Relationships Between Stress Management and Perimenstrual Symptoms among Young Japanese Working Women

Misa Fukuyama[1], Hiroko Watanabe[2]

[1] Osaka University Hospital, Osaka, Japan
[2] Department of Children and Women's Health, Osaka University Graduate School of Medicine, Osaka, Japan
Corresponding Author: watanabe@sahs.med.osaka-u.ac.jp

ABSTRACT

Background: Perimenstrual symptoms can decrease the productivity of working women and interfere with their daily lives. Women with lower stress management skills are less flexible in choosing stress-coping strategies, cannot manage stress appropriately, and may experience severe perimenstrual symptoms.

Purpose: This study aimed to determine the relationship between stress management skills and perimenstrual symptoms among young Japanese working women.

Methods: The participants were Japanese working women aged 20–29 years who were not on leave of absence from work, regardless of their profession or employment status. Stress management skills were assessed using the Sense of Coherence [SOC-13] and Brief Scale for Coping Profile [BSCP]. Perimenstrual symptoms assessed using the Menstrual Distress Questionnaire [MDQ].

Results: Of the participants with symptoms, 158 (89.3%) experienced some disruption. Premenstrual MDQ scores were negatively associated with adaptive qualities for coping with stress and positively associated with stress coping by changing one's point of view. MDQ scores during menstruation were negatively associated with adaptive qualities for coping with stress and stress coping through avoidance and suppression.

Conclusion: Perimenstrual symptoms were more severe among the participants with inadequate stress management.

Keywords: *stress management; perimenstrual symptoms; working women*

BACKGROUND

Perimenstrual symptoms are physical and psychological symptoms caused by fluctuations in female hormones during the menstrual cycle that interfere with daily life including work productivity impairment and increased absenteeism (Cheng et al., 2015). According to a survey of 4,438 Japanese working women aged 20-44 in 2021, 49.0% experienced premenstrual syndrome (PMS) (Otsuka Pharmaceutical Co., Ltd., 2022). In a study of 235 Japanese working women aged 20-44, 32.8% experienced menstrual pain that interfered with their daily lives (Otaki, 2017). In an online survey of 3,324 menstruating Japanese working women aged 15-49, economic loss due to menstrual symptoms was estimated to be 570 billion yen (Health and Global Policy Institute, 2023).

Working women who menstruate who experience severe menstrual pains and other related issues would have the option of menstrual leave, which is a legal right. According to the Basic Survey on Equal Employment in 2020, the percentage of female workers who requested menstrual leave was low at 0.9% (Health et al., 2020). Moreover, working women find it difficult to cope with perimenstrual symptoms during work (Suruga, 2016). Thus, Japanese working women cannot perform adequate self-care for perimenstrual symptoms.

Several studies have reported relationships between PMS or dysmenorrhea and stress-related factors (Ju et al., 2014; Osman et al., 2017; Watanabe et al., 2012). It has also been suggested that stress-induced progesterone fluctuations and stress-related hormones cause prostaglandin imbalance, which causes uterine muscle and vascular tone related to dysmenorrhea (Wang et al., 2004). In addition to pharmacotherapy, non-pharmacological treatments are effective for the treatment of menstrual symptoms (Japanese Society of Obstetrics and Gynecology., 2023). According to the Industrial Safety and Health Survey in 2021 (Health, Labor, et al., 2021; Health, Labour, et al., 2021a, 2021b) 53.0% of working women in Japan experience stress in their work. Therefore, stress management is essential for self-care (Health et al., 2022b).

Sense of coherence (SOC), a concept proposed by Antonovsky in 1979, is a vital skill for managing stress, defined as the ability to select appropriate coping strategies and resources (Antonovsky, 1979). Research indicates that individuals with a strong SOC are associated with good mental health (Kuwato & Hirano, 2020) lower levels of job stress (Lim et al., 2020) and lower stress responses (Yoshida et al., 2018). Additionally, effective coping strategies play a significant role in managing stress. Lazarus and Folkman's cognitive-behavioral theory (1984) highlights that the methods used for coping can impact stress responses. Therefore, developing both SOC and coping skills is essential for effective stress management (Statistics Bureau of Japan., 2022).

From the above, for stressed Japanese working women to cope effectively with perimenstrual symptoms, they need to manage their stress. Women with lower stress

management skills are less flexible in choosing stress-coping strategies, cannot manage stress appropriately, and may experience severe perimenstrual symptoms.

OBJECTIVE

This study aimed to determine the relationship between stress management skills and perimenstrual symptoms among young Japanese working women.

METHODS

1. Participants and settings

This study had a cross-sectional design. The participants were Japanese working women aged 20–29 years who were not on leave of absence from work, regardless of their profession or employment status. Since parity affects PMS (Dennerstein et al., 2010) and dysmenorrhea (Ju et al., 2014) this study focused on working women in their 20s, given the average age of first childbirth in Japan is 30.7 years (Health et al., 2022a). The exclusion criteria were being a student, receiving treatment for gynecological or psychiatric disorders, having given birth, and being pregnant.

The recruitment period was from November to December 2021. SurveyMonkey, an online survey tool, was used to create a web survey and collect the responses. A research recruitment form and a link to the information website were distributed within the Social Networking Service (SNS) account of the operator who cooperated with this survey. Working women who saw the SNS advertisement and were interested in participating in the study accessed and responded to the URL of the web-based survey.

2. Sample size

The sample size was calculated from a previous study's correlation coefficient between stress-coping and modified Menstrual Distress Questionnaire (MMDQ) scores during the premenstrual period in women aged 18–45 years (Watanabe et al., 2012). The correlation coefficient between stress-coping and total premenstrual MMDQ scores was -0.24, and 0.24 was used as the effect size. The sample size was calculated using G*Power with an alpha value of 0.05 and power of 80% for the two-tailed test, resulting in 131 participants. Based on the above results, this study required 131 participants.

3. Measures

Demographic characteristics of the participants included age, education, marital status, employment status, economic status, and smoking habits. Participants' menstruation characteristics included menstrual cycle, length of menses, age at menarche, oral contraceptive use, frequency of taking analgesics for menstruation, and whether there were any problems in their lives due to perimenstrual symptoms.

The severity of perimenstrual symptoms was assessed using the MDQ developed by Moos (1968) (Moos, 1968) and translated into Japanese by Akiyama and Kayashima (1979) (Akiyama A, 1979). Participants were asked to recall their menstrual cycle

(premenstrual, menstrual, and postmenstrual periods) and answer 47 questions using a 4-point scale (0 = none; 3 = strong). The total score ranged from 0 to 141. Higher scores indicated more severe symptoms. The validity of the MDQ has been confirmed (Akiyama & Kayashima, 1984, 1986).

Stress management skills consist of adaptive qualities for coping with stress and stress coping. Adaptive qualities for coping with stress were assessed using the SOC-13 scale developed by Antonovsky (1987) (Antonovsky, 1987) and translated into Japanese by Yamazaki (1999) (Yamazaki, 1999). This is a 7-point scale. Responses were summed to obtain a score range of 13–91 points. Items 1, 2, 3, 7, and 10 have been reversed. The average SOC-13 score in the Japanese population is 59 points (Togari et al., 2015). Using this as a reference, women who scored 59 points or higher were classified as having "high adaptive qualities for coping with stress," and women who scored 58 points or lower were classified as having "low adaptive qualities for coping with stress." Its internal consistency and reliability have been confirmed (Otaki, 2017; Otsuka Pharmaceutical Co, 2022).

Stress coping was assessed using the Brief Scale of Coping Profiles (BSCP) (Kageyama et al., 2004). It measures 6 areas in 10 dimensions: "active solution," "seeking help for a solution," "changing mood," "changing point of view," "emotional expression involving others," and "avoidance and suppression." The questionnaire consisted of 18 items. The answers to the top three questions were summed to calculate six subscale scores. Higher scores indicate more frequent use of the types of coping that people usually engage in. The six subscale scores were classified into two groups, using national averages as a reference (Kageyama & Kobayashi, 2017). Women who scored 10 points or higher were classified as "high active solution," and women who scored 9 points or lower were classified as "low active solution." Women who scored 8 points or higher were classified as "high seeking help for a solution," and women who scored 7 points or lower were classified as "low seeking help for a solution." Women who scored 8 points or higher were classified as "high changing mood," and women who scored 7 points or lower were classified as "low changing mood." Women who scored 8 points or higher were classified as having a "high changing a point of view," and women who scored 7 points or lower were classified as having a "low changing a point of view." Women who scored 5 points or higher were classified as "high emotional expression involving others," and women who scored 4 points or lower were classified as "low emotional expression involving others." Women who scored 7 points or higher were classified as "high avoidance and suppression," and women who scored 6 points or lower were classified as "low avoidance and suppression." Its reliability and validity have been confirmed (Kageyama, 2005).

Stressors were assessed to determine whether the participants felt stressed at work or outside work. Participants who responded "very much" or "much" stressed were

classified as having stressors, while those who responded "not at all" or "hardly at all" stressed were classified as having no stressors.

Stress responses were measured using the Brief Job Stress Questionnaire (BJSQ). It is recommended to evaluate worker stress in Japan (Health, Labor, et al., 2021). The questionnaire contained 29 items rated on a 4-point scale (1 = seldom; 4 = almost always). Items 1, 2, and 3 have been reversed. Scores range from 29 to 116, with 77 and above categorized as the "high-stress group" and 76 and below as the "low-stress group." Internal consistency, reliability, and factional validity have been confirmed (Health et al., 2022b).

Support from supervisors, coworkers, and family or friends was measured using the BJSQ. Each of the three questions asked for responses using a 4-point scale (1 = very supportive, 4 = not supportive at all; 1 = very dependable, 4 = not dependable at all). The scoring range was 4–12 points. The scores were calculated using the scoring method (subtracting the total score of each support from 15), as shown in the prime score conversion table. Higher scores indicate greater support. Regarding the standard values based on the regular group of women (n = 8,447), a score of 5 or less was defined as "low support from supervisors," a score of 6 or more was defined as "high support from supervisors," a score of 8 or less was defined as "low support from colleagues," a score of 9 or more was defined as "high support from colleagues," a score of 8 or less was defined as "low support from family or friends," and a score of 9 or more was defined as "high support from family or friends." Internal consistency and reliability have been confirmed (Kageyama et al., 2004; Lazarus & Folkman, 1984).

Work and life satisfaction were measured using the BJSQ. Each question had one item and required a 4-point scale (1 = satisfied; 4 = unsatisfied). The scores were calculated using the scoring method (subtracting the total score for work and family satisfaction from 10) shown in the prime score conversion table. Higher scores indicated higher levels of satisfaction. Regarding the standard values based on the standard population of women (n = 8,447), the work and life satisfaction score of 5 or more was defined as the "satisfied group," and a score of 4 or less was defined as the "unsatisfied group."

4. Data analysis

The Shapiro–Wilk test was used to confirm the normality of the MDQ scores during the three periods (premenstrual, menstrual, and postmenstrual). As the values did not show normality, they were presented as medians (25–75%). The Mann–Whitney U test was used to compare the degree of menstrual symptoms (MDQ scores) based on the attributes of the participants, stress-related factors, and stress management skills.

Multiple regression analysis was performed using a stepwise method to extract factors associated with the severity of premenstrual and menstrual symptoms. The total

premenstrual and menstrual MDQ scores were dependent variables. The independent variables were SOC score, BSCP score, factors found to be associated with PMS in previous studies (age, smoking history, age at menarche, length of menses, presence of menstrual symptoms, and oral contraceptive use), factors found to be associated with dysmenorrhea in previous studies (age, smoking history, age at menarche, length of menses, menstrual cycle, presence of premenstrual symptoms, and oral contraceptive use), and factors found to be associated with premenstrual MDQ scores in this study (employment status, economic status, stress outside the workplace, stress reaction, support from superiors, and support from family and friends) or factors found to be associated with menstrual MDQ scores in this study (employment status, economic status, stress at work, stress outside the workplace, stress reaction, and support from family and friends). International Business Machine Statistical Package for the Social Sciences ver. 26 was used for statistical analysis (Gynecology. & Japan Association of Obstetricians and Gynecologists. (Eds.)., 2023). The significance level was set at 5% (two-sided).

5.Ethical consideration

This study was approved by the Osaka University Hospital Observational Research Ethics Review Committee (approval no. 21310).

RESULTS

A total of 179 women completed the web-based survey. After excluding 2 respondents whose occupations were students and homemakers, 177 (98.9%) were included in the analysis.

1.Status of perimenstrual symptoms and obstacles in daily life due to perimenstrual symptoms of participants

Table 1 shows the obstacles in daily life due to the perimenstrual symptoms of the participants. Of the participants with symptoms, 158 (89.3%) experienced some disruption. The participants met the definition of perimenstrual symptoms.

Table 1. Obstacles in daily life due to perimenstrual symptoms

		n(%)
Frequency of analgesic medication	do not take medication	25(14.1)
	sometimes	70(39.5)
	take medication every time	75(42.4)
Obstacles in daily life due to perimenstrual symptoms	Yes	158(89.3)
	missed work	37(20.9)
	decreased work efficiency	153(86.4)
	cannot do housework	75(42.4)
	other problems	19(11.2)
	No	12(10.7)

Women with some symptoms before and during menstruation   n = 170

2.Relationships between attributes of participants and the degree of perimenstrual symptoms

The association between the demographic and menstrual characteristics of the participants and the degree of perimenstrual symptoms are shown in Table 2. Premenstrual MDQ and MDQ scores during menstruation were significantly higher among women with irregular employment and an unstable economic status. Premenstrual MDQ scores were significantly higher in women with perimenstrual symptoms. The MDQ score during menstruation was significantly higher in women with perimenstrual symptoms.

Table 2. (Continued)

		n (%)	MDQ score					
			Premenstrual	p-value	During menstruation	p-value	Postmenstrual	p-value
【Characteristics of menstruation】								
Age at menarche	≦ 11	70(39.5)	62.5(38.0-83.0)	0.167	56.0(39.0-81.0)	0.127	14.0(7.0-43.0)	0.055
	≧ 12	107(60.5)	55.0(41.0-71.5)		54.0(30.5-70.0)		10.0(4.0-26.0)	
Menstrual cycle	25~38 days	144(81.4)	55.0(41.0-74.5)	0.351	54.0(32.5-72.0)	0.271	11.0(5.0-28.0)	0.608
	Others	33(18.6)	66.0(38.0-82.0)		62.0(35.0-77.0)		14.0(4.0-36.0)	
Length of menses	3~7days	162(91.5)	56.0(41.0-76.0)	0.322	54.0(34.0-72.0)	0.578	11.0(4.0-28.0)	0.128
	Others	15(8.5)	70.0(36.5-80.5)		69.0(22.0-80.5)		19.0(9.5-39.5)	
Taking oral contraceptives	Yes	53(29.9)	54.0(32.0-76.0)	0.890	55.0(33.0-76.0)	0.936	10.0(4.0-21.0)	0.221
	No	124(70.1)	57.0(42.0-76.0)		54.5(32.5-72.5)		13.0(5.0-32.5)	
Presence of perimenstrual symptoms	Yes	158(89.3)	60.0(42.0 - 79.0)	0.000	56.5(38.0 - 75.0)	0.000	13.0(6.0 - 33.0)	0.002
	No	19(10.7)	25.0(14.0 - 47.0)		21.0(11.0 - 46.5)		6.0 (1.0 - 9.0)	

All n=177 Median（IQR）Mann - Whitney U test

Junior college or vocational school graduates or less：High school graduate or junior college/ vocational school graduate

Employment status Irregular employment：Respondents who answered "part-time employment" or "self-employed."

Economic status Stable：Respondents who answered "Stable" or "Fairly well off." Economic status Unstability: Respondents who answered "struggling" or "having difficulty

Menstrual cycle others："≦ 24 days," "≧ 39 days," "Irregular" or "Unknown"   Length of menses Others："＜3 days," "≧8 days," "Irregular," or "Unknown"

Presence of perimenstrual symptoms "Yes"："Every time" or "Sometimes", Presence of perimenstrual symptoms "No": "Not at all"

3.Relationships between stress-related factors and the degree of perimenstrual symptoms

The associations between stress-related factors and the degree of perimenstrual symptoms are shown in Table 3. The study population consisted of 42 (23.7%) women in the high-stress response group and 135 (76.3%) in the low-stress response group. Premenstrual MDQ scores were significantly higher among women stressed outside work and those with a high-stress response. The MDQ scores during menstruation were significantly higher among women stressed outside work and those with a high-stress response. Premenstrual MDQ scores were significantly higher among women with less support from supervisors, family, and friends. The MDQ scores during menstruation were significantly higher among women with less support from family and friends.

Table 3. Relationships between stress-related factors and the degree of perimenstrual symptoms

		BJSQ Score	n(%)	MDQ score					
				Premenstrual	p-value	During menstruation	p-value	Postmenstrual	p-value
【Stressor and Stress response】									
Stressed at work	Yes		147(83.0)	57.0(42.0-79.0)	0.077	55.0(35.0-75.5)	0.051	12.0(5.0-33.5)	0.147
	No		30(17.0)	49.0(31.0-70.0)		45.0(27.0-63.0)		10.5(2.0-18.0)	
Stressed outside of work	Yes		81(45.7)	70.0(48.0-83.0)	0.000	65.0(47.0-79.0)	0.000	16.0(8.0-45.0)	0.001
	No		96(54.3)	49.0(27.5-66.0)		46.0(24.5-66.5)		9.0(2.0-20.0)	
Stress response	High	≧77	42(23.7)	81.0(71.0-90.0)	0.000	75.5(66.0-93.0)	0.000	34.0(11.0-55.0)	0.000
	Low	≦76	135(76.3)	51.0(35.5-66.5)		48.0(27.5-64.0)		10.0(4.0-19.5)	
【Social support】									
Support from supervisors	Low	≦5	43(24.3)	70.0(46.5-83.0)	0.032	63.0(41.5-82.0)	0.079	13.0(6.0-39.5)	0.409
	High	≧6	134(75.7)	54.5(38.0-73.0)		54.0(29.0-71.0)		12.0(5.0-28.0)	
Support from coworkers	Low	≦8	120(67.8)	57.0(42.0-74.5)	0.401	55.0(34.5-75.0)	0.250	13.0(5.5-31.0)	0.246
	High	≧9	57(32.2)	54.0(27.0-78.0)		50.0(23.0-69.0)		10.0(4.0-28.0)	
Support from family or friends	Low	≦8	41(23.2)	72.0(52.0-83.0)	0.001	62.0(45.0-77.0)	0.043	13.0(7.0-36.0)	0.269
	High	≧9	136(76.8)	53.0(35.5-71.0)		53.0(28.5-71.5)		11.0(4.0-28.0)	
【Satisfaction】									
Work and life satisfaction	Satisfaction	≧5	30(16.9)	65.0(38.0-85.0)	0.224	55.5(42.0-85.0)	0.197	16.0(4.0-52.0)	0.359
	Dissatisfaction	≦4	147(83.1)	55.0(42.0-85.0)		55.0(30.0-72.0)		11.0(5.0-27.5)	

All n=177 Median（IQR）Mann - Whitney U test

Stressd at work/outside of work "Yes"：Respondents who answered "very much" or "much" stressed at work/outside of work

Stressd at work/outside of work "No"：Respondents who answered "not at all" or "hardly at all" stressed at work/outside of work

4.Relationships between stress management skills and the degree of perimenstrual symptoms

The relationship between stress management skills and the degree of perimenstrual symptoms is shown in Table 4. A total of 33 (18.6%) participants had higher adaptive qualities for coping with stress than the national norm, and 144 (81.4%) had lower adaptive qualities for coping with stress. The MDQ scores during the entire period (premenstrual, menstrual, and postmenstrual periods) were significantly higher among women with lower adaptive qualities for coping with stress. No significant association was found between MDQ scores during all periods (premenstrual, menstrual, and postmenstrual) and stress-coping skills.

Table 4. Relationship between stress management skills and the degree of perimenstrual symptoms

		Score	n(%)	MDQ score					
				Premenstrual	p-value	During menstruation	p-value	Postmenstrual	p-value
Adaptive qualities for coping with stress (SOC-13)	High	≧ 59	33(18.6%)	35.0(17.0-51.0)	0.000	43.0(24.0-64.0)	0.000	10.0(3.5-19.0)	0.000
	Low	≦ 58	144(81.4%)	62.5(45.0-79.0)		63.0(46.0-79.0)		14.0(6.0-38.0)	
Stress coping (BSCP)									
Active solution	High	≧ 10	57(32.2%)	58.5(41.0-76.0)	0.442	56.0(33.5-75.0)	0.287	12.5(6.0-28.0)	0.605
	Low	≦ 9	120(67.8%)	52.0(38.0-72.0)		50.0(29.0-69.0)		10.0(4.0-31.0)	
Seeking help for solution	High	≧ 8	54(30.5%)	58.0(41.0-77.0)	0.267	56.0(32.5-74.5)	0.106	13.0(5.0-33.5)	0.529
	Low	≦ 7	123(69.5%)	53.0(38.0-72.0)		45.0(33.0-69.0)		10.5(4.0-21.0)	
Changing mood	High	≧ 8	50(28.2%)	55.0(38.0-76.0)	0.473	55.0(31.0-72.5)	0.724	12.0(4.0-28.0)	0.575
	Low	≦ 7	127(71.8%)	63.0(42.0-75.0)		54.5(38.0-74.0)		13.0(5.0-45.0)	
Changing a point of view	High	≧ 8	85(48.0%)	57.0(39.5-79.0)	0.906	50.5(30.5-72.5)	0.625	11.0(4.5-28.0)	0.597
	Low	≦ 7	92(52.0%)	57.0(41.0-73.0)		56.0(34.0-73.0)		12.0(5.0-29.0)	
Emotional expression involving others	High	≧ 5	103(58.2%)	59.0(43.5-79.0)	0.053	57.0(34.0-74.0)	0.258	11.0(5.5-30.0)	0.757
	Low	≦ 4	74(41.8%)	49.0(31.0-72.0)		49.5(29.0-71.0)		13.0(4.0-28.0)	
Avoidance and suppression	High	≧ 7	108(61.0%)	55.0(38.0-74.0)	0.614	53.5(31.5-71.5)	0.263	12.0(4.0-29.5)	0.841
	Low	≦ 6	69(39.0%)	58.0(41.0-79.0)		57.0(34.0-77.0)		12.0(5.0-28.0)	

All n=177　Median（IQR）　Mann - Whitney U test

5.Extraction of determinants of premenstrual and menstrual MDQ scores

Multiple regression analyses were conducted with premenstrual and menstrual MDQ scores as the dependent variables to extract the determinants of premenstrual and menstrual MDQ scores (Table 5). The results showed that adaptive qualities for coping with stress, stress coping (changing point of view), stress responses, employment status, presence of perimenstrual symptoms, presence of stress outside work, and support from family or friends were significantly associated with premenstrual MDQ scores. The factors regulating MDQ scores during menstruation were adaptive qualities for coping with stress, stress coping (avoidance and suppression), stress response, employment status, and the presence of perimenstrual symptoms.

Table 5. Extraction of determinants of MDQ scores before and during menstruation

	MDQ score（Premenstrual）				MDQ score（During menstruation）			
	B	β	95%CI	p-value	B	β	95%CI	p-value
adaptive qualities for coping with stress (SOC)	－ 16.432	－ 0.236	－ 25.532 － － 7.433	0.000	－ 17.406	－ 0.236	－ 26.821 － － 7.992	0.000
Stress coping（Changing a point of view）[#]	7.830	0.144	1.061 － 14.598	0.024				
Stress coping（Avoidance and suppression）[#]					－ 7.275	－ 0.123	－ 14.512 － － 0.038	0.049
Stress response	18.727	0.293	10.423 － 27.031	0.000	23.113	0.342	14.568 － 31.657	0.000
Employment status	11.613	0.144	1.751 － 21.474	0.021	14.225	0.166	3.711 － 24.739	0.003
Presence of perimenstrual symptoms	15.174	0.173	4.232 － 26.117	0.007	19.104	0.206	7.357 － 30.850	0.002
Stressed at outside of work	8.043	0.148	0.909 － 15.176	0.027				
Support from family ot friend	－ 8.094	－ 0.126	－ 16.015 － － 0.173	0.045				

Multiple regression analysis（stepwise method）

Premenstrual：Adjusted R^2=0.355

Menstrual：Adjusted R^2=0.334

ANOVA p<0.001

B: Partial regression coefficient β: Standard partial regression coefficient CI: Confidence Interval

[#] "Changing a point of view"：It is one of the subscales of the BSCP.

[#] "Avoidance and suppression"：It is one of the subscales of the BSCP.

DISCUSSION

The results of this study suggest that perimenstrual symptoms are more severe among working women with lower adaptive qualities for coping with stress and inadequate stress coping.

Among the participants, 158 (89.3%) were found to have perimenstrual symptoms. A previous study reported that 55.6% of Japanese working women had PMS (Health and Global Policy Institute., 2018), 32.8% of working women experience menstrual pain that interferes with their daily lives (Otaki, 2017). Among the participants in this study, 42 (23.7%) had high stress, which was higher than the 11.6% reported in a previous survey conducted by the National Federation of Industrial Health Organization in 2020 (National Federation of Industrial Health Organization, 2021). As the participants in this study were recruited through SNS, it is possible that the prevalence of perimenstrual symptoms and stress was higher due to a higher interest among women who volunteered to participate in this study.

However, for the following reasons, the participants in this study can be said to be representative of young Japanese women. According to the Comprehensive Survey of Living Conditions 2022 (Health et al., 2022a) the educational background, the university

enrollment rate for women in the 2019 academic year was 50.9% (Gender Equality Bureau Cabunet Office., 2024). The population in this study had a slightly higher proportion of university graduates compared to the general population of Japanese women. In the Population Census of Japan 2020 (Statistics Bureau of Japan., 2021) among women aged 20 to 24, 93.0% were unmarried, 6.5% were married, and 0.5% were widowed or divorced. For women aged 25 to 29, 65.8% were unmarried, 32.3% were married, and 1.9% were widowed or divorced. Regarding marital history, there is no significant difference between the general population of women in Japan and the population in this study.

Irregular employment, which refers to part-time or self-employment, is a determinant of MDQ scores before and during menstruation. Employment status has not been associated with premenstrual or menstrual symptoms in previous studies. According to the 2021 Labor Force Survey the proportion of regular employment among employees (excluding executives) in Japan is 48.9% for those aged 15 to 24 and 67.6% for those aged 25 to 34. The proportion of irregular employment is 51.1% for those aged 15 to 24 and 32.4% for those aged 25 to 34. This study can be said to focus on a group with a higher percentage of regular employees compared to the average employment patterns in Japan. A study involving 1,800 Spanish women aged 15 to 49 found that 34.3% reported feeling the need to take time off work due to menstrual pain and symptoms (Leon-Larios et al., 2024). Another study of 317 full-time female nurses in Japan reported a relationship between somatic symptoms with menstruation and intention to leave work (Ota et al., n.d.). This suggests that women may be more likely to choose irregular employment positions, which allow for easier leave due to the severity of perimenstrual symptoms. Furthermore, previous studies have indicated that irregular Japanese employees have less healthy lifestyle habits than regular employees (Tsurugano & Yano, 2011). Watanabe et al. (2012) (Watanabe et al., 2012)suggested that poor lifestyle habits can affect stress and PMS. Additionally, prior research has reported that unstable employment is associated with stress (Oddo et al., 2024). Therefore, irregular employees may have more severe PMS because of their stressful and irregular lifestyles.

Symptoms during menstruation were determinants of the premenstrual MDQ scores. Previous studies have demonstrated that symptoms during menstruation affect PMS (Yamamoto et al., 2009) which was supported by the present study. Women who are unable to alleviate their symptoms during menstruation may not cope well with daily stress and PMS.

PMS are a determinant of the MDQ scores during menstruation. Previous studies have revealed that PMS affects dysmenorrhea (Latthe et al., 2006) and the present study showed similar results. It is possible that women who cannot reduce their symptoms before menstruation do not cope well with daily stress and may be unable to cope

appropriately with symptoms during menstruation.

High stress responses were a determinant of MDQ scores before and during menstruation. A previous study indicated that stress affects PMS (Watanabe et al., 2012) and dysmenorrhea (Ju et al., 2014), and the present study supports these results. Therefore, reducing stress responses is necessary to alleviate the perimenstrual symptoms.

Stressors outside work and low support from family or friends were determinants of premenstrual MDQ scores. According to the National Institute of Occupational Safety and Health occupational stress model (Hurrell & McLaney, 1988) interfering factors such as support from others influence the process of stressor-induced stress reactions. Therefore, women who receive little support from their families or friends may not cope well with stress and experience reduced PMS.

Low adaptive qualities for coping with stress were determinants of the MDQ scores before and during menstruation. Antonovsky (1987) stated that people with low SOC might not have flexible choices of stress coping strategies. Several studies have reported that individuals with a lower SOC have higher stress reactions (Sawada & Katsuki, 2018; Yoshida et al., 2018). Therefore, women with low adaptive qualities for coping with stress may not be able to take appropriate stress-coping measures and reduce their perimenstrual symptoms.

High-stress coping using a changing point of view was a determinant of premenstrual MDQ scores. To cope with stress, changing points of view are defined as having different viewpoints, ideas, or values toward a problem. Akimoto et al. (2009) suggested that stress coping, such as changing one's perspective on stressful issues, could effectively reduce psychological symptoms (Akimoto et al., 2009). Therefore, women with high stress may cope using changing points of view, that is, women who can view premenstrual symptoms from a different perspective, idea, or value may be able to reduce premenstrual psychological symptoms but not physical symptoms and may not be able to cope with their symptoms adequately.

Less stress coping using avoidance and suppression was a determinant of MDQ scores during menstruation. Avoidance and suppression of stress involve inaction to relieve it. Therefore, women with less avoidance and suppression, that is, women who do not neglect their symptoms during menstruation, are thought not to endure and manage their intense symptoms. According to Ikata et al. (2021), working women with more severe symptoms during menstruation are more likely to cope in some way. However, working women are less likely to take measures other than analgesic medications while at work (Ikata et al., 2021). This suggests that, although they take some measures due to the intensity of their symptoms, they may not be able to alleviate their symptoms because their actions are not sufficient.

This study has some limitations. First, it was a cross-sectional study. Therefore, it

was impossible to identify the causality between the degree of perimenstrual symptoms and stress management skills. Second, the target population was biased, limiting the generalizability of the results. This study recruited young working women through SNS. Working women with strong perimenstrual symptoms and high-stress levels may have been interested in participating in the study. Third, we did not measure the participants' degree of work exertion, and this study did not consider its effect on perimenstrual symptoms.

CONCLUSION

Perimenstrual symptoms were more severe among participants with lower stress management skills and inadequate stress coping. Therefore, workplaces with young female employees should create stress-free work environments and make it easier for them to take menstrual leave and self-care for perimenstrual symptoms. Furthermore, in Japan, occupational health nurses support the health management of working women. Therefore, nurses should support the health of young working women to identify effective stress-coping strategies.

ACKNOWLEDGMENTS

FUNDINGS

REFERENCES

Akimoto, Miyaoka, & Kamo. (2009). Gekkeizen shokogun, gekkeizen hukai kibun shogai no josei no rinsho teki tokucho to sutoresu ko-pingu ni tsuite [Clinical charastaristics and stress coping behaviors in women with premenstrual syndrome or premenstrual dysphoric disorder]. Atomi gakuen jos. *[Journal of Atomi University Faculty of Literature]*, *43*(1), 45–60.

Akiyama A, K. K. (1979). Students on the influence of the menstrual cycle upon the physical and mental condition by means of MDT. *Journal of Japan Society of Nursing Research*, *2*(2), 2_61-2_66. https://doi.org/10.15065/jjsnr.19790601007

Akiyama, & Kayashima. (1984). seishuki ni okeru shuso no bunseki [Analysis of

Women, Midwives, and Midwifery

https://wmmjournal.org

Publisher: Asosiasi Pendidikan Kebidanan Indonesia (AIPKIND)
http://aipkind.org

Complaints in the Menstrual Cycle]. In *Japanese journal of maternal health, 25, 232-340 (in Japanese).*

Akiyama, & Kayashima. (1986). *seishuki ni tomonau shuso ni tsuite shishunki kara seijukuki ni okeru kento [Complaints Associated with the Sexual Cycle. A study from puberty to maturity], Japanese journal of maternal health, 27, 104-110 (in Japanese).*

Antonovsky. (1979). *Health, stress, and coping. San Francisco, CA: Jossey-Bass.*

Antonovsky. (1987). *Kenko-no-nazo-wo-toku [Unraveling the Mystery of Health: How People Manage Stress and Stay Well] (Y.Yamazaki, & K. Yoshii, Trans.). Tokyo: Yushindo Kobunsha.*

Cheng, Sun., Lee, Shih., Chen., Lin, Lu, & Yang. (2015). *Biomed.*

Dennerstein, Lehert, Keung, Pal, & Choi. (2010). A population-based survey of Asian women's experience of premenstrual symptoms. *Menopause International, 16*(4), 139–145.

Gender Equality Bureau Cabunet Office. (2024). *Enrichment of education and learning enabling diverse choices From the "White Paper on Gender Equality 2019".* https://www.gender.go.jp/english_contents/about_danjo/whitepaper/index.html

Gynecology., J. S. of O., & Japan Association of Obstetricians and Gynecologists. (Eds.). (2023). Sanfujinka shinryo gaidorain – fujinka gairai hen [Guideline for gynecological practice in Japan]. In *Guideline), (in Japanese).* (Vol. 31, Issue 10). https://www.jsog.or.jp/activity/pdf/gl_fujinka_2023.pdf

Health and Global Policy Institute. (2018). *Survey on Health Promotion and Working women.* https://hgpi.org/wp-content/uploads/Survey-on-Health-Promotion-and-Working-Women-2018_Final-Report_180810_vFinal.pdf

Health and Global Policy Institute. (2023). *Survey on Health Promotion and Working women.* chrome-

extension://efaidnbmnnnibpcajpcglclefindmkaj/https://hgpi.org/wp-content/uploads/2023_WomensHealthResearchReport_JPN.pdf

Health, M. of, Labor, & Welfare. (2021). *Rodo anzen eisei ho ni motozuku sutoresu chiekku seido jisshi manyuaru [Stress check system implementation manual based on the Industrial Safety and Health Act]. (in Japanese).*

Health, M. of, Labor, & Welfare. (2022a). *Comprehensive Survey of Living Conditions 2022.*

Health, M. of, Labor, & Welfare. (2022b). *Roudo no ba ni okeru sutoresu oyobi sono kenkou eikyou ni kansuru kenkyu hokokusho [Research report on stress at work and its health effects]. (in Japanese).*

Health, M. of, Labour, & Welfare. (2020). *Koyo kinto kihon chosa [Basic Survey of Gender Equality in Employment Management: Summary of Results (Buisiness Establishments)]. (in Japanese). Retrieved October 30, 2022,.*

Health, M. of, Labour, & Welfare. (2021a). *Jinko dotai tokei tokushu hokoku. Reiwa 3 nendo "Shussho ni kansuru tokei"no gaikyo [Specified report of vital statistics 2021, Live births]. (in Japanese).*

Health, M. of, Labour, & Welfare. (2021b). *Rodo anzen eisei chosa no gaikyo [Industrial Safety and Health Survey : Summary of Results]. (in Japanese).*

Hurrell, & McLaney. (1988). Exposure to job stress--a new psychometric instrument. *Scandinavian Journal of Work, Environment & Health*, *14*(1), 27–28.

Ikata, Nameda, & Miyazaki. (2021). Shuro suru sei seijyukuki josei no gekkei zuihan shojo to serufu kea [Menstruation-associated symptoms and self-care in working women of reproductive age]. *Bosei Eisei [Japan Society of Maternal Health]*, *62*(2), 436–443.

Japanese Society of Obstetrics and Gynecology., & J. A. of O. and G. (Eds. . (2023). *Sanfujinka shinryou gaidorain – fujinka gairai hen [Guideline for gynecological*

practice in Japan]. https://www.jsog.or.jp/activity/pdf/gl_fujinka_2023.pdf

Ju, Jones, & Mishra. (2014). *The prevalence and risk factors of dysmenorrhea. Epidemiologic reviews*. https://doi.org/10.1093/epirev/mxt009

Kageyama. (2005). *Report of Project Supported by Grant-in Aid for Scientific Research, 2002-2004 (The Ministry of Education, Science, Sports and Culture, Japan) Development of a brief assessment tool for stress coping profile and application to occupational mental health n.*

Kageyama, & Kobayashi. (2017). *"sutoresu" tono mukiaikata: BSCP niyoru ko-pingu tokusei hyoka kara mieru koto [How to deal with stress: What we can see from the BSCP evaluation of coping profile]. Tokyo Kingo shuppan.*

Kageyama, Kobayashi, Kawashima, & Kanamaru. (2004). *Kinrosha no tame no ko-pingu tokusei kani shakudo (BSCP) no kaihatsu: shinraisei・datousei ni tsuite no kisoteki kento [Development of the Brief Scales for Coping Profile (BSCP) for Workers: Basic Information about its Reliability and Validity]. Sangyo eis*.

Kuwato, & Hirano. (2020). Sense of coherence, occupational stressors, and mental health among Japanese high school teachers in Nagasaki prefecture: a multiple regression analysis. *BMC Public Health, 20*(1), 1355. https://doi.org/10.1186/s12889-020-09475-x

Latthe, Mignini, Gray, Hills, & Khan. (2006). Factors predisposing women to chronic pelvic pain: systematic review. *BMJ (Clinical Research Ed.), 332*(7544), 749–755. https://doi.org/10.1136/bmj.38748.697465.55

Lazarus, & Folkman. (1984). *Stress, appraisal, and coping. New York: Springer Publishing Company.*

Leon-Larios, Silva-Reus, Martínez, P., Roba, R., Martínez, I., Pascual, L., Ratia, N., & Conde, Q. (2024). Influence of menstrual pain and symptoms on activities of daily

living and work absenteeism: a cross-sectional study. *Reproductive Health, 21*(1), 25. https://doi.org/10.1186/s12978-024-01757-6

Lim, Im, Cho, & Choi. (2020). The association between Antonovsky's sense of coherence and job stress among dental hygienists in Korea. *International Journal of Dental Hygiene*, *18*(3), 307–313.

Moos. (1968). The development of a menstrual distress questionnaire. *Psychosomatic Medicine, 30(6), 853–867.*, *30*(6), 853–867.

National Federation of Industrial Health Organization. (2021). *Zeneiren sutoresu cheikku sa-bisu jisshi kekka hokokusho [Stress Check Service Implementation Result Report], (in Japanese).*

Oddo, Mabrouk, Andrea, Ahonen, Winkler, Vignola, & Hajat, A. (2024). The association between precarious employment and stress among working aged individuals in the United States. In *Preventive medicine* (p. 187). https://doi.org/10.1016/j.ypmed.2024.108123

Osman, Sabri, Zoubeidi, Alharbi, Rizk, Narchi, & Souid. (2017). Prevalence, Severity, and Correlates of Premenstrual Dysphoric Disorder Symptoms Among Women in the Arabian Peninsula. *The Primary Care Companion for CNS Disorders, 19*(4), 2112. https://doi.org/10.4088/PCC.17m02112

Ota, Nomura, Hirayama, Maeda, Komatsu, Nakamura, Yamada, Ishikawa, Kobayashi, Shirakawa, Aisaka, Ono, Hiraike, Hiraike, & Okinaga. (n.d.). Relationship between somatic symptoms with menstruation and intention to leave work among university hospital nurses in Japan: a cross-sectional study. *International Archives of Occupational and Environmental Health*, *96*(1), 155–166. https://doi.org/10.1007/s00420-022-01905-0

Otaki. (2017). Hataraku josei no gekkeitsu no taisho kodo ni kanren suru yoin [Factors related to coping behavior to alleviate menstrual pain in working women]. *Nihon*

Bosei Kango Gakkaishi [Journal of Japan Maternity Nursing], (in Japanese)., *17*(1), 53–60.

Otsuka Pharmaceutical Co. (2022). *Hataraku josei no kenko ishiki chosa [Health Awareness Survey of Working Women].(in Japanese).*

Sawada, & Katsuki. (2018). *Seishinka kangoshi no shubi ikkan kankaku (SOC) to sutoresu taisho katei tono kanren ni tsuite [The relationship between Psychiatric Nurses' Sense of Coherence (SOC) and the Stress Management Process]. Nagoya ichiritsu daigaku kango gakubu kiyo [Bulletin.*

Statistics Bureau of Japan. (2021). *The Population Census of Japan 2020. (In Japanese).*

Statistics Bureau of Japan. (2022). *The Labor Force Survey 2021. (In Japanese).*

Suruga. (2016). Kodomo to doukyo shite inai seishain josei ni okeru gekkei zen shoukogun no shoujo to shokugyo sei sutoresu oyobi serufukea gakushu ni-zu tono kanren [Relationship between symptoms and occupational stress and the need to learn self-care skills of premenst. *[Journal of the International University of Health and Welfare], (in Japanese).*, *21*(2), 18–30.

Togari, Yamazaki, Nakayama, Yokoyama, Yonekura, & Takeuchi. (2015). 13 komoku 7 kenho sense of coherence suke-ru nihongo ban no kijunchi no sanshutsu [Nationally representative score of the Japanese language version of the 13-item 7-point sense of coherence scale]. *Nihon Koshu Eisei Zasshi [Japanese Journal of Public Health]*, *62*(5), 232–237. https://doi.org/10.11236/jph.62.5_232 (in Japanese).

Tsurugano, & Yano. (2011). Inoue, M., Nishikitani, M., Hiseiki koyosha no kenko ni kansuru bunken chosa [The health of permanent workers and workers with precarious employment: a literature review]. *Sangyo Eiseigaku Zasshi [Journal of Occupational Health]*, *53*(4), 117–139.

Wang, Wang, Wang, Chen, Ronnennberg, Guang, Huang, Fang, Zang, Wang, & Xu. (2004). Stress and dysmenorrhoea: a population based prospective study.

Occupational and Environmental Medicine, 61(12), 1021–1026.

Watanabe, Toda, Nishiumi, Okada, & Okumura. (2012). Gekkei zen shokogun ni okeru sutoresu to seikatsu shukan to no kanren bunseki [Health care analysis of physical stress and personal lifestyle, as socio-medical backgrounds, in reproductive-age women with premenstrual syndrome]. *Bosei Eisei [Japanese Journal of Maternal Health], (in Japanese).*, *52*(1), 437-443,.

Yamamoto, Okazaki, Sakamoto, & Funatsu. (2009). The relationship between premenstrual symptoms, menstrual pain, irregular menstrual cycles, and psychosocial stress among Japanese college students. *Journal of Physiological Anthropology*, *28*(3), 129–136. https://doi.org/10.2114/jpa2.28.129

Yamazaki. (1999). Kenko he no atarashi kangaekata wo rironka shita kenko seiseiron to kenko hoji noryoku gainen SOC. [Health generation theory and health maintenance capacity concept SOC that theorized a new way of thinking about health]. *Quality Nursing, (in Japanese).*, *5*(1), 825-832.

Yoshida, Yamada, & Morioka. (2018). Seishin oyobi ryoyo byosho de kinmu suru kangoshi no shubi ikkan kankaku to sutoresu hannou tono kanren [Relationship of SOC with occupational stress reaction among nurses in psychological and recuperation wards]. *Nihon Igaku Kangogaku Kyouiku Gakkaishi [Japanese Journal of Medical and Nursing Education], (in Japanese).*, *26*(3), 1–8.