

REVIEW ARTICLE

Conceptual Analysis of Menstrual Disorders in Young Women

Eriko YAMAMOTO ¹⁾ Masuko SAITO ²⁾ Reiko HIRATA ³⁾

- 1) Tokyo Women's Medical University, School of Nursing, Japan
- 2) Kansai University of International Studies, School of Health Sciences
Department of Nursing, Japan
- 3) Nihon Institute of Medical Science, School of Health Sciences
Department of Nursing, Japan

ABSTRACT

To define the concept of menstrual disorders in young women.

Articles were searched from PubMed (2010-2020) using the keywords "Young Women," "Dysmenorrhea" and "Premenstrual Syndrome." Eight articles were extracted from 32 articles. Regarding articles in Japan, Japan Medical Abstracts Society website and CiNii Articles were searched, using the keywords "Young Women" and "menstrual disorders." 23 articles were extracted from 165 articles. A total of 31 articles (23 articles in Japan, 8 articles from overseas) were targeted.

Six attributes: Actual condition of menstrual disorders, risk of menstrual disorder, endometriosis and treatment, use of analgesics, use of oral contraceptives (hereinafter OC), and Quality of Life (hereinafter QOL) in menstrual period. Five preconditions: Young women and motivation, women's lifestyle and change in life habits, menstrual mechanism and normal values, classification and symptoms / treatment of menstrual disorder, view of menstruation and menstrual education. Four consequences: Awareness of menstruation, education surrounding menstruation, research on menstruation, and issues related menstruation were extracted.

This concept was defined as "in actual conditions of menstrual disorders, there is great variation, such as dysmenorrhea, PMS, and irregular menstruation, and accordingly, related risks have been observed, and the existence of endometriosis is also partially indicated. Analgesics and OC are not appropriately utilized, and QOL of young women during menstrual period decreases."

< Key-words >

Young women, menstrual disorders, conceptual analysis

yamamoto.eriko@twmu.ac.jp (Eriko YAMAMOTO; Japan)

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I. Introduction

Regarding the study background, when a self-care scale for young women with menstrual pain was prepared, it was indicated that young women with strong menstrual pain do not properly care for themselves, their symptoms are not improved by self-care. Consequently, they need to visit a gynecologist¹⁾.

A survey by the Japan Association for The Advancement of Working Women (2004) pointed out that 27.1% of women 25 years old and younger visit a gynecologist for irregular menstruation. However, in contrast, 55.9% did nothing. Regarding degree of menstrual pain, 43.1% of women 25 years or younger responded “very bad,” and “bad”. However of these, only 13.6% visit a gynecologist, and 28.8% did nothing.²⁾

Similarly, the rate of consultation among women 25 years or younger was less than 30%, even though they had irregular menstruation and approx. 10% had strong menstrual pain. Menstrual disorders were often overlooked. According to Mochizuki, the most frequent main complaint by young women visiting a gynecologist is menstrual disorder.³⁾

Furthermore, most surveys on menstrual disorder in young women are small-scale studies. -omission- Approximately 80% of girls with menstruation-related disorders were reported to experience difficulty in their physical exercises and study but did not consult with anyone. Consequently, an accurate portrayal of the actual condition of menstruation in pubescent girls is still not understood.⁴⁾

Currently, no studies have been carried out which define the concept of menstrual disorders in young women. Identifying the conceptual structure of menstrual disorders in young women would be meaningful for health-care professionals and deepen their understanding, as well as be the foundation for future research. Consequently, the purpose of this study is to define the conceptional structure of menstrual disorders in young women by conceptual analysis.

II. Operational definition of terms

Young women: women in their late teens to early 20s who have experienced ovulatory cycles for several years after their first menstruation and are more susceptible to functional dysmenorrhea.

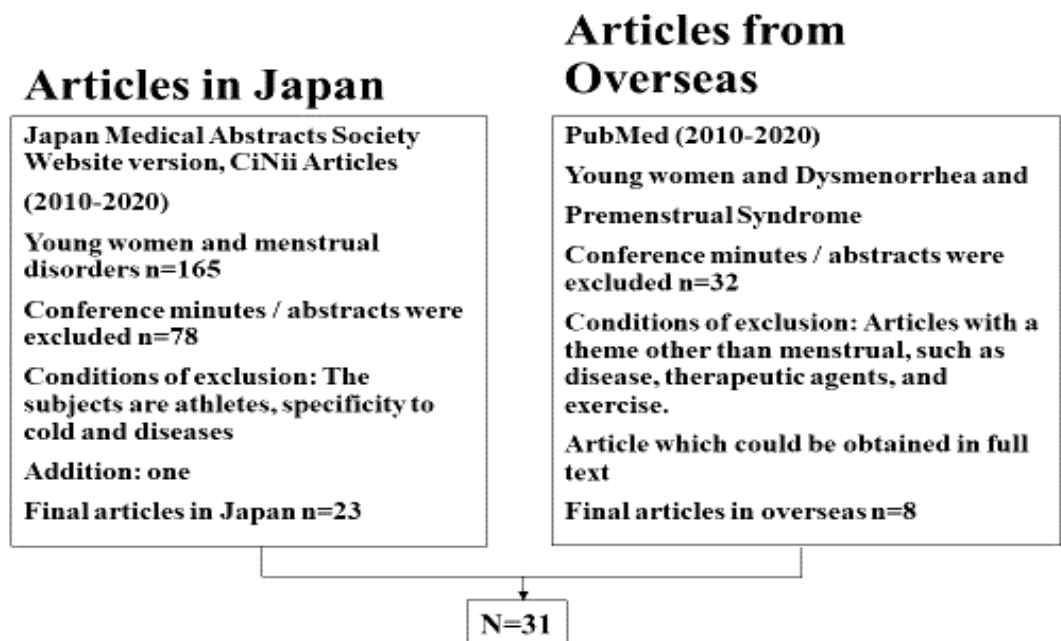
III. Research method

1. Selection of Articles

Articles from overseas were searched from PubMed (2010-2020) using the keywords “Young Women,” “Dysmenorrhea” and “Premenstrual Syndrome,” and conference minutes and review papers were excluded, and then original papers between 2010 and December 2020 were searched. The search was then narrowed down to articles published in academic magazines and with an abstract. resulting in a total of 32 articles extracted. From these 32 articles, studies regarding diseases and therapeutic agents, and studies with a theme other than exercise and menstruation were excluded, and 8 articles which could be obtained in full-text were extracted.

For articles in Japan, Japan Medical Abstracts Society website and CiNii Articles were searched using the keywords “Young Women” and “menstrual disorders.” 165 original papers published between 2010 and December 2020 were extracted. After conference minutes and review paper were excluded, 78 articles were extracted.

From these 78 articles obtained by the search, studies on a specific diseases and coldness, and studies targeting only athletes, were excluded, an article regarding the latest research on menstruation by the author was added, and a total of 23 articles were extracted. 8 articles from overseas and 23 articles in Japan, for a total of 31 articles, were targeted for analysis (refer to Fig. 1).



<Figure 1> Article extraction method and number of articles

2. Data analysis method

In this study, the conceptual analysis method of Rodgers (2000) was used to determine the conceptual analysis of menstrual disorders in young women. Since the philosophical foundation of this analysis has been refined and developed by changes over time, Rodger’s conceptual analysis was considered appropriate as the lifestyle of women with menstrual disorder has greatly changed over these past 30 years, and the environment surrounding young women is predicted to change with each generation.

The targeted articles were read intensively, attributes which comprise the concept, preconditions which show the background of menstrual disorders in young women and contents that correspond to the consequences as a result of the concept, were encoded and extracted. After that, the articles were divided into attributes, preconditions, and consequences, and the codes are classified into sub-categories, then the common items of the sub-categories were categorized, and correlation between categories were shown in a conceptual diagram (refer to Fig.2).

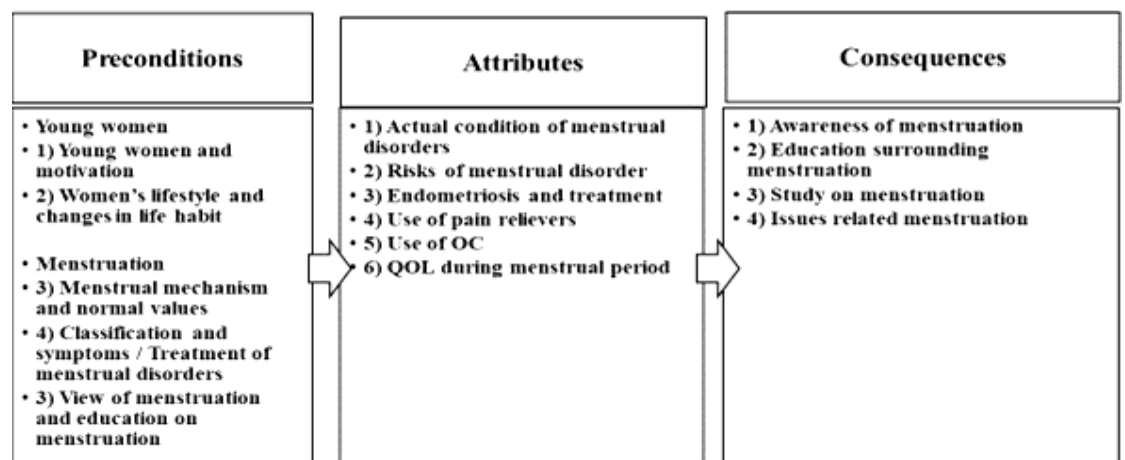
To ensure reliability and validity of the analysis, two professors of maternity nursing education supervised the analysis.

3. Ethical consideration

For the articles used in this study, quoted articles and the original sources were clearly described so as to avoid any copyright infringement.

IV. Results

The constructed concept of menstrual disorders in young women is shown in Fig. 2. Hereinafter, categories are shown as { }, sub-categories as [], and codes as “ ”. Here, the extracted categories are explained.



<Figure 2> Concept construct of menstrual disorders in young women

1. Attributes (Refer to Table 1)

As attributes of menstrual disorders in young women, six categories were extracted.

1) {Actual condition of menstrual disorders}

“Recognized symptoms of menstrual disorders increased 80% in Japan and abroad,”^{5,6} “Symptoms of menstrual disorders affected daily life / academic activities,”⁷ [Actual condition of symptoms during menstruation] increased, especially, [rate of dysmenorrhea and causes] exceeded 80%, with “excessive production of prostaglandin” determined to be the cause⁸. [Actual condition of irregular menstruation] was also approx. 25%, and “50% of women who have irregular menstruation had polycystic ovary syndrome (hereinafter referred to as PCOS).”⁷

In [Actual condition of menstruation concomitant symptoms / perimenstrual symptoms], “98.4% had symptoms.”⁵ In [Actual condition of menstrual pain], “lower abdominal pain (91%), lumbar backache (52.8%)” were observed. Regarding the [Actual condition of PMS], “In Europe, persons with premenstrual symptoms exceed 90%.” Also in Japan, “Patients with PMS and PMDD could potentially be 180,000 persons.” From this, the [Actual condition of menstrual disorders] affects most young women.

2) {Risks of menstrual disorders}

Among the [Risks of PCOS / irregular menstruation], “Ovulation disorder is the cause of 25-30% cases of infertility”¹² and among [Risks of dysmenorrhea], the “risk of endometriosis is 2.6 times higher”¹³ and among [Risks of PMS], “persons with a family history of such risks are 4.19 times more likely to experience PMS.”¹⁴

Furthermore, among the [Risks of hypermenorrhea], the “Risk of anemia” can be mentioned,^{7,15} and regarding [Risks of abnormal age of menarche], “the risk of abnormal bleeding is 6.92 times higher.” From this, the {Risks of menstrual disorder} are very large.

3) {Endometriosis and treatment}

[Early endometriosis] can easily be “diagnosed as functional dysmenorrhea since internal examination and image diagnosis are not possible.”^{4,13} [Causes of endometriosis] are “related to hormones and periodic menstruation,”¹⁶ and one of the [Signs of endometriosis] is “dysmenorrhea, which has spread among young women.”¹⁶ Furthermore, since “Late diagnosis of endometriosis” is listed among [Diagnosis and treatment of endometriosis]¹⁰, early detection of {Endometriosis and treatment} are difficult and delay in treatment is common.

4) {Use of analgesics}

Regarding the [Period of use of analgesics], it is “use is recommended in the early phase.”⁹ However, “persons who are averse to their use is 65%”⁹ due to [anxieties regarding use]. Consequently, [education of analgesics] is needed. Furthermore, regarding

the [rate of use of analgesics], “25-60% of young women use over-the-counter drugs.”⁹⁾ As a result, the “analgesic effect” is “insufficient in 40% of cases.”⁹⁾

Regarding [Therapeutic agents], “administration of NSAIDs”⁴⁾ is standard.

5) {Use of OC}

[Characteristics of OC users] include a “higher average age and a higher level of physical activity”.¹⁷⁾

Regarding [Efficacy of OC], “reduction in the amount of menstruation bleeding in RCT was clearly evident in 43% cases when administered to women with hypermenorrhea.”¹⁸⁾ However, the [Rate of use of OC] was found to have “a low distribution rate in Japan.”¹⁸⁾

6) {QOL during menstrual period}

“Q-LES-Q-SF”¹⁹⁾ is [a scale which can appropriately measure menstrual cycle QOL]. However, [satisfaction during menstrual period] was resulted in “satisfaction in the perimenstrual period in women 25 years and younger,”¹⁹⁾ and “rate of participation in the labor force for women 20-24 years old with functional dysmenorrhea is 69.1%, a decrease in not only QOL, but also QOW is observed,”^{1,7,10)} [Menstrual disorder adversely affects QOL], and {QOL during menstrual period} decreases.

<Table 1> Attributes of menstrual disorders in young women

Categories	Subcategories	Main code	Documentation
Actual condition of menstrual disorders	Actual condition of menstrual disorders	In Japan and abroad, menstrual symptoms were 30% before 1983 and increased to more than 80% after 2000; the number of young women complaining of menstrual symptoms over 30 years increased.	5) Kaimura&Ueda 6) Yamamoto
		Premenstrual and menstrual symptoms affected daily life / academic activities.	7) Karout, Hawai&Altuwajri
		Menstrual symptoms included lower abdominal pain (75%), bloating (75%), irritability (73%), increased appetite (64%), and acne (62%). Prevalence of lower abdominal pain was lower for East Asians than for Caucasians and South Asians.	17) Alicia, Jarosz&Ahmed
	Prevalence and causes of dysmenorrhea	Dysmenorrhea is the most common menstrual symptom with a prevalence of 85%.	4) Adachi
		Prevalence of dysmenorrhea in Iran is 22-28%, and most cases are primary dysmenorrhea.	19) Farideh, Sakineh&Moigan
		Dysmenorrhea is observed in 26% of 22-27 year olds and decreases to 21% for 31-36 year olds.	27) Brown W, Dobson A, Bryson L & Byles J
		7.7-57.8% were absent due to dysmenorrhea, 21.5% had reduced social activities, and back pain, headache, heavy bleeding were observed in half of the subjects.	10) Mark, Theodor, Moniek, Didi & Annemiek
		Prevalence of dysmenorrhea in Australian teens was 93%, 80% in Egyptian teens. A universal method to evaluate dysmenorrhea is lacking. Excessive prostaglandin production is a cause of dysmenorrhea pain.	8) Emmanuel, Samuel, Yaoyao, Xinxin & Xueqing
		Prevalence of dysmenorrhea in Ethiopia is 85.1%, due to family history and circumcision (female genital mutilation). 66% of case of dysmenorrhea experience lower abdominal pain, 28.4% mild, 24.2% moderate, 13.3% severe.	14) Muluken, Mamo & Desalegn 15) Ahmed, Atiea & Nadia
	Actual condition of irregular menstruation	25.2% of students with irregular menstruation have rare menstruation, rare menstruation is a symptom of PCOS, 50% of women with irregular menstruation have PCOS.	7) Karout, Hawai & Altuwajri
		Irregular menstruation affects life, health and work, irregular menstruation 24.38%.	8) Emmanuel, Samuel, Yaoyao, Xinxin & Xueqing
	Actual condition of menstruation concomitant symptoms / perimenstrual symptoms	Strong menstruation concomitant symptoms include decreased concentration, increased absenteeism, school absenteeism 25.3-51%, limited activity 60.4-63%, among those with menstrual symptoms 98.4%. Those with irregular sleeping and resting habits, no exercise habits, binge eating, smoking, and unhealthy stress management behaviors experience stronger perimenstrual symptoms.	5) Kaimura & Ueda
		88.2% have menstrual cramps, but do not address them. 32.8% have menstrual cramps that interfere with daily life.	5) Kaimura & Ueda
		Subjects with constant menstrual pain all the time (56.9%), occasional pain (43.1%), extreme pain (14.6%), moderate pain (68.1%). Mild pain (17.4%), 80% of those with menstrual pain experience difficulty in daily life, lower abdominal pain (91%), lumbar backache (52.8%). Menstrual pain symptoms include lower abdominal pain, headache, back pain, nausea, diarrhea, etc. Other non-medical faculty showed a 2.5 to 3 times higher risk of menstrual pain. Women in their late teens to early 20s have strong menstrual pain.	9) Hirata 13) Momoeda 22) Kaimura
	Actual condition of PMS	Subjects who experience premenstrual symptoms exceeded 90% in Europe, 77.3% of women have psychological impairment before and during menstruation, 30% PMS, 8% PMDD. There are potentially 180,000 patients with PMS and PMDD, 1-4% with PMDD in Japan, 5-20% with moderate to severe PMS.	10) Mark, Theodor, Moniek, Didi & Annemiek 11) Hamanishi
Psychobehavioral symptoms of premenstrual symptoms were irritability (34.8%), fatigue (28.7%), depression (26.3%), anxiety/tension (23.7%), physical symptoms included breast tenderness (52.3%), abdominal distension (33.9%), acne (26.0%), headache (19.0%), and joint and muscle pain (17.5%).		14) Muluken, Mamo&Desalegn	
The prevalence of PMS increases with dysmenorrhea, and school absenteeism and decreased work productivity were observed in patients with moderate to severe PMS.		19) Farideh, Sakineh&Moigan	
More than 60% of subjects experience premenstrual irregular symptoms. Premenstrual irregular symptoms have a negative impact on interpersonal problems, and many college students have premenstrual symptoms.		24) Kagawa, Kitamura, Ninomiya & Terashima	
PMS is observed in 35% of 22-27 year olds and decreases to 41% for 34-39 year olds.		27) Brown W, Dobson A, Bryson L & Byles J	
Risks of menstrual disorders	Risks of PCOS / irregular menstruation	PCOS is a risk of endometrial hyperplasia and endometrial cancer due to long-term estrogen exposure due to anovulation. Not only for amenorrhea treatment, but regular cancer screening, risk factors for future hypertension, hyperlipidemia, and diabetes.	3) Mochizuki
		Factors such as age, age at menarche, drinking, lack of exercise, lack of socializing, and BMI increase the risk of developing menstrual irregularities.	8) Emmanuel, Samuel, Yaoyao, Xinxin & Xueqing
		Menstrual disorders are a risk for developing osteoporosis, uterine cancer, etc. Ovulation disorders are the cause of infertility in 25-30% cases. About 70% of menstrual disorders are caused by abnormalities of the central hypothalamic-pituitary system. Irregular menstruation is associated with a 28% increase in the risk of coronary heart disease and a higher risk of type 2 diabetes.	12) Iwasa, Matsuzaki & Irahara 15) Ahmed, Atiea & Nadia
	Risks of dysmenorrhea	Patients with functional dysmenorrhea have a 2.6 times higher risk of developing endometriosis in the future.	13) Momoeda
		Persons with a family history of dysmenorrhea are 4 times more likely to develop dysmenorrhea. Dysmenorrhea is a hereditary factor.	14) Muluken, Mamo & Desalegn
	Risks of PMS	Persons with a family history of PMS are 4.19 times more likely to experience PMS, and those with irregular menstruation are 4.19 times more likely to experience PMS. 1.87 times more likely to have PMS, due to irregular menstruation which can cause PMS.	14) Muluken, Mamo & Desalegn
	Risks of hypermenorrhea	Blood loss due to menstruation affects QOL, heavy bleeding is a risk for anemia.	7) Karout, Hawai & Altuwajri 15) Ahmed, Atiea & Nadia
Risks of abnormal age at menarche	Abnormal age at menarche is 4.76 times that of the normal age of menarche, risk of rare menstruation is 3.17 times, and risk of abnormal bleeding is 6.92 times. Prevalence is high when age at menarche is less than 11 years or more than 14 years.	7) Karout, Hawai & Altuwajri	

Endometriosis and treatment	Early endometriosis	Early endometriosis cannot be diagnosed by internal examination or imaging, so it is diagnosed as functional dysmenorrhea, functional dysmenorrhea is an early stage of endometriosis exists, endometriosis causes infertility in 30-50% of women, treatment begins early in women with severe dysmenorrhea.	4) Adachi, 13) Momoeda
	Causes of Endometriosis	Endometriosis is present in 6-10% of women of reproductive age, onset is related to sex steroid hormones and cyclical menstruation.	16) Kitajima, Seno, Hiraki, Kawano, Hamaguchi & Fujishita
		Dieting causes abnormal uterine muscle contraction due to hormonal imbalance, resulting in increased menstrual blood reflux which promotes the development of endometriosis lesions.	25) Fujiwara
	Signs of endometriosis	13.0% of students experience menstrual pain extending to the anus, which is an indicator of endometriosis. Early detection and treatment of endometriosis before pregnancy.	7) Karout, Hawaii & Altuwajri
		Dysmenorrhea that progresses in young women and chronic pelvic pain outside of the menstrual period is organic dysmenorrhea caused by endometriosis. 10% of cases of severe dysmenorrhea show uterine abnormality, and dyspareunia may indicate endometriosis.	16) Kitajima, Seno, Hiraki, Kawano, Hamaguchi & Fujishita 15) Ahmed, Atia & Nadia
Diagnosis and Treatment of Endometriosis	Many general practitioners consider the diagnosis of endometriosis to be late. Endometriosis is seen in 25-70% of young women with chronic pelvic pain after laparoscopic surgery. Incidence of endometriosis greatly increases in women over 20 years of age. Treatment is pain control and inhibiting progression of endometriosis lesions. NSAIDs and low-dose pills are used, but if no effect, laparoscopic surgery is performed.	10) Mark, Theodor, Moniek, Didi & Annemiek 16) Kitajima, Seno, Hiraki, Kawano, Hamaguchi & Fujishita	
Use of pain relievers	Period of use of pain relievers	Use of analgesics during the early stage of menstrual pain is recommended, 48.7% use analgesics at early stage, 51.3% use it when pain appears.	9) Hirata
	Anxiety regarding use	A negative stance toward the use of analgesics results in a delay of treatment. Regarding the reason for not using analgesics early 21% say they "should be patient", and 65% are reluctant to use them. Dependence, tolerance, concerned about side effects 55%, awareness of side effects 75%, when ineffective, it is easy to think tolerance has been developed.	9) Hirata
	Therapeutic agents	Treatment: NSAIDs, if endometriosis suspected use of low-dose EP combination.	4) Adachi
	Education on analgesics	Since the side effects are not understood, include education on therapeutic agents in school curriculum, consult with pharmacists and doctors, and provide thorough guidance. Introduction of the use of medicine in health and physical education at junior high schools from 2012, and education on the use of analgesics by high school students is needed.	9) Hirata
	Rate of use of analgesics	Use of analgesics a few days a month for menstrual pain is not a problem. 25-60% of young women use analgesics, and many use over-the-counter drugs. Analgesic use for menstrual pain is 54.2%, 426 times higher in the group with very severe menstrual pain and 38 times higher in the group with moderate menstrual pain.	9) Hirata
	Analgesic efficacy	Efficacy of analgesics lacking in 40% of cases, over-the-counter analgesics less effective than prescribed analgesics. Analgesic effect: markedly effective 60.3%, relief but still painful 37.2%, only slight relief 2.6%, insufficient effect 39.7%.	9) Hirata
	Information on analgesics	Information on analgesics was 75.6% from family, teachers, and friends, 10.3% from doctors and pharmacists, 9.0% from outer box description, and 5.1% from package insert. Regarding junior high school students, half of the mothers worry about their daughters' use of analgesics, accurate knowledge of analgesics is needed, even for parents.	9) Hirata
	Side effect of the use of analgesics	25.0% of patients do not know the side effects of the analgesic, 68.1% have side effects but do not know details, 6.9% understand the side effects and details. Side effects include drowsiness, headache/dizziness, stomach problems. Persons unfamiliar with the side effects are anxious simply because there are side effects and don't use them.	9) Hirata
Use of OC	Attributes of users of OC	The average age of OC users is higher, and physical activity is higher in OC users than in non-users.	17) Alicia, Jarosz & Ahmed
	Rate of use of OC	Caucasian women use OCs the most (43%), others (34%), South Asians (17%), East Asians (13%). For PCOS treatment, administration of progestins to promote periodic bleeding and normalize menstruation. Postmenopausal women do not have reservations regarding the use of OCs, but the prevalence of OCs is low in Japan. Women with dysmenorrhea have a lower rate of OCP use.	17) Alicia, Jarosz & Ahmed 18) Koumura 27) Brown W, Dobson A, Bryson L & Byles J
		Efficacy of OC	Use of OC improves premenstrual symptoms, there are fewer severe side effects, OC promotes the good management of premenstrual symptoms, and alleviates moderate/severe premenstrual symptoms. Efficacy of OC for dysmenorrhea is clearly evident in RCT, reduction in menstrual bleeding after OC administration in women with hypermenorrhea in 43% of cases.
QOL during menstrual period	Scales which can appropriately measure menstrual cycle QOL	Scales such as SF-36, SF-12, and WHOQOL are not suitable to assess variation in QOL during the menstrual cycle. Q-LES-Q-SF is a suitable scale which can assess the variation of QOL during menstrual cycle.	19) Farideh, Sakineh & Mojgan
	Degree of satisfaction of menstruation	Satisfaction with the peri-menstrual period among women under 25 years of age is lower than that for women over 25 years of age. In the Q-LES-Q-SF, scores for physical and psychosocial factors are significantly lower during the premenstrual week than in the late follicular phase.	19) Farideh, Sakineh & Mojgan
	Menstrual disorders negatively affect QOL	Rate of participation in the labor force for 20-24 year olds with functional dysmenorrhea is 69.1% QOW as well as QOL is decreased, and economic loss due to increased absenteeism/medical use is observed. PMDD decreases QOL of students suffering from PMS. Moderate and severe dysmenorrhea and PMS negatively affect QOL.	1) Yamamoto 7) Karout, Hawaii & Altuwajri 10) Mark, Theodor, Moniek, Didi & Annemiek 19) Farideh, Sakineh & Mojgan 27) Brown W, Dobson A, Bryson L & Byles J

2. Preconditions (Refer to Table 2)

Regarding preconditions influenced by the subjects, {Young women and motivation}, {women's lifestyle and change in life habits}, could be extracted, those influenced by menstruation itself, five preconditions, namely {menstrual mechanism and normal values}, {classification and symptoms / treatment of menstrual disorders}, and {view of menstruation and education of menstruation} were extracted.

1) {Young women and motivation}

[Definition of young women] is "women in their late teens to early 20s who experience extreme menstrual pain"⁵⁾ and do carry out self-care without "[motivation] of goals"²⁰⁾.

2) {Women's lifestyle and changes in life habits}

[Change of women's lifestyle] is large. Late marriage and births later in life -omission- tended to increase the frequency of menstruation, and as a result, "increased dysmenorrhea".¹⁾ The [effect on reproductive function] occurred due to [changes in life habits] and [the effect of missing breakfast].

However, there is a strong [desire to lose weight], and [meals and life rhythm are important], so there is a need for [intervention of life habits].

3) {Menstrual mechanism and normal values}

[Definition of menstruation], [normal values of menstruation], [menstrual feedback mechanism], and [normal value of first menstruation] are almost the same in Japan and abroad.

4) {Classification and symptoms / Treatment of menstrual disorders}

Menstrual disorders are varied and classified as [Abnormality in the first menstruation period], [definition of menstrual disorder], [causes and classification of amenorrhea], [disorders in menstrual cycle], [abnormal bleeding], [definition of dysmenorrhea], [tendency of dysmenorrhea], [functional dysmenorrhea and organic dysmenorrhea, definition], [symptoms of PMS], [causes and treatment of PMS], and [tendency of PMS].

5) {View of menstruation and education on menstruation}

Since "younger women have a more negative view of menstruation,"²¹⁾ they have "strong menstruation concomitant symptoms."^{5,22)} Although "The Netherlands is an open society, the taboo of menstruation has not broken."¹⁰⁾ The [menstruation taboo] exists. In Japan, [Dissatisfaction regarding menstrual education and lack of knowledge] is observed, [Coping behavior during menstrual period] is not effective.

<Table 2> Preconditions of menstrual disorders in young women

Categories	Sub- categories	Main code	Documentation
Young women and motivation	Definition of young women	Young women over 18 years old and under 25 years old [Definition of young women] is "women in their late teens to early 20's who experience extreme menstrual pain" ⁵⁾ and do carry out self care without "[motivation] of goals" ²⁰⁾ .	1) Yamamoto, 20) Fukuyama 5) Kaimura & Ueda
	Motivation	Behaviors and life habits which lead to improved QOL include the reasons for the behavior, preparation factors that motivate behavior, and the behavior There are reinforcing factors that provide continuous and sustained rewards and motivation, and enabling factors needed to realize the behavior Provision of knowledge is needed, but without the motivation of goals necessary for self-care, self-care is not carried out.	5) Kaimura & Ueda 20) Fukuyama
Women's lifestyle and change in life habits	Change in women's lifestyle	Marriage and childbirth later in life, over 30 years old at time of first childbirth, declining birthrate. Frequency of menstruation 10 times that of before World War 2. Frequency of menstruation has increased, and more women experience dysmenorrhea Changes in women's lifestyles: 1) westernized diet, 2) earlier sexual maturity, 3) higher education, 4) increase number of working people, 5) Marriage later in life, 6) Decreased birthrate, 7) Increased frequency of menstruation, 8) Increased life expectancy	1) Yamamoto 28) Yasui
	Increased stress	Stress among women aged 12 and older was 40.4% in 1995 and 52.2% in 2007. Stress is higher among younger women Female reproductive organs are sensitive to physical and physiological stress, and high stress negatively affects both physically and emotionally.	5)Kaimura & Ueda, 22)Kaimura 8)Emmanuel,Samuel,Yaoyao, Xinxin & Xueqing
	Change in life habits	In terms of sleeping habits, most women go to bed after 2:00 a.m., and the percentage of women who miss breakfast was 28.6%. After school enrollment, increase from 6.0% to 24.7% after 3 months, exercise habit is low at 10.8%, smoking habit is high at 12.8%	22) Kaimura
	Effect of missing breakfast	Missing breakfast negatively affects menstrual cycle disorders, reproductive function, and affects daily QOL	25) Fujiwara
	Effect on reproductive function	Abnormalities in reproductive function caused by irregular dietary habits occur and interfere with the period of motherhood. Diet restrictions which are disassociated with diurnal rhythms have a synergistic negative effect on reproductive functions	25) Fujiwara
	Intervention in life habits	Comprehensive interventions to effectively regulate behavior and life habits, and promotion factors are needed.	5) Kaimura & Ueda
	Diet and the desire to be thin	As the ideal for a young women to weigh less than the standard weight, the number of underweight women 20-29 years old has increased, doubling from 30 years ago. Many teenage girls want to be thinner than necessary, and dieting is strongly related as a trigger for amenorrhea.	5) Kaimura & Ueda, 25) Fujihara 26) Narahara
	meals and life rhythm are important	Consistency in meals and life rhythm can minimize the negative affect reproductive function while dieting.	25) Fujiwara
Menstrual mechanism and normal values	Definition of menstruation	Menstruation is periodic bleeding from the endometrium which occurs approximately once a month and stops spontaneously within a limited number of days. Menstruation is exfoliative bleeding of the endometrium caused by the disappearance of sex steroid hormones secreted by the ovaries.	3) Mochizuki 26) Narahara
	Menstruation and normal values	A normal range is a cycle of 25-38 days, with a ± 6 day variation, lasting 3-7 days and 20-140 ml of menstrual bleeding. If ovulation is normal, average blood loss is 33.2 (10-84) ml, cycle is 26-35 days, bleeding is 3-6 days with a maximum on Day 2	3) Mochizuki, 26) Narahara 7) Karout,Hawai & Altuwajri 8)Emmanuel,Samuel,Yaoyao, Xinxin & Xueqing, 15) Ahmed,Atlea & Nadia
	Menstrual feedback mechanism	In young women, the hypothalamic-pituitary-ovarian system is immature, there is anovulation shortly after menarche, and there is no ovulation. Cycles are indeterminate during the first 2 years after menarche, 80% at 5 years, and more than 90% at 6-7 years.	6) Yamamoto, 18) Koumura,
	Normal values of the first menstruation	Irregular menstrual cycle immediately after menarche, anovulatory bleeding, 25-50% anovulatory bleeding even 4 years after menarche. Mean age of menarche is 12.3 \pm 1.5 years, range is 11-16 years	3) Mochizuki, 25) Fujiwara 8)Emmanuel,Samuel,Yaoyao, Xinxin & Xueqing, 15) Ahmed,Atlea & Nadia

Classification and Symptoms / Treatment of menstrual disorders	Abnormal timing of menarche	Menarche onset at less than 10 years of age (premature menstruation), menarche onset at 15 years of age or older (delayed menstruation), no menstruation until 18 years of age	4) Adachi, 29) Koumura
	Definition of menstruation disorder	Secondary amenorrhea: suspension of menstruation for more than 3 months	4) Adachi, 12) Iwasa, 29) Koumura
		Frequent menstruation: menstrual cycle of 24 days or less, Rare menstruation: menstrual cycle of 39 days or more Irregular cycle: menstruation that does not match the normal cycle of 25-38 days, cycle variation: continues within ± 6 days	4) Adachi
	Causes and Classification of Amenorrhea	Causes of secondary amenorrhea - reduced eating (43.6%), overeating (6.3%), stress (10.7%)	28) Yasui
		There are two types of secondary amenorrhea: first-degree amenorrhea and second-degree amenorrhea.	26) Narahara
		Secondary amenorrhea with weight loss is classified as weight loss amenorrhea or anorexia nervosa	26) Nakahara, 28) Yasui, 30) Koumura,
	Menstruation cyclic disorder	Causes of hypothalamic amenorrhea: stress, weight loss, exercise burden, environmental changes	26) Narahara
		Abnormal menstrual cycle: hypothalamic-pituitary-ovarian dysfunction, suppression causes: inappropriate eating habits, stress, excessive exercise Dieting: increased menstrual cycle disorder, past experience dieting: no menstrual cycle disorder but strong menstrual pain	25) Fujiwara
		Polycystic ovary syndrome (PCOS): 5-8% cause of infertility	18), 29) Koumura, 28) Yasui
		Extremely short menstruation: bleeding for 2 days or less, Extremely long menstruation: bleeding for 8 days or more	4) Adachi
	Abnormal bleeding	Excessive menstruation: abnormally heavy bleeding; Hypogonadism: abnormally light menstrual bleeding	4) Adachi
		Abnormal bleeding: need to change the sanitary napkin more than 5 times a day - discharge of blood clots (heavy menstrual flow) Clots during menstruation: severe menstrual pain	8) Emmanuel, Samuel, Yaoyao, Xinxin & Xueqing, 15) Ahmed, Atlea & Nadia, 30) Tada & Asaka
	Definition of dysmenorrhea	Dysmenorrhea: a pathologic symptoms accompanying the menstrual period.	30) Tada & Asaka
	Trends in dysmenorrhea	Dysmenorrhea, under 25 years old 43.1% , school life affected 40%.	1) Yamamoto
		Menstrual concomitant symptoms in more than 70% to 90% of cases, strong menstrual pain in late teens and early 20s, 88.2% with menstrual pain Interference with daily life 30%, school absenteeism 10%, interference in daily life 32.8% but not addressed	5) Kaimura & Ueda
		Approximately 1/4 had dysmenorrhea, psychological complaints, significant fatigue, and decreased activity in one out of three persons	10) Mark, Theodoor, Moniek, Didi & Annemiek, 27) Brown W, Dobson A, Bryson L & Byles J
		Dysmenorrhea is observed in 20-24 year olds and decreases thereafter, 21-35 day menstrual cycle decreases dysmenorrhea	14) Muluken, Mamo & Desalegn
	Functional dysmenorrhea and Organic dysmenorrhea	Mean age of menarche 12 years old, 7 years older after menarche, ovulatory cycle and functional dysmenorrhea from 19 years old	6) Yamamoto
Classified as functional dysmenorrhea if there is no organic cause or as organic dysmenorrhea if there is organic disease.		13) Momoeda	
Functional dysmenorrhea is painful during menstruation without organic disease, starts several hours before bleeding, and lasts 48-72 hours Organic dysmenorrhea affects fertility and requires treatment.		19) Farideh, Sakineh & Mojgan, 31) Ayabe	
Causes and treatment of dysmenorrhea	Treatment includes non-steroid, anti-inflammatory analgesics, non-pyrine analgesics, antispasmodics, and low-dose pills.	6) Yamamoto	
	Women with dysmenorrhea have high levels of PGs in the endometrium and menstrual blood, and ischemic changes cause lower abdominal pain and back pain	31) Ayabe	
Definition of PMS	Premenstrual syndrome: physical and mental symptoms begin 3-10 days before the onset of menstruation and decrease with the onset of menstruation	4) Adachi	
	Mental and physical symptoms that occur repeatedly before menstruation are called PMS, and those with strong mental symptoms are called PMDD	11) Hamanishi, 14) Muluken, Mamo & Desalegn	
	Premenstrual symptoms include physical and psychosocial symptoms occur in the late luteal phase and decrease a few days after the onset of menstruation.	17) Alicia, Jarosz & Ahmed	
PMS Symptoms	PMDD is often associated with aggressive behavior, hindering interpersonal relationships Physical symptoms include swelling, headache, fatigue; psychological symptoms including anxiety, depression, etc. More than 80% of women experience these symptoms regularly	11) Hamanishi, 17) Alicia, Jarosz & Ahmed	
Causes and treatment of PMS	PMS is caused by a decrease in progesterone, which leads to a decrease in serotonin secretion, depression, and fatigue. Symptoms such as irritability occur, treatment methods are hormonal therapy, herbal therapy, psychotropic drugs, symptomatic treatment, and LEP preparations	7) Karout, Hawal & Altuwaijri, 15) Ahmed, Atlea & Nadia, 18) Koumura	
	Symptoms disappear with the onset of menstruation in 97.8% of cases of PMS. When symptoms appear, daily life is affected	8) Emmanuel, Samuel, Yaoyao, Xinxin & Xueqing	
Trends in PMS	Many women in their late teens and early twenties experience psychosocial symptoms caused by menstrual pain before menstruation.	22) Kaimura	
	More than one-third of women suffer from PMS, with prevalence peak approximately at the age of 35.	27) Brown W, Dobson A, Bryson L & Byles J	
View of menstruation and menstrual education	Negative view of menstruation and positive view of menstruation	A negative view of menstruation as 'troublesome' is strong, and the younger the person is, the more negative the view of menstruation is.	21) Kaimura & Ueda
		A negative reactions during menarche influences the formation of a negative view of menstruation. Persons with a negative view of menstruation have more concomitant symptoms with menstruation.	5) Kaimura & Ueda, 22) Kaimura
		A healthy lifestyle and a positive view of menstruation reduce menstrual-associated symptoms	21) Kaimura
	Menstruation taboo	The Netherlands is an open society, but lacks openness to menstrual complaints and menstrual taboos have not been broken.	10) Mark, Theodoor, Moniek, Didi & Annemiek
	Dissatisfaction regarding menstrual education and lack of knowledge	Menstruation education is provided, but 33.3% are dissatisfied with the education because it is insufficient 24% of junior high and high school students have some knowledge of the menstruation mechanism, a lack of knowledge regarding menstruation is indicated.	5) Kaimura & Ueda
Coping behavior during menstrual period	Regarding frequently used medications such as analgesics, have students read the package inserts in class and recognize specific side effects	9) Hirata	
	Common coping behaviors during menstruation include "lie down and rest" and "endure."	21) Kaimura & Ueda	

3. Consequences (Refer to Table 3)

Regarding consequences, four categories, namely {Awareness of menstruation}, {education surrounding menstruation}, {research on menstruation}, {issues related to menstruation} were extracted.

1) {Awareness of menstruation}

Regarding [Acceptance of menstruation], “modification of awareness of menstruation”²³⁾ and “comprehensively understanding physical, mental, and social factors,”⁵⁾ and “education of knowledge regarding perimenstrual symptoms, and enlightenment / PR activities”²⁴⁾ are needed.

Furthermore regarding [Awareness of premenstrual symptoms], “rather than negatively accepting it, assisting a person to understand the importance of acceptance”²⁴⁾ is valuable.

2) {Education surrounding menstruation}

In [Actual condition of visiting a gynecologist], “85.9% of women in their 20s experience PMS, but awareness of disease and visits to a gynecologist are low.”¹¹⁾ The rate of visiting a gynecologist is not high. Regarding [Support during the menstrual period], since there is little “information support,”⁵⁾ it does not lead to “continued knowledge and self-care.”¹⁾ One [Meaning of health education regarding menstruation] is that “early detection of disorders such as a menstrual disorder is beneficial”⁷⁾.

3) {Studies on menstruation}

Regarding [Studies on menstruation are behind], “conditions surrounding menstruation have not changed, even though more than 10 years have passed since indications were defined by the Ministry of Health, Labour and Welfare.”⁵⁾ However, “improvement in menstruation concomitant symptoms due to self-care has been observed according to some studies.”¹⁾

Since [Development of a scale for menstruation is poor], “research on a scale development is needed”⁵⁾ due to “few new development is needed”⁵⁾ due to “few new developments in Menstrual Distress Questionnaire (MDQ) and PMS memory”⁵⁾.

4) {Issues related menstruation}

Regarding [Compensation for the lack of knowledge on menstruation and response] “an appropriate response is not taken due to the lack of knowledge on menstruation and too few places where health consultations are provided.”²²⁾ Regarding [Consultation leading to a visit to the gynecologist], among persons who receive a consultation for menstruation in Japan, “80% are mothers,”⁵⁾ “influenced by the advices of their family.”⁵⁾ Regarding [Improvement of the negative influence on society], since “menstruation issues influence family, society, and the national economy,”^{8,14,22,24)} improvement is needed.

<Table 3> Consequences of menstrual disorders in young women

Categories	Sub-categories	Main code	Documentation
Awareness of menstruation	Awareness to accept menstruation	In Japan, menstruation is only treated from the medical perspective, but there are few multifaceted perspectives that include the mental and social aspects. In the future, a comprehensive view of the physical, mental, and social factors and demonstrating how they are interrelated, is needed.	5) Kaimura & Ueda
		Medical treatment and counseling at a medical institution can promote a change in perception of menstruation and positive coping choices can be more easily made.	23) Kagawa, Tsuchiya, Saito & Terashima
	Awareness of premenstrual symptoms	It is possible not only to accept menstruation, but also think positively about it. Menstruation is a familiar problem and affects QOL. Support through education of knowledge regarding perimenstrual symptoms, and enlightenment / PR activities	24) Kagawa, Kitamura, Ninomiya & Terashima
		For premenstrual symptoms, there is a difference in resilience and seeking support and in the perception of menstruation regarding mental and physical complaints. There is also a difference in knowledge and how to deal with it.	23) Kagawa, Tsuchiya, Saito & Terashima
Education surrounding menstruation	Practice of gynecology examination and diagnosis	Through counseling, students with premenstrual symptoms can learn how not to view menstruation negatively, but realize the importance of accepting it, their original worries can be alleviated.	24) Kagawa, Kitamura, Ninomiya & Terashima
		Care when interviewing and examining teenage patients is important. If the pelvic examination is traumatic, they may refuse to see the doctor and reject medical treatment. Checking for sexual intercourse and pregnancy, and half of all visits to gynecologists by young women are for menstrual disorder.	3) Mochizuki
		85.9% of women in their 20s experience PMS, but awareness of the disease is low and they have not visited a gynecologist because the symptoms go away after menstruation, they are not aware of the disease and do not seek medical attention.	11) Hamanishi
	Support during menstrual period	Screening women with strong premenstrual symptoms can encourage them to seek medical attention and prevent secondary problems	24) Kagawa, Kitamura, Ninomiya & Terashima
		Less than 30% of women receive education on self-care of menstrual pain, and this is not connected to continued knowledge, and self-care. No information on symptom relief, daily living, etc. is provided during menstrual education.	1) Yamamoto
	Significance of health education regarding menstruation	Young women receive emotional support, but are not given practical support regarding symptom relief and daily living.	5) Kaimura & Ueda
		Health education on menstrual disorders that targets female students and their parents, including education on reproductive health, in the school curriculum is considered beneficial for early detection of disorders such as menstrual disorder.	7) Karout, Hawai & Altuwajri
Study of menstruation	Study of menstruation is behind	The use of PMS memory and education on menstruation concomitant symptoms are important	24) Kagawa, Kitamura, Ninomiya & Terashima
		Understanding events even under stressful conditions and positive recognition is important in maintaining and improving health.	
		Studies have clarified that menstruation concomitant symptoms have a major physical and mental effect, but improvement of such symptoms is observed by self care.	1) Yamamoto
	Development of menstrual scale are few	Conditions surrounding menstruation have not changed, even though more than 10 years have passed since indications were defined by the Ministry of Health, Labour and Welfare	5) Kaimura & Ueda
In the future, a comprehensive view of the physical, mental, and social factors have each been studied, but a comprehensive view of factors and demonstrating how they are interrelated, is needed. Studies of perimenstrual symptoms which focus on the QOL of young women are behind			
Issues related Menstruation	Lack of knowledge on menstruation	MDQ and PMS memory are tools to measure menstruation concomitant symptoms, but they have been modified and used independently, with little new development.	5) Kaimura & Ueda
		Perception of perimenstrual symptoms is subjective, and symptom assessment requires objectification and quantification. Consequently, research for the development of a scale is needed.	
	Consultations which lead to a medical examination	Menstrual pain is a health issue which is caused by insufficient treatment due to women's lack of knowledge and society's lack of understanding.	20) Fukuyama
		Due to the lack of knowledge on menstruation and the fact that there are not enough places where health consultations are provided.	22) Kaimura
	Improvement on the effect on society	80% of consultations for menstruation are by mothers and are influenced by the advice of their family.	5) Kaimura & Ueda
43.7% consulted with the doctor, 11.4% were referred to a gynecologist, 9.8% had endometriosis, adenomyosis, fibroids, and PCOS.		10) Mark, Theodor, Moniek, Didi & Annemiek	
Menstrual problems consulted doctors, pharmacists, mothers, sisters, friends.		15) Ahmed, Atiea & Nadia	
		Menstruation issues influence family, society, and the national economy.	5) Kaimura & Ueda, 8) Emmanuel, Samuel, Yaoyao, Xinxin & Xueqing, 14) Muluken, Mamo & Desalegn, 22) Kaimura, 24) Kagawa, Kitamura, Ninomiya & Terashima

V. Discussion

1. Attributes of menstrual disorders in young women

The concept of menstrual disorders in young women was defined as “in actual conditions of menstrual disorders, there is great variation, such as dysmenorrhea, PMS, irregular menstruation, and accordingly, related risks have been observed, and the existence of endometriosis is also partially indicated. Analgesics and OC are not appropriately utilized, and QOL of young women during menstrual period decreases.”

2. Background of menstrual disorders in young women

1) Young women's lifestyle and change in life habits

One precondition, [Women's lifestyle and changes in life habits], is significant as background. Over the past 30 years, women's lifestyles in Japan have greatly changed. As popularization of higher education, advances in society, trends in decreased birthrate due marrying and having children later in life, have continued, the average age for a women's first birth was over 30 years. Total fertility rate in 2020 was 1.34, and continues to fall. Consequently, after World War 2, the frequency of menstruation has significantly increased, and more women experience dysmenorrhea.¹⁾

Furthermore, life habits of young women have also greatly changed. “the number of women 20-29 years with a low body weight has increased, twice that of 30 years ago” as represented by the [desire to lose weight].^{5,25)} Dieting causes the menstrual cycle to become irregular, and the weight loss eventually leads to amenorrhea. For persons who have dieted in the past, even if amenorrhea is treated and the menstrual cycle returns to normal, strong menstrual pain often remains.²⁶⁾

Sleeping habits have also changed due to the spread of the Internet, and the number of persons who go to sleep after 2 am has increased. The proportion of women in their 20s who miss breakfast is 28.6%. Exercise habits are few, and the number of women who partake in luxury items such as smoking and alcohol, have increased, as the number of working women has increased.²²⁾ Since “diet restrictions which are disassociated with diurnal rhythms have a synergistic negative effect on reproductive functions”²⁵⁾, menstrual disorders can easily occur in the daily lives of young women in the modern generation.

2) Negative view of menstruation and lack of education on menstruation

“A negative the view of menstruation as ‘troublesome’ is strong, and the younger the person is, the more negative the view of menstruation is.”²¹⁾ “A negative reaction to the person's first menstruation affects the formation of a negative view of menstruation.”^{5,22)}

In Japan, menstruation education is provided for all elementary school students, but “33.3% are dissatisfied with the education because it is insufficient.”⁵⁾ Since “24% of junior high and high school students have some knowledge of the menstruation mechanism, a

lack of knowledge regarding menstruation is indicated,”⁵⁾ and consideration of the contents of the menstruation education is needed.

3. Issues in menstruation education and research surrounding young women

In Japan, “80% of consultations for menstruation are by mothers,” “influenced by the advice of their family.”⁵⁾ Overseas however, “43.7% consult with a physician.”¹⁰⁾

Regarding [Actual condition of visiting a gynecologist] in Japan, “85.9% of women in their 20s experience PMS, but awareness of the disease is low and they have not visited a gynecologist because the symptoms go away after menstruation.”¹¹⁾ The rate of young women visiting a gynecologist is low. Although “they experience menstrual pain -omission- an appropriate response is not taken due too few places where health consultations are provided.”²²⁾ Consequently, an environment where “consultations which lead to the action of visiting a gynecologist,” are needed.

Regarding [Support during menstrual period], since “information support which connects to practical self-care, such as symptom alleviation and ideas in daily life are few,”⁵⁾ “health education on menstrual disorders that targets female students and their parents, including education on reproductive health, in the school curriculum is considered beneficial for early detection of disorders such as menstrual disorder.”⁷⁾ Similarly, [improvement in the negative effect to society] by {a compensatory response to the lack of knowledge on menstruation}.

While [research on menstruation is behind] is currently observed, “studies have clarified that menstruation concomitant symptoms have a major physical and mental effect, but improvement of such symptoms is observed by self-care.”¹⁾ Consequently, consideration of menstruation education to help young women perform self-care is needed.

[Development of a scale for menstruation is poor] is observed, and MDQ and PMS memory, etc. are scales developed in 1900s. Study on the development of a new scale for menstruation which considers the background of modern young women is important in the future.

VI. Conclusion

The concept of menstrual disorders in young women was defined as “in actual conditions of menstrual disorders. There is great variation, such as dysmenorrhea, PMS, irregular menstruation, and accordingly, related risks have been observed, and the existence of endometriosis is also partially indicated. Analgesics and OC are not appropriately utilized, and QOL of young women during menstrual period decreases.” Consideration of the background of modern young women who easily experience menstrual disorders, and promotion of better menstruation education are important.

VII. Limitations and future asks of this study

One limitation of this study is that analysis on the use of terms is based on a limited number of articles. The possibility of bias in article extraction can be mentioned.

Moreover, menstrual disorders in young women are individualized, therefore individual factors which can influence the process of developing a menstrual disorder are thought to exist. In the future, the refinement of the concept is needed, and verification in practice with young women are needed.

This study adds to and revises the contents presented at the 62nd Academic Conference of the Japan Society of Maternal Health.

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E-mail: ashhs201091@gmail.com

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