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Prevalence, Severity, and Factors Associated with Severity of Menopausal Symptoms among Women after Hysterectomy with Bilateral Salpingo-Oophorectomy in Thailand

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Abstract

Background: Menopausal symptoms can immediately occur in younger women due to a loss of ovarian function after a hysterectomy with bilateral salpingo-oophorectomy (HBSO). Additionally, some factors may increase the level of menopausal severity in these women.
Objectives: A cross-sectional study was to investigate the prevalence, severity, and related factors of menopausal symptoms among Thai women after HBSO
Methods: The research participants were 126 women, aged 20 to 50 years, and 3 months after their HBSO. The survey was conducted at a hospital-affiliated university. The socio- demographic characteristics, menstrual history, and menopausal symptoms, including vasomotor, physical, psychological, and urogenital symptoms, were collected by using the interview questionnaire. Statistical tests included frequency, percentages, and the chi-square test or Fisher's exact test.
Results: The mean age of the women was 47.4 ± 3.9 years. The three most common symptoms of menopause included painful urination (92.8% (95%CI: 0.34-0.52)), low back pain and overall back pain **(**90**.**4**% (**95%CI: 0.30-0.46)) and feeling lonely **(**90**.**4**% (**95%CI : 0.16-0.31)) as no or mild symptoms**.** Additionally, the total mean score of menopausal symptoms was 27.13 ± 12.42, which indicated mild menopausal symptoms. The menopausal severity of women after HBSO was associated with age at menarche (*P*=0.043)**.**
Conclusion: Most of the women reported mild menopausal symptoms 3 months after surgical menopause. Therefore, it is important to consider the appropriate treatment for this cohort of women before experiencing menopausal symptoms.

Keywords: hysterectomy with bilateral salpingo-oophorectomy; menopausal symptom; severity

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Background

Hysterectomy with bilateral salpingo-oophorectomy (HBSO) is a common procedure for women with gynecological diseases. Bilateral oophorectomy needs to be performed at the time of hysterectomy for women who experience ovarian cancer (Novetsky et al., 2011; Secoșan et al., 2019), breast cancer (Novetsky et al., 2011; Secoșan et al., 2019), and re- operation after hysterectomy in examples of endometriosis and pelvic inflammatory disease. Hysterectomy is a primary surgery that can be approached through abdominal, vaginal and laparoscopic surgeries and can be performed in both total and subtotal surgeries depending on gynecological disease progression, the patient themselves, surgical instruments, and medical training courses (Egbe et al., 2018). This surgery is commonly provided for women with benign gynecological concerns (i.e., leiomyoma, endometriosis, and uterine prolapse) aged below 44 years old to preserve their ovaries (Prusty et al., 2018). This includes women diagnosed with abnormal uterine bleeding and those with chronic pelvic pain which do not respond to alternative treatment and women with cervical cancer (Egbe et al., 2018). Hysterectomy is not only prescribed by gynecologists, but some women also choose to undergo it. The reasons for their choice can include a lack of faith in the alternative treatments; fear of the medical treatment failing; and cancer which is the greatest concern (Sardeshpande et al., 2014).

Previous studies indicate that after hysterectomy or salpingectomy could reduce the risk of epithelial ovarian cancer (Darelius et al., 2021; Secosan et al., 2019). However, available evidence from Thailand reports that women with benign gynecological concerns were diagnosed with ovarian cancer after 9.9 years (average interval time from surgery to diagnosis) after hysterectomy (Charoenkwan et al., 2004). Based on the aforementioned, it can be suggested that gynecologists need to know about the socioeconomic background of patients to clearly discuss the benefits and drawbacks of undergoing hysterectomy with or without salpingectomy or with bilateral salpingo- oophorectomy. Furthermore, it is essential that gynecologists need to assess patients' adherence to hormone replacement therapy after bilateral oophorectomy. This is because, after this procedure, menopausal symptoms in women can immediately occur due to a loss of function of the ovaries. These women can experience moderate or severe menopausal symptoms after this surgery (Stuursma et al., 2018) which can reduce their quality of life (Mahajan et al., 2016).

In Thailand, more than 40,000 women (60% are approximately 45 years old) undergo HBSO each year due to the risks of ovarian and breast cancers, and severe endometriosis (Kongwattananon et al., 2014). Although this type of surgery is effective for gynecological diseases, menopausal symptoms can occur in these women (Stuursma et al., 2018). Previous study demonstrates that menopausal symptoms and their severity in women with natural menopause are different depending on demographics and social variables; body mass index (BMI) ; lifestyle variables such as smoking (Goodman et al., 2020) and menstrual history including the age at menarche (Shadyab et al., 2017). Nonetheless, most of the research on factors related to menopausal symptoms has emphasized the prevalence of natural menopause in healthy women (Al-Musa et al., 2017; Rathnayake et al., 2019). There was a paucity of studies to examine the prevalence of menopausal symptoms after HBSO in Thailand. Further investigation on this issue is needed to provide more information on the extent to which women of reproductive age experience menopause after HBSO. Therefore, we aimed to examine the prevalence and severity of menopausal symptoms in women after performing HBSO in the Thai context. We also identified the factors related to their menopausal symptom severity.

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Methods

Study Design

A cross-sectional study was conducted without a follow-up period at a Thai hospital-affiliated university.

Samples/Participants

Women after HBSO who visited the gynecological outpatient clinic were recruited through a convenient sampling process. The sample size was calculated based on a total of 197 premenopausal women who had HBSO, with a 7% precision of a 95% confidence level. Moreover, we allowed a 30% attrition rate for missing data (Pan & Zhan, 2020). Therefore, the required sample size for this study was 126 participants.

Inclusion criteria: Women: 1) Aged 18– 50 years; 2) Undergoing any surgical approach of hysterectomy with bilateral salpingo- oophorectomy (*International Classification of Disease, 10th Revision, Clinical Modification* [ICD-10CM] was used to identify the procedure codes); 3) Experiencing normal menstrual cycles for three consecutive months before having HBSO to ensure that patients are not currently experiencing any abnormal menstrual patterns; 4) having undergone HBSO at least 3 months before participating in the study (Gumussoy et al., 2020)) and; 4) Express willingness to participate in the present study.

Exclusion criteria: Women: 1) Diagnosed with any type of cancer (using diagnosis codes of ICD-10CM) before or within 6 months (Hanley et al., 2022); 2) have received hormone replacement therapy 3 months before or after the surgical procedure; or 3) withdraw to participate in this study.

Instruments

The instruments used in this study for data collection contained two questionnaires.

1.Thesocio-demographic questionnaire included age, marital status, educational levels, smoking status (currently smoker and non-smoker, including women who were no longer smoker or who had never smoked) , careers type, and menstrual history (age at menarche with the cut-off for age at 14 years (Shadyab et al., 2017), menses duration, and cycle duration) . Regarding the body mass index (BMI) , weight was recorded in shoeless and minimal clothes, using the digital scale. The height was identified as shoeless using a measuring tape. The values of both weight and height were used for the BMI formula [weight (kg)/ height $(m)^2$].

2. The menopausal symptom questionnaire which was developed for assessing Thai women' s perceptions of menopausal symptoms (Sriboonwong, 2002). This questionnaire includes common menopausal symptoms. Twenty- seven menopausal symptoms are divided into 4 domains, comprising vasomotor, physical, psychological, and urogenital domains. The scores range from 0 to 81 and indicate the following: 0 to 27 = no or mild menopausal symptoms; 28 to 54 = moderate menopausal symptoms; and 55 to 81 = severe menopausal symptoms. The content validity was approved, and the internal consistency reliability was high (alpha = 0.91) for the menopausal symptom questionnaire. The scale of this questionnaire was appropriate for measuring the severity of menopausal symptoms. Therefore, the women in this study were asked about their experience of each symptom, which was rated by using a 4-point Likert scale, ranging from not at all = 0, mild = 1, moderate = 2, and severe = 3. A pilot questionnaire was conducted to identify the difficulties of reading and understanding the language, and the internal consistency reliability of the questionnaire. Thirty women who were aged 18 to 50 years and who had undergone HBSO for at least 3 months at a hospital- affiliated university were recruited in

a pilot study to identify the reliability of the questionnaire. They could understand the questions in the questionnaire, taking 10 minutes to complete it. The reliability of this questionnaire using Cronbach's alpha showed a high internal consistency (alpha = 0.90).

Data collection

Data was collected between March 2015 and August 2015 to identify the eligible participants. The electronic records of historical treatment were used to identify these participants who would have visited the gynecological outpatient clinic. The eligible participants were invited to participate in the present study. Then, an information sheet outlining the study was distributed while they attended the clinic. A private room was prepared for the participants who agreed to participate in the study. After signing informed consent, these participants were required to answer questions in the questionnaires, which took 15 minutes. This was performed while they were waiting for treatment by gynecologists.

Data Analysis

Data was analyzed using Stata statistical software version 17 (StataCorp, LLC). The amount of missing data was < 1% and mean imputation was used to address these missing data. Data was reported by using descriptive statistics, including frequency, percentages, and mean and standard deviation. The association between factors that were related to menopausal symptoms and the severity of menopausal symptoms (i.e., no or mild, moderate, and severe menopausal symptoms) was determined by using a chi-square test or Fisher's exact test, and $P < 0.05$ was considered a significant association.

Ethical Consideration

This study was carried out in accordance with the 2000 Helsinki Declaration .Ethics approval was obtained from the research setting with the approval number COA. MURA2015/135. Individuals were not able to be identified from the data, and the data were used for the present study only.

Results

A total of 126 women who had HBSO were willing to participate in the study. Overall, the mean (standard deviation [SD]) age of the women was 47. 4 ± 3. 9 years. Socio-demographic characteristics of the sampled participants indicated that 63. 5% had an education of high school or less, 57. 9% were married, 57.1% were non-workers, 80.2% were non-smokers, and 50% had a BMI ranging from 18.5 to 24.9 kg/m^2 (26.5 ± 5.01 kg/m^2). When identifying the menstrual history of participants, the mean (standard deviation [SD]) age at menarche was 13.52 ± 1.59 years, and 54% had age at menarche at 14 years or older. The mean (standard deviation [SD]) duration of the menstrual cycle was 5.19 ± 1.71 days, and 68. 3% reported the duration of menstruation as around 3 to 5 days. The mean (standard deviation [SD]) interval of menstruation was 24. 6 ± 3. 74, and 78. 6% reported an interval of menstruation of 21 to 35 days. The data regarding the socio-demographic characteristics and menstrual history of the participants were presented in Table 1.

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Table 1 Socio-demographic characteristics and menstrual history (N=126)

Characteristics and menstrual history	Number	Percentage
Age (years), mean ± SD	47.4 ± 3.90	
35-40	12	9.5
41-45	17	13.5
46-50	97	77.0
Educational level		
High school or less	80	63.5
Bachelor's degree or higher	46	36.5
Marital status		
Single	40	31.7
Married	73	57.9
Divorced/separated/widowed	13	10.3
Occupation		
Employed	54	42.9
Unemployed	72	57.1
Smoking status		
Smoker	25	19.8
Non-smoker	101	80.2
BMI (kg/m^2), mean ± SD	26.1± 4.82	
< 18.5	2	1.6
18.5–24.9	63	50.0
25–29.9	32	25.4
≥ 30	29	23.4
Age of menarche, mean ± SD	13.52 ±1.59	
< 14 years	58	46.0
≥ 14 years	68	54.0
Duration of menstruation, mean ± SD	5.19 ± 1.71	
3–5 days	86	68.3
> 5 days	40	31.7
Interval of menstruation, mean ± SD	24.6 ± 3.74	
< 21 days	27	21.4
21–35 days	99	78.6

Abbreviation: SD: Standard deviation; BMI: body mass index

Table 2 shows the level of menopausal symptom severity from no to severe symptoms among the vasomotor, physical, psychological, and urogenital domains. Of these domains, the majority of the women reported no or mild symptoms in the physical domain. The three most common symptoms after HBO included painful urination (92.8, 95%CI: 0.34-0.52); low back pain, and overall back pain (90.4%, 95%CI: 0.30-0.46); and feeling lonely (90.4%, 95%CI: 0.16-0.31). The total mean score of menopausal symptoms was 27.13 ± 12.42, which indicated mild menopausal symptoms.

Table 2 Menopausal symptom severity in participants (N = 126)

Symptoms	Severity level of menopausal symptoms		
	No or mild n (%) (95%CI)	Moderate n (%) (95%CI)	Severe n (%) (95%CI)
Vasomotor domain			
Hot flushes	84 (66.7) (0.29-0.45)	33 (26.2) (0.20-0.35)	9 (7.1) (0.04-0.13)
Sweating	86 (68.2) (0.29-0.45)	27 (21.4) (0.20-0.30)	13 (10.4) (0.06-0.17)
Tightness in the head	81 (64.3) (0.43-0.60)	32 (25.4) (0.13-0.27)	13 (10.3) 0.06-0.17)
Physical domain			
Low back pain and overall back pain	114 (90.4) (0.30-0.46)	6 (4.8) (0.02-0.10)	6 (4.8) (0.02-0.10)
Joint pain	95 (75.4) (0.38-0.55)	19 (15.1) (0.10-0.23)	12 (9.5) (0.05-0.16)
Muscle pain	94 (74.6) (0.40-0.57)	23 (18.3) (0.12-0.26)	9 (7.1) (0.04-0.13)
Muscle cramps	96 (76.2) (0.38-0.56)	25 (19.8) (0.14-0.28)	5 (4.0) (0.17-0.09)
Sleeping difficulty	74 (58.7) (0.31-0.48)	32 (25.4) (0.21-0.36)	20 (15.9) (0.05-0.16)
Heart beating quickly	99 (78.6) (0.21-0.37)	25 (19.8) (0.02-0.09)	2 (1.6) (0.03-0.11)
Feeling dizzy	109 (86.5) (0.30-0.53)	14 (11.1) (0.07-0.19)	3 (2.4) (0.03-0.11)
Physical domain			
Decrease in stamina	90 (71.4) (0.24-0.40)	24 (19.0) (0.13-0.27)	12 (9.6) (0.01-0.07)
Little energy	97 (77) (0.30-0. 47)	22 (17.5) (0.19-0.34)	7 (5.5) (0.00-0.06)
Feeling bloated	104 (82.5) (0.39-0.56)	15 (11.9) (0.16-0.31)	7 (5.6) (0.90-0.21)
Feeling tried	74 (58.7) (0.26-0.43)	37 (29.4) (0.14-0.28)	15 (11.9) (0.00-0.06)
Dry skin	72 (57.2) 0.43-0.60)	30 (23.8) (0.07-0.07)	24 (19.0) (0.01-0.72)
Decrease in skin elasticity	64 (50.8) (0.40-0.57)	45 (35.7) (0.19-0.34)	17 (13.5) (0.05-0.16)
Weight gain	70 (55.6) (0.34-0.51)	35 (27.8) (0.12-0.25)	21 (16.6) (0.21-0.10)
Psychosocial domain			
Feeling annoyed	79 (62.7) (0.40-0.53)	35 (27.8) (0.02-0.10)	12 (9.5) (0.03-0.11)
Feeling lonely	114 (90.4) (0.16-0.31)	5 (4.0) (0.05-0.16)	7 (5.6) (0.00-0.06)
Feeling unhappy	104 (82.5) (0.26-0.42)	15 (11.9) (0.02-0.10)	7 (5.6) (0.01-0.07)
Psychosocial domain			
Feeling anxious	99 (78.6) (0.26-0.43)	24 (19.0) (0.20-0.35)	3 (2.4) (0.01-0.07)
Wanting to be alone	113 (89.6) (0.35-0.53)	6 (4.8) (0.09-0.21)	7 (5.6) (0.04-0.13)
Feeling insecure	108 (85.7) (0.34-0.52)	12 (9.5) (0.07-0.19)	6 (4.8) (0.03-0.11)
Poor memory	80 (63.5) (0.37-0.55)	29 (23.0) (0.22-0.38)	17 (13.5) (0.07-0.20)
Urogenital domain			
Painful urination	117 (92.8) (0.34-0.52)	6 (4.8) (0.17-0.33)	3 (2.4) (0.00-0.56)
Frequent urination	89 (70.6) (0.29-0.45)	34 (27.0) (0.28-0.45)	3 (2.4) (0.09-0.21)
Stress incontinence	100 (79.4) (0.32-0.49)	17 (13.5) (0.21-0.36)	9 (7.1) (0.11-0.24)
Total mean score ± SD		**27.13 ± 12.42**	

Note: Severity level of menopausal symptoms as follows: 0 to 27 = mild menopausal symptoms; 28 to 54 = moderate menopausal symptoms; and 55 to 81 = severe menopausal symptom

Table 3 shows the relationships between socio-demographic characteristics and menstrual history, and menopausal severity**.** There were no significant differences between the demographic characteristics and the severity of menopausal symptoms**.** However, the menstrual history, regarding the age at menarche approached borderline significance (*P*=0.043)**.** More than half **(**64**.**7**%)** of the women whose age at menarche was 14 years or older experienced no or mild menopausal symptoms compared with less than half **(**29**.**4**%** and 5**.**9**%)** of the women who experienced moderate and severe menopausal symptoms**.**

Table 3 Association between socio-demographic characteristics and the menstrual history and menopausal symptom severity **(**N=126**)**

Demographic characteristics and menstrual history	**Severity level of menopausal symptoms**			**X^2**	***P***
	No or mild n (%) n=71	**Moderate n (%) n=49**	**Severe n (%) n=6**		
Age (years)					
35-40	8 (66.7)	4 (33.3)	0	-	0.200[b]
41-45	13 (76.5)	3 (17.6)	1(5.9)		
46-50	50 (51.5)	42 (43.3)	5 (5.2)		
Educational level					
High school or less	42 (52.5)	33 (41.2)	5 (6.3)	-	0.410[b]
Bachelor's degree or higher	29 (63.0)	16 (34.8)	1 (2.2)		
Marital status					
Single	25 (62.5)	14 (35.0)	1 (2.5)	-	0.401b
Married	40 (54.8)	30 (41.1)	3 (4.1)		
Divorced/separated/widowed	6 (46.1)	5 (38.5)	2 (15.4)		
Occupation					
Employed	30 (55.6)	21 (38.9)	3 (5.5)	-	1.000b
Unemployed	41 (56.9)	28 (38.9)	3 (4.2)		
Smoking status					
Smoker	16 (64.0)	9 (36.0)	0	1.88(df=2)	0.391
Non-smoker	55 (54.5)	40 (39.6)	6 (5.9)		
BMI (kg/m2)					
< 18.5–24.9	31 (47.7)	32 (49.2)	2 (3.1)	-	0.103b
25–29.9	21 (63.6)	9 (27.3)	3 (9.1)		
≥ 30	19 (67.9)	8 (28.6)	1 (3.5)		
Age at menarche					
< 14 years	27 (46.5)	29 (50.0)	2 (3.5)	-	0.043[b]
≥ 14 years	44 (64.7)	20 (29.4)	4 (5.9)		
Duration of menstruation					
3–5 days	51 (59.3)	30 (34.9)	5 (5.8)	2.17 (df=2)	0.339
> 5 days	20 (50.0)	19 (47.5)	1 (2.5)		
Interval of menstruation					
< 21 days	12 (44.4)	14 (51.9)	1 (3.7)	2.43 (df=2)	0.297
21–35 days	59 (59.6)	35 (35.4)	5 (5.0)		

Note: [a]= Chi- square; [b]= Fisher's exact test
Abbreviation: BMI; body mass index

Discussion

This cross- sectional study aimed to identify factors, including sociodemographic characteristics and menstrual history, related to menopausal symptom severity in women 3 months after having HBSO. The women' s mean age (SD) was 47.4 (3.9) years which is the normal age at natural menopause for Thai women (Peeyananjarassri et al., 2005). However, the age at menopause in our study was 5 years later compared with the findings of a Western study (Stuursma et al., 2018). The authors reported that the median age at menopause of Western women who experienced surgical menopause was approximately 42 years. In their studies, the women' s age at surgical menopause was also related to sociodemographic characteristics, tubal sterilization, and gynecological conditions. These variables appear to differ from our study with women who were older at menopause (Peeyananjarassri et al., 2005). Overall, most of the women in the present study experienced mild menopausal symptoms, including vasomotor, physiological, psychological, and urogenital symptoms. These findings were in line with a previous study, reporting that Iranian women with natural menopause complained of mild menopausal symptoms, including somatic, psychological, and urogenital symptoms of menopause (Masjoudi et al., 2017). The previous study and our study share a number of key features, including sociodemographic characteristics and cultural experiences that may be comparable with regard to menopausal severity. Differently from our findings, Stuursma et al. (2018) reported that the women with a mean age of 42 years had mostly complained of moderate symptoms of menopause after menopausal surgery for approximately 8 years and their history of breast cancer was related to moderate or severe symptom of menopause. The association between younger women and the severity of menopause is supported by the prevalence of higher severity of natural menopausal symptoms that were experienced by younger women (Masjoudi et al., 2017). It is possible, therefore, that mild menopausal symptoms of the women in the present study may be related to the stability of menopausal hormones before HBSO. Their age at menopause was close to the menopausal transition for Thai women (Im, 2009) and that was not associated with moderate to severe menopausal symptoms (Masjoudi et al., 2017). Additionally, it is found that the time of menopause can be related to the mild severity of menopausal symptoms due to the stability of sexual hormones in early post menopause (Freitas et al., 2009).

In the present study, the majority of the women reported physical symptoms with the most prevalent symptoms, including painful urination, low back pain and overall back pain, and feeling lonely as no or mild**.** These symptoms are consistent with the previous study in a similar population (Borker et al., 2013)**.** Most women reported that they experienced painful urination symptoms after HBSO which was congruent with the study of Stuursma et al. (2018). The authors reported that most of the Dutch women experienced menopausal symptoms with urogenital symptoms, including bladder problems, one year after salpingo- oophorectomy, caused by insufficient estrogen, resulting in an atrophic urinary tract**.** However, the percentage of painful urination for natural menopausal women (Losif et al., 1984) was lower than the women after HBSO in our study**.** This study also found that low back pain and overall back pain were the second most frequent symptom after HBSO. This finding is closely similar to the menopausal symptoms in previous study which showed that most Asian women experiencing natural menopause complained of high severity of body and joint pains (Peeyananjarassri et al., 2005). This symptom is less likely to be complained about by Western women compared to Asian women but for them, it was sleeplessness and feeling hot and cold (Im, 2009). The various differences in

menopausal symptoms and the severity levels discussed above may have been due to cultural, racial, and regional variations (El Shafie et al., 2011; Gold, 2011). In addition, a study by Im (2009) on menopausal symptoms in Asian women showed that these women experienced less severity of menopausal symptoms than Asian American women owing to potentially better cultural attitudes towards menopausal symptoms.

The present study revealed that the majority of the women experienced psychosocial symptoms related to feelings of loneliness which was classified as either no or mild symptoms. In contrast to a previous study, loneliness accounts for the severity of menopausal symptoms, and this severity increased more than five years after menopausal status for women with natural menopause (Bingöl et al., 2019). Due to the impact of estrogen deficit and/or growing old, it could be difficult to identify what is the impact of natural menopause and its symptoms. Loneliness after longer menopause may thus be related to aging rather than hormone-related menopause. Furthermore, one study has shown that psychological symptoms, including loneliness as a trigger factor for perimenopausal women, were not changed by bilateral oophorectomy surgery (Benshushan et al., 2009). This finding indicates that reduced menopausal hormones after surgery do not potentially affect psychological symptoms and aging as well as sociocultural factors (Goodman, 2020), maybe more important.

One of the results for the present study is that the age at menarche was associated with menopausal symptom severity**.** Women whose age at menarche was 14 years or older were less likely to experience moderate or severe menopausal symptoms compared with those whose age at menarche was younger than 14 years. This is in agreement with a previous study, showing that older age at menarche was not associated with severe menopausal symptoms in Chinese perimenopausal women (Zhang et al., 2020). Bjelland et al. (2018) conducted the research with a largely female population, reporting that women with older menarche at age 16 years or older were associated with a shorter duration of reproductive function of at least 5 years compared to women with menarche at age 11 years or younger. Recently, Louwers and Visser (2021) suggest that age at menarche and age at menopause are controlled by a biological mechanism in terms of the period of released sexual hormones. Based on our result in relation to age at menarche and menopausal symptom severity, we suggest that women after HBSO who have older at menarche are less likely to experience severe menopausal symptoms due to a shorter time of reproductive capacity than women who have early age at menarche. Our study also demonstrates that the factors of socioeconomic status (i.e., education, marriage, and occupation), as well as lifestyle (i.e., smoking and BMI), were not associated with the severity of women's menopausal symptoms after HBO. In a study reviewed by Masoumeh et al. (2019) indicates that between Western and Asian women with natural menopause, the factors related to menopausal severity were different. The authors conclude that type of nutrition (e.g., soy and phytoestrogens) and social support (e.g., positive attitude of husband) were associated with menopausal severity in Asian women. Therefore, educating about the impact of diet on menopausal symptoms and enhancing attitudes towards menopause among family members of women prior to HBSO may reduce the menopausal symptom severity in this cohort.

To the best of our knowledge, this is the first study to identify menopausal symptoms in women 3 months after having HBSO performed without any hormonal influences. This is also the first study of its type to be conducted on Thai women. We have addressed the main question, regarding the prevalence of menopausal symptom severity after HBSO and have also indicated the associated factors of this severity. Therefore, this study provides knowledge to help perform further similar

research and information that could assist healthcare professionals to produce a treatment plan for this cohort of women before experiencing menopausal symptoms. The findings in this study can be useful for women aged less than 14 years old to be aware of risk factors after menopausal surgery for reducing the severity of menopausal symptoms.

There are some limitations in terms of the scope of the study. We applied a cross-sectional design in the short term, but women may experience menopausal symptoms for a long period. Therefore, a longitudinal study design should be considered for a further gynecological study to identify the changes in these women's symptoms. Additionally, our study focused on the prevalence of menopausal symptoms after HBSO. This will be the subject of further studies, involving the application of group comparison design which will take these variables into account. The comparisons of women after HBSO with different menopausal statuses to healthy women need to be examined further. This includes a comparison of menopausal symptoms before and after menopausal surgery with treatment effects. The outcomes may provide different experiences of women's menopausal symptoms and their severity after HBSO for a better understanding of this phenomenon.

Conclusion

This study examined the factors of socio- demographic characteristics and the menstrual history in women 3 months after HBSO was performed**.** Most of these women experienced no or mild menopausal symptoms 3 months after surgery**.** They mostly reported this experience with physical symptoms and the most prevalent symptom was painful urination, low back pain, and overall back pain, and feeling lonely**.** Moreover, the age at menarche was associated with menopausal symptom severity**.** Additionally, the prevalence of menopausal symptoms in women whose age at menarche was 14 years or older experienced severe menopausal symptoms less frequently than those whose age at menarche was younger than 14 years**.** Therefore, the latter group of women may need to be followed up or be provided with more treatment and intervention for reducing menopausal symptoms**.** Researchers need to conduct a long**-** term follow**-** up investigating the burden of menopausal symptoms**.**

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