, Kokot-Kierepa M : Women's voices in the menopause : results from an international survey on vaginal atrophy. Maturitas 67 : 233-238, 2010
8. Management of symptomatic vulvovaginal atrophy : 2013 position statement of The North American Menopause Society. Menopause 20 : 888-902, 2013
9. Erekson EA, Yip SO, Wedderburn TS, Martin DK, Li FY, Choi JN, Kenton KS, Fried TR : The vulvovaginal symptoms questionnaire : a questionnaire for measuring vulvovaginal symptoms in postmenopausal women. Menopause 20 : 973-979, 2013
10. Park MG, Cho S, Oh MM : Menopausal Changes in the Microbiome-A Review Focused on the Genitourinary Microbiome. Diagnostics 13(6) : 1193, 2023
11. Tomoe H, Ozaki Y, Yamamoto M, Kuwajima M, Ninomiya N, Sekiguchi Y, Takahashi S, Nagao K : Epidemiological study of genitourinary syndrome of menopause in Japan (GENJA study). Menopause 30 : 447-453, 2023
12. Ohta H, Hatta M, Ota K, Yoshikata R, Salvatore S : An online survey on coping methods for genitourinary syndrome of menopause, including vulvovaginal atrophy, among Japanese women and their satisfaction levels. BMC Womens Health 23 : 282, 2023
13. Wasnik VB, Acharya N, Mohammad S : Genitourinary syndrome of menopause : A narrative review focusing on Its effects on the sexual health and quality of life of women. Cureus 15(11) : e48143, 2023
14. Sarmento ACA, Costa APF, Vieira-Baptista P, Giraldo PC, Eleutério J Jr, Gonçalves AK : Genitourinary syndrome of menopause : Epidemiology, physiopathology, clinical manifestation and diagnostic. Front Reprod Health 3 : 779398, 2021
15. Sato Y, Ozaki Y, Tomoe H, Ninomiya N, Sekiguchi Y, Yamamoto M, Takahashi S : Cross-sectional study of the association between regular sexual activity and sexual function and genitourinary syndrome of menopause-related symptoms. Menopause 32 : 592-600, 2025
16. Rahn DD, Carberry C, Sanses TV, Mamik MM, Ward RM, Meriweather KV, Olivera CK, Abed H, Balk EM, Murphy M : Vaginal estrogen for genitourinary syndrome of menopause : a systematic review. Obstet Gynecol 124 : 1147-1156, 2014
17. Labrie F, Archer DF, Koltun W, Vachon A, Young D, Frenette L, Portman DJ, Montesino M, Cote I, Parent J, Lavoie L : Efficacy of intravaginal DHEA on moderate to severe dyspareunia, the most bothersome symptom of vulvovaginal atrophy. Menopause 25 : 1339-133, 2018