

## Genitourinary Syndrome of Menopause (GSM) and its impact on Quality of Life (QoL) among Midlife Women in Accra, Ghana

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### Abstract

**Introduction:** Genitourinary syndrome of menopause (GSM) is a chronic, progressive, vulvovaginal, sexual, and lower urinary tract condition characterized by a broad spectrum of signs and symptoms. It is a consequence of the hypoestrogenic state associated with reproductive aging and impacts the quality of life of affected women. Even though the condition mainly affects postmenopausal women, it is seen in many premenopausal women as well. This study sought to determine the prevalence, associated factors and quality of life impact associated with GSM among midlife women reporting for cervical routine screening in a tertiary hospital.

**Method:** A cross-sectional study of 400 women aged 40 to 60 years who had a routine cervical smear at the Korle Bu Teaching Hospital (KBTH) from February 2022 to September 2022. GSM was defined by using three parameters: one symptom of GSM, one physical sign of vaginal atrophy and vaginal pH > 5. Quality of life was determined using the Day-to Day Impact on Vaginal Aging (DIVA) Questionnaire. Multiple logistic regression was used to assess significant association and 95% confidence intervals calculated around the estimates generated.

**Results:** The prevalence of GSM was 46.8%. The most common symptom and sign was vaginal dryness (57%) and vaginal pallor (85%) respectively. Age, frequency of sexual activity and anogenital index were significantly associated with GSM. Participants with GSM had higher mean DIVA scores as well as higher scores for the sexual dysfunction and self-perception domains.

**Conclusion:** The study found a high prevalence of GSM significantly associated with increasing age, frequency of sexual activity and high anogenital index. As GSM negatively impacted the QoL of the women. It is important to screen and intervene early to improve QoL.

**Keywords:** Genitourinary syndrome; Menopause; Midlife; Anogenital index

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## 1. Introduction

Midlife is a particularly challenging phase in a woman's life. Apart from the physical toll of aging, hormonal excursions as well as the psychological and social debacles associated with this phase of life present a major health impact on the woman's life (1). As women transition from the late reproductive stages to early post-menopausal stage, they experience many health challenges largely attributed to the hormonal excursions during the perimenopause and the declining hormonal functions that follows during the postmenopausal stage. Symptoms commonly reported by midlife women include vasomotor symptoms, abnormal uterine bleeding, joint and musculoskeletal dysfunction, depression and mood disorders, and genitourinary syndrome of menopause (2). Though, vasomotor symptoms are regarded as the commonest and most distressing among these clinical syndromes, the genitourinary symptoms associated with the midlife period have been regarded as the most important syndrome due to its chronic and progressive nature, as well as its significant impact on the QoL and relationships of midlife women (3)(4)(5).

The genital and lower urinary tract are known to develop from the same embryonic origin, the urogenital sinus (6). These two structures are saturated with oestrogen receptors (ERs) such that, the urinary system, including the bladder and urethra, and the lower genital tract are greatly affected by decreased estrogenic levels (6). Histologically, the vaginal mucosa consists predominantly of superficial cells in a layer of stratified epithelia which lies over an immune-cell rich lamina propria and surrounded by layers of smooth muscle, collagen, and elastin. The vaginal mucosa is thrown into pleats or ridges known as rugae which serves to increase the surface area of the vagina and enables the vagina to expand during sexual stimulation and childbirth. Activated estrogenic receptors encourages epithelia proliferation, improves blood supply to the vagina and thus enhances vaginal lubrication and increases Lactobacilli production of lactic acid from glycogen (6)(7). During hypoestrogenic states, there is thinning of the epithelia, decreased blood supply, reduced Lactobacilli population and weakening of the structures of the urinary and genital tract (6). This usually manifest as vaginal dryness, burning sensation, dyspareunia, dysuria, and recurrent urinary tract infections (7)(8). It has been reported that changes in the urogenital micro-architecture occur over time beginning from the late reproductive life and increasing during menopause peaking at 3years post-menopause (6). For instance, a longitudinal study done in Australia found that in early perimenopause the prevalence vulvovaginal atrophy was 4%, rising to 25% one year after menopause and to 47% three years after menopause (9). A more recent study however, found a higher prevalence ranging from 19% in the late fertile period to as high as 53% in the early postmenopausal period (10).

The constellation of symptoms resulting from the hypoestrogenic effect on the urogenital tissues were originally referred to as vulvovaginal atrophy or atrophic vaginitis (11). This term, however, was replaced with a new terminology, the Genitourinary Syndrome of Menopause (11)(8) by the North American Menopause Society (NAMS) in 2014. According to NAMS, GSM may be defined as a chronic, progressive, vulvovaginal, sexual, and lower urinary tract condition characterized by a broad spectrum of signs and symptoms (8). The genitourinary syndrome of menopause often has significant adverse effects on a woman's sexual health and quality of life (QoL) (12). This is corroborated by several studies that have underscored the negative impacts of GSM on sexual function, partner relationships, and quality of life (QoL) (12–16). For instance, Women in the Vaginal Health: Insights, Views and Attitude (VIVA) study in the United States reported that vaginal discomfort and symptoms of vaginal atrophy resulted in the following: negative effect on their lives (80%), adverse effects on sexual intimacy (75%), and negative impact on marriage/relationship (33%) (17). Also, in the Real women's views of treatment options for menopausal vaginal changes (REVIVE) study, 85% of women reported that vulvovaginal atrophy (VVA) symptoms led to some loss of intimacy, 59% were detracted from enjoyment of sex, the symptoms interfered with the relationship among 47% of women, in 29% of participants the symptoms negatively affected sleep (29%), with 27% admitting that the symptoms adversely affected their general enjoyment of life (18). Available studies on GSM, however, tend to rely on self-reported symptoms with no consideration for vaginal signs and other objective indicators (19). This clearly has implications for quoted prevalence, risk factors and, estimates relating to QoL (10)(19). Also, women in the midlife who are more likely to experience the distressing consequences of sexual dysfunction associated with the condition are left out in most of the available studies (20). This study, therefore, sought to determine the prevalence of GSM among midlife women using symptoms and objective indicator and to assess the impact on their quality of life since evidence ties availability of quality data about these women's experiences to improved care and overall QoL (10,14).

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## 2. Methods

This was an analytic cross-sectional study that employed a standardized, interviewer-administered questionnaire for data collection. Three different groups of questions were asked. The first set consisted of questions on sociodemographic characteristics, the second evaluated the various factors that influence genitourinary syndrome

among the study population, and the third involved the use of the Day-to-Day Impact on Vaginal Aging (DIVA) questionnaire (21). The study began in February 2022 and ended in September 2022.

The study was carried out at the Reproductive Health Centre, Department of Obstetrics and Gynaecology at Korle Bu Teaching Hospital (KBTH) the largest tertiary hospital in Ghana.

Using the formula for estimating a single population proportion and 40% prevalence of vaginal atrophy among midlife women (10, 22, 23) at 95%, confidence interval the minimum sample size of 368 was calculated and adjusted to 400 to account for non-response / inconsistencies. A simple random sampling technique using an online random number generator was used. In this regard, the random number generator was used to select at random 400 numbers out of a total of 800. Clients who qualify to participate in the study were sequentially numbered as they reported for the cervical screening, and those whose numbers had been selected in the random generation of numbers were invited to participate. Any selected client who refused participation was replaced with the next client whose number was not previously selected. Eligible women who were selected and who gave informed consent to the study were issued the questionnaire.

Each eligible participant who gave written informed consent was interviewed by a research assistant in a language the participant understood. Each questionnaire consisted of four sections, namely, section A, B, C and D. Section A asked questions about basic socio-demographic characteristics of participants, Section B sought to evaluate the various clinical factors (including the BMI of the participants) that affected GSM among participants, Section C consisted of questions aimed at diagnosing GSM and Section D consisted of questions adopted from the Day-to -Day Impact of Vaginal Aging (DIVA) Questionnaire (21).

Presence of subjective symptoms of GSM were identified through the interviews and the signs were identified through vaginal examination performed by the researcher, assisted by a nurse at the Reproductive Health Unit who served as a chaperone. To ensure validity of the vaginal findings and the perineal measurements, the first 10 participants were examined under the supervision of a urogynaecology consultant who affirmed the findings recorded by the researcher. Symptoms that were considered included vaginal dryness, itching, burning, lack of lubrication during sex, discomfort or pain during sex, bleeding or bruising during sex, dysuria, urgency, and incontinence of urine. They were graded as 0 = "Not applicable or absent", 1 = "Slight /Minimal", 2 = "Moderate", and 3 = "Severe". The objective signs recorded during the vaginal evaluations included thinning of vaginal rugae, pallor of the mucosa and presence of petechiae. The objective signs were also graded as 0 = "Normal", 1 = "Mild", 2 = "Moderate" 3 = "Severe". For mucosal pallor, any vaginal mucosa that appeared as red was graded as normal, pink as mildly pale, faded pink as moderate and peach as severely pale. For vaginal rugae, presence of vaginal rugae on the full extent of the lateral vaginal wall from the lateral fornix to the introitus was regarded as normal and scored 0, absence of rugae only at the proximal 3rd of the vagina was regarded as mild recession of rugae and scored 1, absence of rugae that involved the proximal two-thirds of the lateral vaginal wall was regarded as moderate and graded 2 and the absence of rugae from the lateral fornix to the introitus was graded severe and scored 3. The lateral wall of the vagina was chosen for assessment of rugae because it was the most assessable part of the vaginal during a Pap smear. Finally, the absence of petechiae on the vaginal walls even after insertion of the speculum was scored 0, presence of petechial spots after application of the speculum was regarded as mild and scored 1, while bleeding of the vaginal walls after insertion of the speculum was regarded as moderate and scored 2, and the presence of petechiae or bleeding on the vaginal mucosa prior to insertion of the speculum was regarded as severe and scored 3.

Additionally, the anogenital distance, a measure of female genital aging was measured using a disposable calibrated paper metric rule (made of cardboard) and the value recorded for each participant. Vaginal pH of each participant was recorded using a strip of disposable pH paper.

After selection and getting informed consent, each participant had her weight and height measured by one Research Assistant. The weight and height were measured using the SECA<sup>R</sup> automated weight and height scale manufactured by seca GmbH & Co, based in Germany. The weight, height, and the calculated body mass index (BMI) of each participant were recorded in the data sheet. Each participant was examined by the researcher in an enclosed, private examination room in the presence of a chaperone. Patients were examined in the lithotomy position with the lower abdomen and perineum exposed. A strip of litmus paper was shown to the client after explaining how the strip is used to check the vaginal pH. After a gentle parting of the labia, the pH strip was inserted into the vagina for 30secs, after which it was removed and compared with the pH-scale. The vaginal pH value obtained was recorded on the data sheet. A sterile plastic speculum, lubricated with normal saline was then passed after seeking verbal consent from the client and secured in place. The colour, state of the vaginal wall, presence of petechiae and the presence or otherwise of vaginal rugae were noted and recorded. The cervical smear was performed using disposable cytobrush. In the process of

removing the speculum, the vaginal walls were examined for bruises and bleeding and the findings recorded and graded. A visual analogue scale was used as a guide to grade the state of the vaginal mucosa. After removing the speculum, a disposable, calibrated paper metric rule was used to measure the anogenital distance (from the posterior fourchette to the mid portion of the anal orifice) and the value recorded. The findings were communicated to the patient and follow up visit for collection of Pap smear report also arranged.

The outcome variable was the diagnosis of GSM, defined as the presence of all the following three parameters: (1) vaginal pH > 5 (2) at least one genitourinary symptom and (3) the presence of the any objective sign of vaginal aging, irrespective of the grade (mild, moderate or severe). Another dependent variable that was assessed was the Quality of life. This was measured as a continuous variable with a score from 0 to 4. A higher score indicated a greater impact of vaginal symptoms.

The independent variable included demographic characteristics of participants such as age, body mass index (defined as body weight in kg, divided by the square of the height in meters), smoking habit defined as a history of past or present smoking of at least a stick of cigarette a day), alcohol consumption (defined as the intake of at least one bottle of an alcoholic beverage in a week), level of education, occupation, religion and sedentary life style (defined as sitting or lying for more than 6 hours during the waking hours of the day). Also, reproductive factors such as gravidity, parity, previous vaginal delivery, previous history of vaginal trauma, previous gynaecological surgery, presence of vasomotor symptoms, menopausal status, menstrual irregularities in the previous 6 month, anogenital index as a proxy for anogenital distance, history of contraceptive use, actual use of vaginal therapies (moistures, lubricants, hormones) and systemic therapies (hormones, phytoestrogens) would be included.

Data collected was entered into Microsoft Excel and Imported into STATA version 15. For continuous variables, descriptive statistics was performed with means and, standard deviation (SD) while categorical variables were summarized with counts and percentages. Association between confirmed diagnosis of GSM and the various clinical variables was assessed with the chi-square test. The normality of the Quality-of-life scores was assessed using Q plots, histogram, and kurtosis with the impact of GSM on QoL assessed using the student's t-test.

Factors independently associated with GSM including BMI were evaluated by means of logistic regression analysis, with significant associations assumed when the p-value < 0.05.

Ethical approval was granted by the Scientific and Technical Committee and Institutional Review Board of the Korle Bu Teaching with reference number, IRB/000205/2021. Informed consent was sought from study participants using consent forms prior to questionnaire administration. Aggregated data obtained from the respondents will be used in any publication originating from this research

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### 3. Results

#### 3.1. Background Characteristics of Participants

Four hundred women were recruited out of which 378 responded to the questionnaires. Thus, a non-response rate of 5.5%. The mean age of participants was 47.2±3.9. The mean body mass index of women studied was 28.9 ± 6.3 with 25.0% having normal weights while 37.3% were obese. The mean anogenital distance was 25.7 ± 4.2, while the mean anogenital index (mean anogenital distance divided by BMI, or adjusted anogenital distance) was 0.9 ± 0.2. The mean age at menarche was 13.0 ± 2.1 while the mean age at sexual debut was 18.0 ± 3.7. Majority of the participants were married (56.9%), had had sex within the last 12months (66.1%), but less than once a month (36.9%). Christians were predominant (91.8%) while Muslims were less than a ten percent (8.2%). Majority (71.2%) of the participants were found to be current alcohol consumers, 14.0% consumed alcohol in the last 3months while 14.8% do not consume alcohol. Upon categorizing participants into the various reproductive ages, 144(39.1%) were premenopausal, 173(47.0%) were perimenopausal while 51(13.9%) were postmenopausal. (Shown in Table 1)

**Table 1** Background and Clinical Characteristics of Respondents

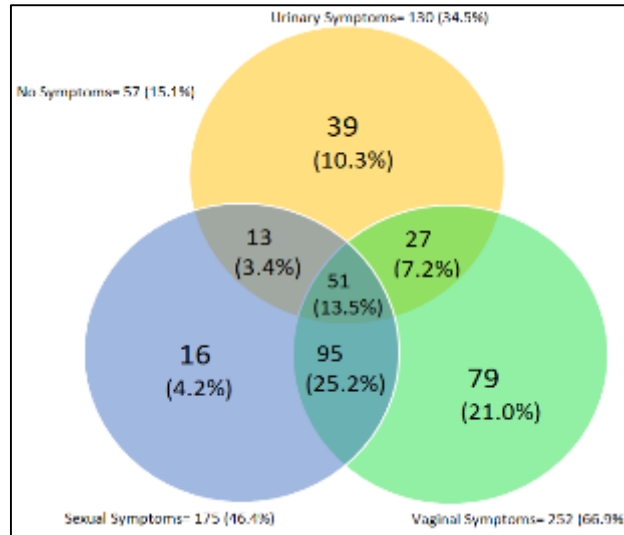
Variable	Category	Frequency	Percentage
Age	40 – 45	149	39.42
	46 – 50	153	40.48
	51 – 55	74	19.58
	56 – 60	2	0.53
Relationship status	Single	59	15.61
	Married	215	56.88
	Co-Habiting	21	5.56
	Divorced	55	14.55
	Widowed	28	7.41
Parity	0	80	21.16
	1	60	15.87
	2-4	170	44.97
	>5	68	17.99
Religion	Christian	347	91.80
	Muslim	31	8.20
History of Alcohol Consumption	Currently	269	71.16
	In the past 3months	53	14.02
	Not drinking	56	14.81
Body Mass Index	Underweight	10	2.65
	Normal	97	25.66
	Overweight	130	34.39
	Obese	141	37.30
Lifestyle	Active	142	37.67
	Sedentary	235	62.33
Age at Menarche	<13years	30	8.43
	13-16years	255	71.63
	>16years	71	19.94
Sexual Activity (In last 12months)	Yes	128	33.86
	No	250	66.14
Vasomotor Symptoms	No	143	37.83
	Yes	235	62.17
Night Sweat	No	200	52.91
	Yes	178	47.09

### 3.2. Symptoms and Signs of Vaginal Atrophy of participants

Symptoms of GSM, was reported by 84.9 % of the participants. Symptoms reported, included 66% vaginal symptoms, 46.4% sexual symptoms and 34.5% urinary symptoms. (Fig 1).

For vaginal symptoms, vaginal dryness was the most common symptom reported (57%) and for sexual and urinary symptoms, lack of lubrication (37.6%) and dysuria (25%) respectively were the most common symptoms.

Vaginal signs included mild vaginal mucosal pallor (84.4%), moderate mucosal pallor (1.6%), mild vaginal atrophy (41.8%), moderate vaginal atrophy (33.3%) and severe vaginal atrophy (0.8%); mild vagina petechiae (3.4%), while had severe sign of petechiae ((2.4%). (Table 2).



**Figure 1** Proportion of Participants with Various Symptoms of GSM

**Table 2** Vaginal Signs

Signs	Assessment	Frequency	Percentage
Mucosal pallor	Normal	53	14.02
	Mild	319	84.39
	Moderate	6	1.59
	Severe	0	0
Vaginal Rugae	Normal	91	24.07
	Mild	158	41.80
	Moderate	126	33.33
	Severe	3	0.79
Presence of Petechiae	Normal	353	93.39
	Mild	13	3.44
	Moderate	9	2.38
	Severe	3	0.79

### 3.3. Prevalence of GSM

GSM was diagnosed in 177 (46.8%) participants. GSM was diagnosed in 29.2% (42/144) of premenopausal women, in 54.3% (94/173) of perimenopausal women, and in 70.6% (36/51) of (54.3%). Shown below in Table 3.

**Table 3** Proportion of GSM participants against menopausal status

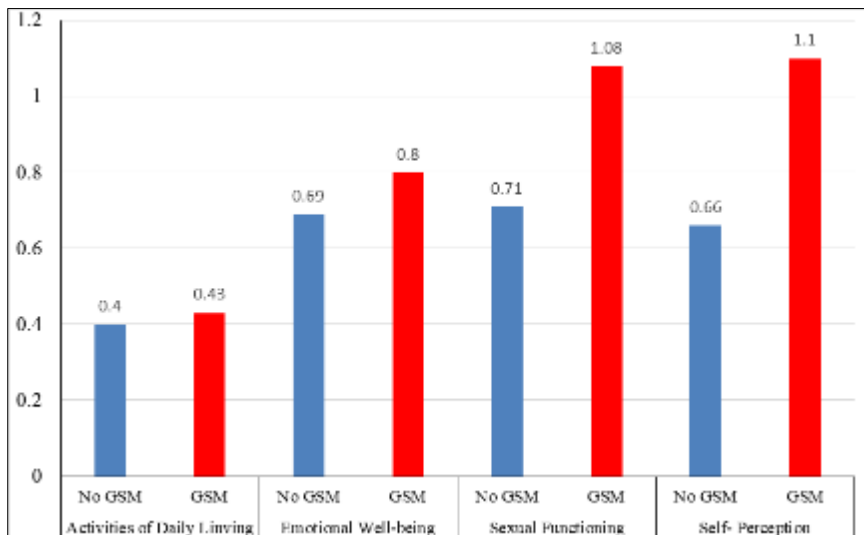
Reproductive age status	GSM status		TOTAL
	No GSM	GSM	
Premenopausal	N=201 102 (70.83)	N=177 42 (29.17)	N=378 144
Primemenopausal	79 (45.66)	94 (54.34)	173
Postmenopausal	15 (29.41)	36 (70.59)	51

**3.4. Impact of GSM on Quality of Life (QoL)**

The overall mean Diva score for participants with GSM was  $0.85 \pm 0.78$  while the mean DIVA score for participants without GSM was  $0.61 \pm 0.59$ . The difference was statistically significant ( $\mu= 0.24$ ; CI= 0.10 – 0.38, p-value = 0.01) as shown in table 4 below. The various domains for the mean DIVA scores is shown in (Fig 2) below.

**Table 4** Assessing the Impact of GSM On Quality of Life

GSM Status	Sample	Mean	95% CI	S. D	p-value
Positive	177	0.85	0.74 – 0.97	0.78	
Negative	201	0.61	0.53 – 0.70	0.59	
Difference		0.24	0.10 – 0.38		0.01



**Figure 2** Bar Chart Depicting Impact of GSM on the Various Domains of the DIVA Scores

**3.5. Factors Influencing Genitourinary Symptoms in Menopause**

Women aged 40 to 45years were thrice more likely to be diagnosed with GSM (AOR= 3.08; CI= 1.51 – 6.28), Aged 46 to 50years 6.31times more likely to experience GSM (AOR= 6.31; CI= 2.07 – 19.20). Having sex once a week is associated with 75% reduced risk of GSM (AOR= 0.25; CI= 0.10 – 0.63). An increase mean Anogenital index was associated to 99.91% decreased odds of experiencing GSM (AOR= 0.09; CI= 0.02 – 0.55) (Table 5).

**Table 5** Strength of association Between GSM status and independent variables

Variable	Category	COR	CI	AOR	CI
Age	40 – 45	Ref		Ref	
	46 – 50	3.38	2.10 – 5.43	3.33	1.61 – 6.88
	51 – 55	9.60	4.87 – 18.90	6.31	2.39 – 22.96
	56 – 60	2.24	0.14 – 36.58	0.78	0.02 – 19.02
Menstrual pattern last 12months	Regular	Ref		Ref	
	Irregular	2.34	1.5 – 3.55	0.55	0.08 – 3.70
Gravidity	0	Ref			
	1	1.28	0.48 – 3.45	0.93	0.09 – 9.36
	2-5	2.47	1.19 – 5.12	1.84	0.38 – 8.88
	>5	1.92	0.87 – 4.25	0.99	0.17 – 5.87
Parity	0	Ref		Ref	
	1	2.30	1.16 – 4.56	1.84	0.53 – 6.33
	2-5	2.39	1.38 – 4.14	1.51	0.54 – 4.30
	>5	2.23	1.15 – 4.31	2.03	0.51 – 8.11
Coitarche	< 15	Ref		Ref	
	15 – 19	0.8	0.39 – 1.65	0.46	0.16 – 1.32
	20 – 24	0.67	0.30 – 1.51	0.53	0.16 – 1.75
	25 – 29	7.12	1.43 – 35.41	3.21	0.43 – 23.94
	> 30	0.56	0.11 – 2.90	0.14	0.01 – 1.93
Frequency of sex	Less than once a month	Ref		Ref	
	Once a month	0.69	0.35 – 1.37	0.63	0.28 – 1.41
	Twice a month	1.73	0.31 – 9.37	2.01	0.20 – 20.56
	Thrice a month	0.56	0.28 – 1.13	0.66	0.28 – 1.54
	Four times a month	0.27	0.12 – 0.61	0.25	0.10 – 0.64
	More than four a month	0.35	0.10 – 1.23	0.12	0.02 – 0.94
Mean Anogenital index		0.24	0.11 – 0.53	0.09	0.02 – 0.55
Menopausal status	Premenopausal	Ref		Ref	
	Perimenopausal	2.89	1.81 – 4.61	2.13	0.32 – 14.41
	Postmenopausal	5.83	2.89 – 11.75	7.35	0.25 – 215.14
Sudden heat sensation from chest	No	Ref		Ref	
	Yes	1.83	1.20 – 2.78	0.79	0.32 – 14.41
Night sweat this 12months	No	Ref		Ref	
	Yes	2.018	1.34 – 3.04	1.11	0.48 – 2.58



#### 4. Discussion

GSM, a modern terminology describing an age-old chronic condition denotes a compilation of signs and symptoms emanating from decreased oestrogenic stimulation of the urogenital tissues (24). This study done among a homogeneously black African women has revealed a high prevalence of GSM (47%) among midlife women. This finding is higher than the 31%-37% reported in studies that focused on women within similar age categories (9, 10,23). This difference could be explained by population characteristics such as race and indeed the higher prevalence in this study may reflect and affirm an earlier observation that black women tend to be more sensitive to hypoestrogenic changes of menopause and thus a higher prevalence of urogenital symptoms of atrophy (26,27). The trend of GSM among the sub-categorized midlife population (premenopausal, perimenopausal and postmenopausal) found in this study has been similar to that found by Geng L et al in China with highest prevalence among postmenopausal women as expected by the pathophysiology linked to oestrogen status. It is noted that most studies rely on only patient-reported symptoms with a few combining both symptoms and signs as well as a more objective indicator such as the maturation index (28) or vaginal pH (10,25). Though the maturation index has been generally regarded as the gold standard for diagnosing vaginal atrophy, current evidence has revealed that the sensitivity of using vaginal pH to diagnose vaginal atrophy is similar to what is obtained from using maturation index (28). In a resource constrained environment such as Ghana where getting a cytological diagnosis may be challenging because of limited cytologist and financial cost, vaginal pH offers an alternative. This study sought to provide a more robust criteria for the diagnosis of vaginal atrophy by combining genitourinary symptoms and signs of atrophy with vaginal pH as the objective indicator. Earlier studies have shown that a combination of these 3 indicators (most bothersome symptom of vaginal atrophy, at least one sign of vaginal atrophy and vaginal pH > 5) provides more robust evidence for diagnosing vaginal atrophy (10,25). This study however, deviated slightly from the method used in the ANGEL study. Whereas the ANGEL and AGATA study used the most bothersome symptom (MBS) as a criterion (10, 25) this study used any positive symptom reported. In a population where majority of the women studied have attained low level of education, understanding these symptoms and rating them appears more challenging compared to reporting their mere presence. There are also some inconsistencies in the main symptom chosen as the MBS, some studies use vaginal dryness while others use dyspareunia (10, 25, 29). However the use of presence of just any one of the symptoms would account for the high prevalence of GSM in this study. Increasing age, increase frequency of sexual intercourse and mean anogenital distance found to be significantly associated with GSM in this study is consistent with findings by Faubion SS et al, Cagnacci A et al, and Palma F et al. (8, 10,25) This finding obviously related to decreasing hormonal function with age and shear tissue degeneration associated with aging (1). The study found regarding mean anogenital distance an increase in this distance was associated with 99.91% decreased odds of being diagnosed with GSM (AOR = 0.09; CI= 0.02 – 0.55). This is also consistent with emerging evidence that anogenital distance is a sexually dimorphic anatomical distance and a marker of endocrine dysfunction in early fetal life (30, 31). A recent case-control study by Dominici et al revealed that the mean anogenital distance among premenopausal women was significantly longer than that among postmenopausal women (32). And Lee et al reported that shorter AGD was significantly associated with a diagnosis of vulvovaginal atrophy (30). It is believed that reduced oestrogen concentration associated with reproductive aging results in a decrease in collagen production which leads to reduced thickness of tissue between the vagina and the anus, tissues rich in oestrogen receptor concentrations and highly sensitive to decline in oestrogen (30). Regarding coital frequency it was found that women who had sexual intercourse once a week was associated with 75% decreased risk of being diagnosed of GSM (compared with women who had sex less than once a month. This is also consistent with findings from other studies with the explanation that sexual activity improves blood supply to the genitalia thereby enhancing transudation of vaginal fluid and vaginal epithelial regeneration (33, 34). Women who are sexually active therefore have to be reassured and encouraged on the positive impact of sexual activity on their vaginal health.

The study found there was a significant negative overall impact associated with GSM demonstrated by the mean DIVA scores. This is consistent with findings from other studies some of which even demonstrated that GSM has comparable negative impact on QoL as that of impact chronic medical conditions such as Asthma, Arthritis, and Irritable Bowel Disease (17, 28, 29, 35, 36). It is noted here that though existing literature assessing the impact of GSM on QoL have largely involved postmenopausal women, this study has been able to establish that younger women in the midlife can also be negatively impacted. Future studies engaging a bigger population may provide a better perspective on this subject.

Despite providing a foundation upon which future studies on this topic could be done, there are The limitations of this study include being a hospital-based study that patient selection did not screen for co-morbidities that could be independently associated with GSM besides the associations found in this study such could also affect the overall QoL impact of GSM. Also the QoL tool used, the DIVA questionnaire has not been validated in this local population yet, though it has been validated in a multiracial population. Perhaps, future validation of this tool may be useful

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## 5. Conclusion

This study has revealed a high prevalence of GSM (47%) among women in their midlife (40-60years). in attending a tertiary centre in Ghana. Increasing age, increase in mean anogenital index and less frequent sexual intercourse(less once a month) were are factors that are significantly associated with a diagnosis of GSM. There was a significant negative impact on the quality of life of women with GSM. In spite of this high prevalence and negative impact on QOL of GSM among we recommend screening of patients for GSM at the gynaecological outpatient clinics as an initial step to be up scaled in future to other clinics

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## Compliance with ethical standards

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### *Disclosure of conflict of interest*

No conflict of interest to be disclosed.

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