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Premenstrual syndrome: Physiotherapy tools to relieve symptoms.

A workshop for SAMK physiotherapy students

DEGREE PROGRAMME IN PHYSIOTHERAPY
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ABSTRACT

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The purpose of this thesis was to open the discussion about the premenstrual syndrome and its severe form, premenstrual dysphoric disorder because there was a lack of information about women's health and menstrual disorders in the study curriculum of SAMK physiotherapy students. This thesis described the impact on women's daily lives and the possible role of the physiotherapist to help them to manage this condition in everyday life. The objectives were to gather available information from the current literature and then create a workshop for SAMK physiotherapy students. Therefore, the aims of this thesis were to develop physiotherapy students' knowledge about the premenstrual syndrome and give them different tools to implement in their future practice.

The first part of the thesis explored in depth the menstrual cycle and the premenstrual syndrome condition. Then, the second part defined the possibility to assess the premenstrual syndrome and described different treatment methods available to alleviate the symptoms and improve women's quality of life.

Based on the current literature, all the tools mentioned proved to be efficient at managing the symptoms and improving the daily functioning. A workshop was created and implemented at SAMK university for SAMK physiotherapy students. According to the feedback, the aim of the thesis was reached.

Keywords: Premenstrual syndrome, physiotherapy, menstrual cycle, premenstrual symptoms, strength training, yoga, patient education, lifestyle change, cognitive behavioural therapy, Jacobson relaxation technique, soft tissue mobilization, aerobic exercises, nutrition,

CONTENTS

1 INTRODUCTION

According to the current literature, eighty percent of women experience premenstrual symptoms in their reproductive life. The premenstrual phase occurs 6 to 12 days prior to the menstruation cycle and lasts 2 to 4 days after the onset of menstruations. (Mahapatra S, 2019.) When a cluster of symptoms happen every month during the premenstrual phase, it is identified as a premenstrual disorder. In this thesis, when we will mention premenstrual disorders, it can either refer to premenstrual syndrome (PMS), premenstrual dysphoric disorder (PMDD), or both. Four out of ten women (40%) experience symptoms of premenstrual syndrome (PMS), and out of these, 5% to 8% suffer from severe PMS. (Green LJ, 2017.)

“Premenstrual disorders can affect women’s daily life significantly and impair their functioning, their health, and their relationships, at work or in private sphere” (Schuiling & Likis, 2017, p.556). It interferes with their capacity to manage stressful events and decrease their internal resources to cope with external factors. According to Schuiling and Likis (2017), to provide validity to the symptoms that women experience, premenstrual syndrome and premenstrual dysphoric disorder had to be identified, classified, and supported with evidence gathered through scientific studies. Furthermore, the visibility and credibility of these disorders has to be recognized and integrated into the general population.

The first line of treatment used by most gynaecologists and general practitioners mainly include pharmacological drugs, such as oral contraceptives and selective serotonin reuptake inhibitors (SSRIs). Even though these treatments are efficient in decreasing symptoms, there are not exempt of side effects, such as nausea, fatigue, risk of venous thromboembolism and sexual dysfunction, thus impacting women’s life. (Pearce et al., 2020.) Therefore, the

exploration of non-pharmacologic and non-invasive methods, such as physiotherapy, in the first line of treatment seems to be necessary (López-Liria et al., 2021).

Moreover, the National Institute for Health and Care Excellence (NICE) and the Royal College of Obstetricians and Gynaecologists (RCOG) both suggest exercise and lifestyle changes as a first line of treatment for premenstrual disorders (Pearce et al., 2020). The benefits of physical activity are well known with production of endorphins, reduction of fatigue and anxiety, improvement of the mood and more. Therefore, physiotherapy has a role to play in the care of these disorders and can help consequently women to deal with it.

However, at SAMK University of Applied Sciences, physiotherapy students do not get to study gynaecology or women's health on their study curriculum. The aim of this thesis is to increase the knowledge of physiotherapy students about premenstrual disorders, its diagnosis, and the main role a physiotherapist can have by educating on self-care and management of premenstrual symptoms.

2 AIM AND OBJECTIVES

This thesis aims to develop physiotherapy students' knowledge about premenstrual syndrome and the role a physiotherapist can have in relieving the symptoms with different tools to implement in their future practice. The objectives are to collect the evidence-based information from the current literature about premenstrual disorders and describe the different methods a physiotherapist can use to relieve women's symptoms. Information about women's health is lacking in the curriculum studies of SAMK physiotherapy students, therefore a workshop will be then implemented at SAMK University of Applied Sciences for SAMK physiotherapy students to gain knowledge on the topic.

3 MENSTRUAL CYCLE

3.1 Definition

The menstrual cycle occurs in women between the puberty – beginning of adolescence – and the menopause to assure the human reproduction. This period is known as the women's reproductive life with the onset of the first menstrual period called menarche. The optimal menstrual cycle happens monthly, lasts 21 to 35 days, with an average of 28 days. We count the first day of this cycle as the onset of menstruation. Ovulation occurs on average at day 14 with a range going from day 13 to day 16. The menstrual flow lasts 4 to 6 days in general, although the range of 2 to 8 days is still considered as normal. (Schuiling & Likis, 2017, p.87-93.)

The menstrual cycle is composed of two synchronized entities, the ovarian cycle, and the endometrial cycle, both acting at the same time with the final objective of reproduction. But to understand these cycles, it is important to understand better what happens on the hormonal level and the implication of different factors. However, it is important to mention that the information given in this thesis are based on normal physiologic conditions and do not apply for pathologies related to the menstrual cycle. (Schuiling & Likis, 2017, p.87-93.)

3.2 Hypothalamic pituitary ovarian axis

Complex interactions between the nervous system, the endocrine system and their target organs occur during the female reproductive cycle. The hypothalamus, the anterior pituitary gland and the ovaries are all involved in this process (Figure 1). The hypothalamus, located in the brain, secretes a hormone, gonadotropin-releasing hormone (GnRH), which activates in a pulsative manner the anterior pituitary gland, located in the sphenoid bone of the skull, to produce other hormones, follicle-stimulating hormone (FSH) and luteinizing hormone (LH). These pituitary hormones will then, travel through the circulatory system to target organs, particularly the ovaries and indirectly the uterine

endometrium in women. FSH aims the ovaries that will themselves produce oestrogen and progesterone steroids. They induce the follicles growth and development. LH plays a distinct role by focusing on the developing follicle within the ovary, triggering ovulation and promoting the formation of the corpus luteum along with hormone production in the ovaries. Due to the cyclic release of gonadotropic hormones, FSH and LH, the ovaries and the uterine endometrium change throughout these cycles and are inter-related to each other. (Schuiling & Likis, 2017, p.87-93.)

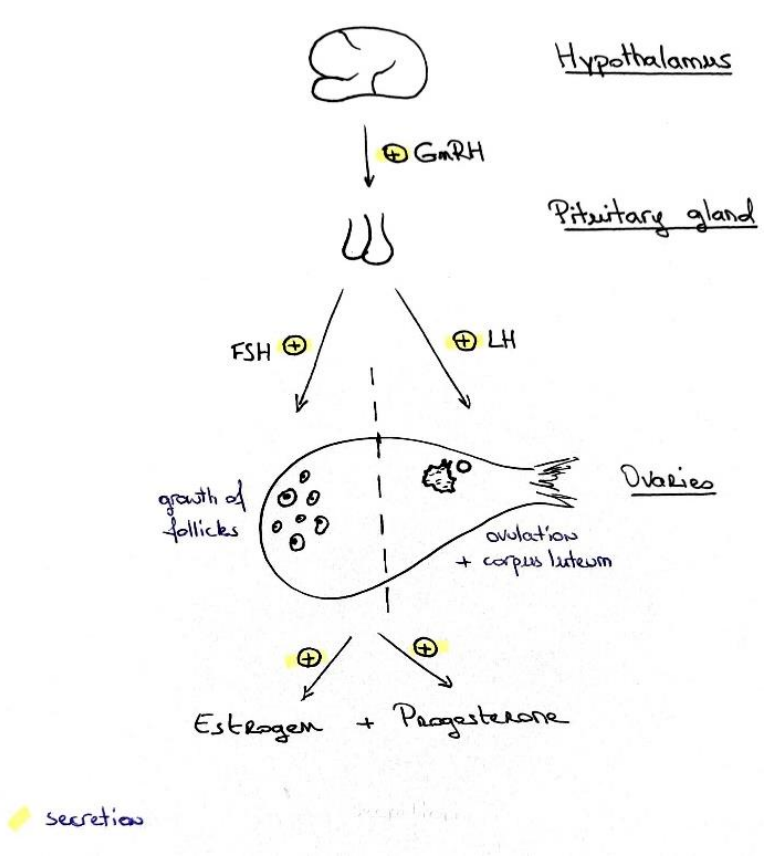

Figure 1. Hypothalamic pituitary ovarian axis drew by the author.

During the menstrual cycle, the interaction between hormones is well orchestrated to ensure the reproduction. Under the influence of the steroid hormones, all the hormones are delivered into short pulses, approximately every 60 to 90 minutes within the whole cycle. The frequency of pulses decreases as menstruation approaches. The release of LH and FSH is regulated by the hypothalamus and the pituitary gland which are themselves regulated by the negative feedback of oestrogen and progesterone (Figure 2). (Schuiling & Likis, 2017, p.87-93.) The negative feedback is a biological process to maintain the

homeostasis of the body (Amoeba sisters, 2017). Under FSH and LH influence, the ovarian follicles are producing oestrogen, increasing the oestrogen levels in the circulation to the point it gets high enough, inducing a positive feedback to the pituitary gland (Schuiling & Likis, 2017, p.87-93). Unlike the negative feedback, a positive feedback can be described as an intensification of a variable (Amoeba sisters, 2017). This positive feedback creates a surge of FSH and LH levels by the pituitary gland, causing the ovulation (Figure 3). The amount of LH secreted transform the ruptured follicle into a corpus luteum, which produces progesterone. The level of progesterone gets higher to facilitate the hypothetic fecundation and embryonic development. If fecundation does not occur, the corpus luteum disintegrates, progesterone and oestrogen levels fall, leading to menstruation. (Schuiling & Likis, 2017, p.87-93.)

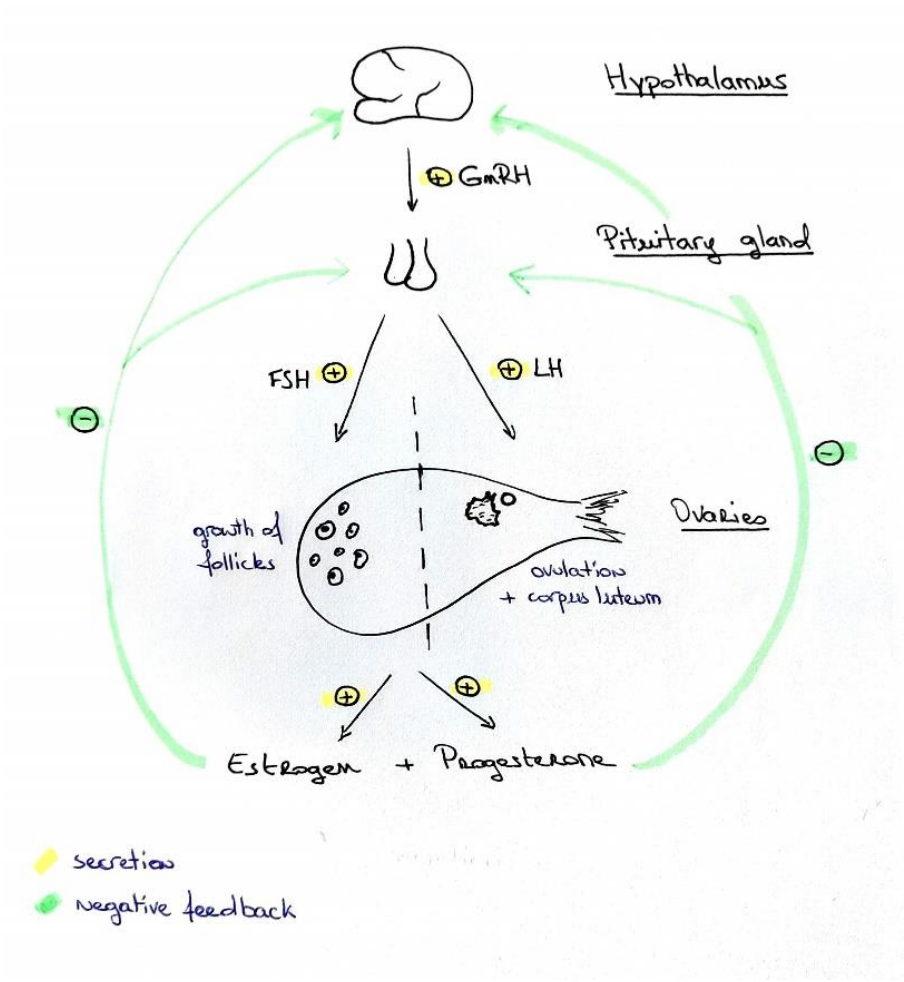

Figure 2. Negative feedback effect drew by the author.

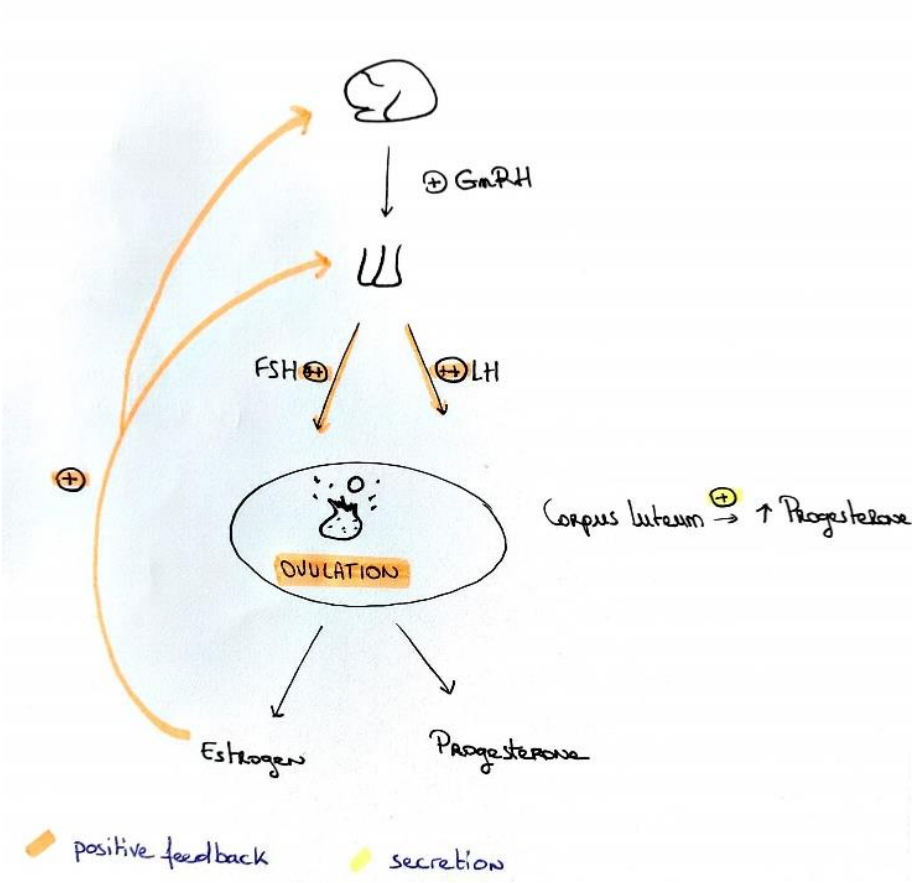

Figure 3. Positive feedback effect drew by the author.

3.3 Ovarian and endometrial cycles

As mentioned above, scientists consider that the menstrual cycle begins with the first day of menses. The ovarian and the endometrial cycles also follow this concept. The ovarian cycle is divided in three phases: pre-ovulatory, ovulation and luteal. The main objective of the ovarian cycle is to develop a dominant follicle able to achieve the ovulation and to be fertile. Meanwhile, the endometrial cycle is also composed of three phases: menstrual, proliferative, and secretory. The main objective of this cycle is to create an environment viable enough to receive the embryo and favourable to pregnancy. (Schuiling & Likis, 2017, p.87-93.) The cyclical changes in the ovaries and uterine endometrium occur simultaneously and are linked to changes in hormone levels in the bloodstream (Anupama Saptoka, 2022).

3.3.1 Ovarian cycle

The period between the first day of menstruation and ovulation refers to the follicular phase. From Day 1 (D1) to Day 4 (D4), primary follicles are recruited from the non-proliferating follicles in response to an increase in FSH levels. This induces the development of receptors on the granulosa cells, which stimulate the oestrogen production. The LH secreted by the pituitary gland stimulate the production of androgen, which are converted into oestrogen by the granulosa layers. From D5 to D13, a dominant follicle is selected among the other primary follicles to become the Graafian follicle (Figure 4). As oestrogen production induces a negative feedback effect on the pituitary gland, FSH levels start to decline. The outermost granulosa layer starts to create more LH receptors in preparation of the ovulation. The oestrogen levels continue to gradually rise. (Schuiling & Likis, 2017, p.87-93.)

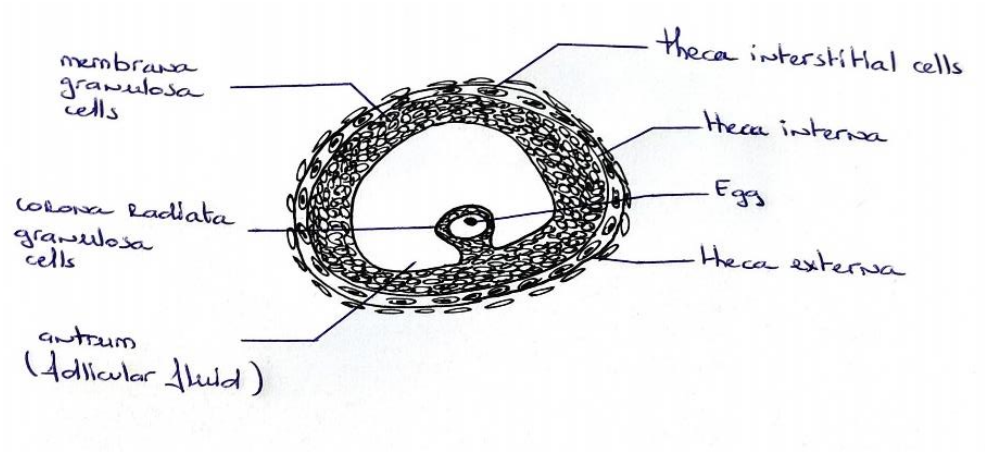

Figure 4. Dominant follicle drew by the author.

Theoretically, during the 14th day of the menstrual cycle, the ovulation process happens. It occurs due to a high level of oestrogens in the blood circulation – about 200 pg/mL – which creates positive feedback on LH, inducing a surge of LH responsible for numerous changes in the mature follicle. In addition to the LH surge, the progesterone production rises and the combination of high levels of steroid hormones lead to an explosive release of the ovum. (Schuiling & Likis, 2017, p.87-93.) The female hormones cycle is represented in Figure 5.

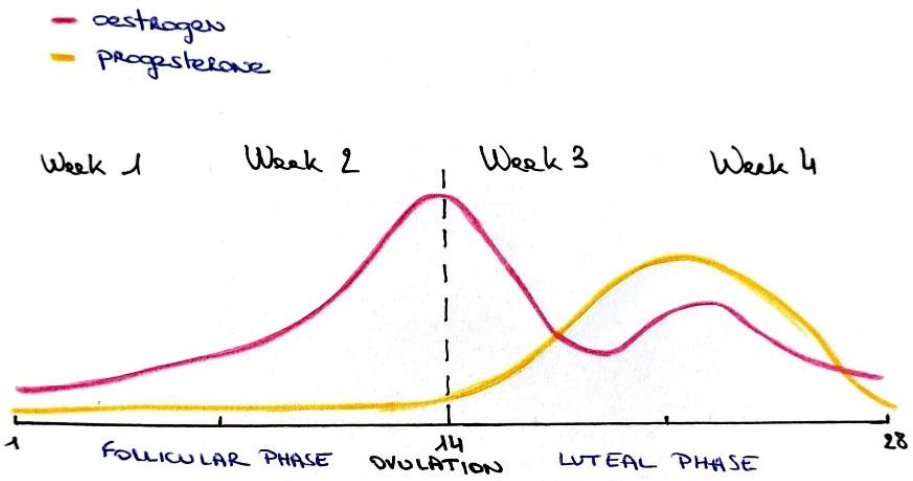

Figure 5. Female hormones cycle, done by the author.

After ovulation, the luteal phase begins. Depending on the hormone levels, it can be divided into two sub-phases, the early luteal phase, and the late luteal phase. From D15 to D22, the early luteal phase, the dominant follicle becomes the corpus luteum, active for approximately 8 days. During this period, mainly progesterone is secreted – to keep the corpus luteum active – in association with oestrogen. This secretion creates negative feedback on the hypothalamus and pituitary gland to maintain the homeostasis and prevent further ovulation during the current cycle. Due to the lack of implantation, the late luteal phase begins and is characterized by the degeneration of the luteal cells to become the corpus albicans. Progesterone and oestrogen levels decline drastically, removing the negative feedback effect. Therefore, FSH and LH levels rise again to initiate the new menstrual cycle. (Schuiling & Likis, 2017, p.87-93.)

3.3.2 Endometrial cycle

The menstruation, or “period”, is a biological monthly cycle where a woman’s body prepares to pregnancy, lasting from puberty to menopause. The menstrual phase generally lasts from 4 to 6 days. If no pregnancy occurs, the uterus loses its lining. Prostaglandins, a group of lipids that act like hormones, induce contraction of the smooth muscles of the uterus and eliminate the degradation of endometrial tissue, leading to menstruation. Simultaneously with the depletion of the endometrium, the action of FSH induces the production of

oestrogen and stimulates the regeneration of the endometrial epithelium two days after the onset of menses. (Anupama Saptoka, 2022.)

From the fifth day to ovulation, during the proliferative phase, the endometrium regrowth progressively under the influence of oestrogen. During this phase, the shape of the endometrial gland changes, increasing in size and thickness in preparation for fertilization. Then, the secretory phase occurs once the ovulation has happened and lasts until the end of the menstrual cycle. Due to the progesterone rising effect, the endometrium glands are more tortuous, dilated, filled with secretion and spiral arteries. They become thicker, cushiony, and nutritive to get ready for a potential fecundation. If there is no implantation during the late luteal phase, then the oestrogen and progesterone levels drop and the corpus luteum shrinks. In the final days of the menstrual cycle, withdrawal of the steroid hormones causes constriction of the spiral arterioles, initiating the start of the new menstrual cycle. (Schuiling & Likis, 2017, p.87-93.)

4 PREMENSTRUAL SYNDROME

4.1 Definition

The premenstrual syndrome is a disorder that occurs cyclically during the luteal phase of the menstrual cycle. It is characterised by a cluster of symptoms, psychological and/or physical, that resolves few days after the onset of menstruation. According to the World Health Organisation (WHO), these symptoms can impair women’s health, relationships, and the occupational functioning. (Schuiling & Likis, 2017, p.556-573.) Studies shown higher rates of work absence, medical expenses, and lower health-related quality of life in women with PMS (Dickerson et al., 2003).

The clinical symptoms are diverse and can interfere with each other (Table 1). Nonetheless, the frequency and severity of symptoms can vary between

women but, in general, the symptoms appear six days before the menses with a peak about two days before menstruation (Matsumoto et al., 2013). About 20% of women described severe symptoms enough to disrupt their daily lives (Gudipally & Sharma, 2022). Yet, due to the hormonal fluctuations throughout the cycle, many women experience symptoms that are considered physiologically “normal” during their menstrual cycle. The difficulty, as practitioners, is to identify the limit between what is physiologically normal and what is pathological (Appendix 1). However, each woman seeking care and help to alleviate these symptoms should be treated and taken into consideration. (Schuiling & Likis, 2017, p.556-573.)

Table 1. Symptoms of PMS and PMDD (Schuiling & Likis, 2017)

Symptoms	PMS	PMDD
Physical symptoms	- Abdominal bloating and pain - Mild weight gain from water retention - Constipation followed by diarrhea at the onset of the menses. - Headache - Pelvic pain and cramping - Fatigue - Extremity oedema - Nausea/food cravings	- same as PMS but may be more severe - Symptoms can begin immediately after ovulation.
Psychological symptoms	- Depression - Anxiety - Anger/ irritability - Insomnia - Confusion/Decrease in mental sharpness. - Social withdrawal - Feelings of low self-esteem/poor self-image	- Marked affective lability. - Marked irritability or anger or increased interpersonal conflicts. - Markedly depressed mood, feelings of hopelessness, or self-deprecation thoughts. - Marked anxiety, tension, feelings of being “keyed up” or “on edge”. - Decreased interest in usual activities. - Subjective sense of difficulty concentrating. - Lethargy - Insomnia or Hypersomnia - A subjective sense of being overwhelmed or out of control.

Within the current literature, the precise diagnostic criteria differ. However, the author decided to take the diagnosis criteria of PMS from the American College of Obstetricians and Gynaecologists (ACOG) as the main reference (Table 2). According to them, “to diagnose PMS, a woman’s symptoms must:

- be present in the 5 days before menses for at least three menstrual cycles in a row.
- end within 4 days after a period starts.
- interfere with some normal activities.” (Premenstrual Syndrome (PMS) | ACOG, n.d.)

Table 2. Diagnosis criteria for PMS based on ACOG recommendations (Schuiling & Likis, 2017, p.563).

CRITERIA
Symptoms are consistent with PMS
The symptoms may be somatic and/or physical
The number of symptoms is not specified
The symptoms are absent from the post-menstruation to the ovulation
Consistent occurrence of the symptoms only during the luteal phase of the menstrual cycle
Negative impact of the symptoms on some facet of the woman’s life
Exclusion of other diagnoses that may better explain the symptoms

4.2 Aetiology

The aetiology of PMS remains mainly uncertain. Yet, many theories have explored the impact of several factors, identifying PMS as a multifactorial condition. “Factors like biological, psychological, environmental, nutritional, ovarian hormones, micronutrients deficiency and their interactions, have been correlated with PMS symptoms.” (Askari et al., 2018.)

The lifestyle impact, the individual sensitivity to hormonal changes and neurotransmitters abnormality are the main causes (Lepczynski et al., 2023). The lifestyle factors, such as low physical activity, low quality of sleep and fast food or sugary dietaries have an important influence on premenstrual symptoms (Gudipally & Sharma, 2022). In addition, a close correlation between the neurotransmitter serotonin and the steroid hormones level has been described and will be more detailed in the pathophysiology sub-part. However, genetic predisposition and psychological factors, e.g., relationships, lack of support,

stress load, shall also be considered in the overall picture. (Schuiling & Likis, 2017, p.556-573.) For example, studies are showing that there is a high probability (70%) that a daughter, whose mother had a strong premenstrual syndrome, is more at risk to get premenstrual syndrome herself (Lepczynski et al., 2023).

Therefore, the influence and the impact of the biopsychosocial factors on the menstrual cycle should not be neglected. An increase response to stress, a low self-esteem and an alteration of stress hormones regulation can all lead to increase the PMS symptoms. (Schuiling & Likis, 2017, p.556-573.)

4.3 Epidemiology

The epidemiology of PMS/PMDD differs depending on the studies. Yet, 80% to 90% of women experience at least one or more premenstrual symptoms. The PMS symptoms are mainly debilitating around 20s to mid-30s, although they can already start during the adolescence – around fourteen years old or two years post menarche – and last along the reproductive life. (Matsumoto et al., 2013.)

It has been reported that PMS occurs in 20% to 32% of women and, according to the DSM-5 guidelines, PMDD would affect 5% to 8% of women (Schuiling & Likis, 2017, p. 556-573). The symptoms are often mild in 75% (Ravichandran & Janakiraman, 2022). Nevertheless, some women can experience a clinical premenstrual dysphoric disorder without reaching the diagnosis criteria. One symptom can be missing to meet the five-symptoms criteria, whereas women are in a distress situation and seek for help. Thus, the clinical prevalence of women having premenstrual dysphoric symptoms, with distress and functional impairments would, in reality, reach 13% to 18%. (Matsumoto et al., 2013.)

4.4 Pathophysiology

Premenstrual disorders are a complex biopsychosocial interaction, and the pathophysiology is not yet understood. However, different theories identified throughout the years could explain these phenomena. (Matsumoto et al., 2007.) For many years, the low level of progesterone and the hormonal imbalance were the main hypothesis of the premenstrual symptoms. Netherless, studies have shown that progesterone itself has not a direct role in these disorders. Some women are more sensitive to the normal exposure of the ovarian hormones level, thus develop more symptoms, emotional and/or physical, than other women. (Rapkin & Akopians, 2012.) However, studies highlight the responsibility of progesterone's metabolite, allopregnanolone (ALLO). The symptoms of PMS occur after the ovulation and women who do not ovulate (contraceptive oral pill, etc) will not experience those symptoms, neither are menopausal women. But women who are menopausal and receiving a hormonal treatment with progesterone will experience again premenstrual disorders symptoms. This suggests that a factor produces by the corpus luteum after the ovulation – progesterone and its metabolite, allopregnanolone – might lead to premenstrual symptoms. (Bäckström et al., 2021.) The allopregnanolone has anxiolytic effects, essential in the regulation of the central nervous system. It increases also the sensitivity of GABAa receptors to the neurotransmitter GABA through its positive modulatory effect on these receptors. As an inhibitory neurotransmitter of the central nervous system (CNS), located in different places in the brain, e.g., hypothalamus, brainstem, basal ganglia etc, GABA is important for stress, anxiety, vigilance and fear managements. (Allen et al., 2023.) Although ALLO can induce anxiolytic effects and increase GABA's activity, a long duration of exposure of the GABAa receptors to ALLO is suspected to create a biphasic effect. Therefore, the receptors are less receptive to GABA, induce an anxiogenic effect, with negative changes correlated to PMS symptomatology. (Nappi et al., 2022.) This theory is underpinned by a study evaluating the effect of sepranolone, an antagonist of allopregnanolone on GABAa receptors, in women with PMDD. It showed that women receiving injections of sepranolone had a reduction in symptoms of distress and impairment during the

premenstual phase, suggesting the involvment of ALLO in the pathophysiology of premenstrual syndrome. (Bäckström et al., 2021.)

Another theory is the interaction between steroid hormones and the serotoninergic system. Serotonin (5-HT or 5-hydroxytryptamine) is a neurotransmitter that regulates mood, eating and circadian rhythms. A correlation between premenstrual symptoms and serotonin deprivation symptoms – irritability, mood swing, anxiety, difficulty of concentration or aggressivity – has been established. Furthermore, the efficacy of the selective serotonin reuptake inhibitors (SSRIs) in reducing PMS symptoms, particularly affective symptoms, and the absence of identical results with an antidepressant that does not target serotonin support this theory. (Nappi et al., 2022.)
In addition, an imbalanced serotonin activity has been shown during the luteal phase of the menstrual cycle for women with PMDD. Serotonin is thought to be particularly sensitive to the influence of the steroid hormones, which alter the availability of serotonin at neuronal synapses. Studies showed that the steroid hormones interact with monoamine oxidase (MAO), an enzyme responsible for serotonin's catabolism. The oestrogen level, mainly high during the follicular phase, increase the degradation of MAO, thus enhance the availability of the serotonin's precursor – tryptophan – in the CNS and create a natural antidepressant effect. Whereas the progesterone level, mainly elevated during the luteal phase, has an antagonistic effect and promotes MAO activity, resulting in a decrease of serotonin levels available. (Nappi et al., 2022.) "This results in a reduced level of serotonin in blood circulation and reduced uptake of serotonin by platelets within the luteal phase of menstrual cycle, which could partly explains the affective symptoms" (Rapkin & Akopians, 2012).

Finally, the altered sensitivity of the autonomic nervous system is another part of the pathophysiology of the premenstrual syndrome. The sympathetic and parasympathetic nervous systems assure the homeostatic function of the body by harmoniously giving response to internal and external stimuli. According to Matsumoto et al. (2007), "instability or even a slight disorder of the autonomic nervous system […] could induce broadly ranged psychophysiological

phenomena, such as premenstrual symptomatology, and ultimately, far-reaching adverse effects on health". It has been found that in premenstrual disorders, especially PMDD, the autonomic nervous system activity is dysregulated with a lower response of the parasympathetic system during the late luteal phase of the menstrual cycle compared to the follicular phase (Matsumoto et al., 2013). For some women, the two physiological branches of the autonomic nervous system are altered and a poor adaptation to the stress response can be observed all along the menstrual cycle (Matsumoto et al., 2007).

4.5 Differential diagnosis

A clinician, before diagnosing premenstrual disorders (PMS or PMDD) has to make sure the occurrence of symptoms is not related to another or an underlying pathology, non-diagnosed yet or already present in the individual's medical background (Schuiling & Likis, 2017, p.556-573). Those pathologies, known to have similar symptoms with PMS, could be mood disorders (e.g., depression, anxiety disorders, dysthymia), substance abuse disorders or psychiatric disorders, such as anorexia and bulimia. Also, the gynaecological disorders, e.g., endometriosis or dysmenorrhea, have common symptoms with premenstrual disorders', which can make the diagnosis more intricates. It is also important to rule out possible endocrine diseases such as hypothyroidism and others. (Lepczynski et al., 2023.)

"Many medical and psychiatric conditions may be exacerbated in the premenstrual or menstrual phase of the cycle" (Schuiling & Likis, 2017). For example, women with Crohn's disease or irritable bowel disease declare an increase of gastrointestinal symptoms before the menses (Schuiling & Likis, 2017 p.556-573).

4.6 Premenstrual dysphoric disorder

"Premenstrual dysphoric disorder (PMDD) is defined as a diagnostic label that applies to a much smaller number of menstruating women experiencing severe

PMS with predominantly negative affective symptoms (e.g., increased interpersonal conflicts, feeling of hopelessness, marked anxiety). PMDD encompasses cognitive, behavioural, emotional, and negative symptomatic changes that severely impair daily functioning, relationships, parenting, and ability to work in the late luteal menstrual phase." (Schuiling & Likis, 2017, p.556-573.) It is considered as a psychiatric disorder and is included in the fifth edition of the diagnostic and statistical manual for mental disorders (DSM-5) (Gudipally & Sharma, 2022). According to the current statistics, 5% to 8% of women suffer from this disorder. Certain factors, such as history of traumatic events, anxiety disorders and lower level of education, are risk factors to develop PMDD. (Schuiling & Likis, 2017, p.556-573.) The diagnosis criteria based on the American College of Obstetrics and Gynaecologist (ACOG) is presented in Table 3.

Table 3. Diagnostic criteria for PMDD according to ACOG (Schuiling & Likis, 2017, p.556-573)

1) In the majority of cycles, five or more symptoms, including affective and physical symptoms, are present during the week before menses and are absent in the follicular phase.
2) One (or more) of the following symptoms is present: irritability, depressed mood, marked anxiety, tension, or affective lability.
3) One or more of the following symptoms must additionally be present (the combination of symptoms in 2 and 3 must total five): decreased interest in usual activities, difficulty concentrating, fatigue, appetite change (decreased or increased), changes in sleep patterns (hypersomnia or insomnia), sense of feeling overwhelmed, physical symptoms such as breast tenderness, joint or muscle pain, bloating, or weight gain.
4) The symptoms markedly interfere with occupational or social functioning
5) The symptoms are not due to an exacerbation of another disorder
6) The preceding criteria have been confirmed by prospective daily ratings over at least two menstrual cycles

Since 2019, PMDD is also recognized by the World Health Organization (WHO) in the International Classification of Diseases 11th revision (ICD-11). This inclusion into the medical references ensures the recognition of this disorder by the scientific world and facilitates access to healthcare for women with this condition. (Osborn et al., 2020.) In a study comparing the different degrees of premenstrual symptomatology, women with severe symptoms experience a significant difference about their stress level and their quality of life – self-

esteem, leisure activities and play – compare to women with mild symptoms (Lustyk et al., 2004).

5 ASSESSMENT

The aim of the assessment is to define functionality impairment to produce an appropriate treatment plan. It also aims to draw a diagnosis which helps women feel validated in their experiences. The assessment of premenstrual disorders by the physiotherapist should include screening questions – about the various symptoms, pelvic pain and daily life's impairment – in addition with health history review and the effectiveness of previous therapies in this context. (Schuiling & Likis, 2017, p.556-573.)

A prospective assessment should be done in the first place to get an accurate diagnosis of PMS. It gives women and practitioners an opportunity to recognize the symptoms, evaluate a pattern and its regularity. It is also recommended to record the symptoms even during their treatment in order to evaluate the outcomes and adapt the care provided. It could be either a record keeping or symptom monitoring. (Schuiling & Likis, 2017, p.556-573.)

Record keeping, such as PMS symptoms tracker or COPE diary (Appendix 2), is a calendar that should be filled up at least two consecutive months where the patients have to daily record the symptoms they experienced. In addition**,** symptom monitoring, such as menstrual diary (Appendix 3), is a more detailed version of record keeping, where women have to rate the symptoms, from mild to severe, to notice behavioural changes, social and environmental factors. It helps women to associate their symptoms to daily life events, thus to better cope with these. The Daily Record of Severity of Problem (DRSP) is another questionnaire that helps in the diagnosis and assessment of the premenstrual dysphoric disorder in particular (Appendix 3). (Schuiling & Likis, 2017, p.556-573.)

Although they are not specific to PMS, other questionnaires, or evaluators, can be used to obtain an overall view of the situation. The pain intensity can be assessed with the pain visual analogue scale (VAS), which is a simple, valid, and effective tool to evaluate the outcomes of treatment over several weeks (Physiopedia, n.d.-d). For its part, the Women's Health Questionnaire (WHQ) evaluates the overall physical and emotional health of middle-aged women over the past week (Appendix 4) (Hunter, 2003).

6 PHYSIOTHERAPY TOOLS

As premenstrual disorders involve a range of different factors – psychological, social, behavioural, and physical –, an integrative approach seems to be the most appropriate treatment. The aim of an integrative approach is to combine different treatment methods to treat the patient as a whole. Thus, consider the individual in its globality would provide an overview of the problem and allow women to take an informed decision about the treatment. (Schuiling & Likis, 2017, p.556-573.)

To provide the best treatment for each woman, practitioners must take their individual and societal conditions (e.g., having a supportive partner), budgetary resources (e.g., what help could they get from) and biobehavioural impact of the menstrual cycle on their daily lives into consideration (Schuiling & Likis, 2017, p.556-573). Nonpharmacological approaches should be considered first in women with premenstrual disorders, by evaluating their lifestyles, giving patient education advice, assessing their nutrition and exercises habits. If lifestyle changes and psychological support are not enough, the orientation of the patient to a physician and the introduction of pharmacological treatment should be considered. (Askari et al., 2018.)

6.1 Patient education

Women's education about their own reproductive health is essential. This could help them better understand what is happening in their bodies, understand the physiology behind it and feel legitimate. Validating their symptoms and explaining them can be useful on a number of levels; establishing a patient-practitioner relationship, making it easier to seek treatment and constituting the first stage of treatment. The support of the family or partner is also an important factor in the success of treatment. For example, an alternative therapy such as couple-based cognitive behavioural therapy may give better outcomes in terms of response to treatment. (Gudipally & Sharma, 2022.)

Listen and validate medical history have a major impact in term of care and treatment effectiveness. Most of the time, these women have been rejected by the medical world, their symptoms have not been recognised or are illegitimate (Osborn et al., 2020). Explain what is currently known about PMS and incorporate it in the perspective of their life stages, individual characteristics and environmental stressors can provide the help they need to choose the treatment adapted to their individual needs (Schuiling & Likis, 2017, p.556-573).

6.2 Lifestyle changes

Poor lifestyle habits have a major impact on premenstrual symptoms. It is therefore essential to analyse first the lifestyle habits of women who are seeking care. Health promotion strategies, like regular physical activity, a healthy sleeping pattern and a sufficient nutritional intake, are the cornerstone of the treatment and should be the first strategy to adopt. During the premenstrual period, women are more sensitive to the external factors. A strong personal routine can help them coping with these factors, managing better the symptoms and their repercussions in their lives. Physical activity, by increasing the secretion of endorphins in the body, reducing stress hormones, and enhancing movement in daily life, has an influence on improved mood, reduced stress and fatigue and an increased pain tolerance. It reduces most of the physical

premenstrual symptoms (e.g., breast tenderness, cramps, abdominal bloating…). (Lepczynski et al., 2023.)

6.3 Dietary management

Studies reported that high sugar content food increase premenstrual pain and symptoms, as well as caffeine drinks, alcohol, soda, fast food, and fried foods. In the opposite, a balance diet composed of 50% of carbohydrates, 25% of fat and 15% of protein, including a portion of fish twice a week, during three months, showed a reduction of the premenstrual symptoms and pain. (Yilmaz-Akyuz & Aydin-Kartal, 2019.) Concerning the nutritional behaviour, it is recommended to eat aliments with a high serotonin concentration during the premenstrual period. For example, by increasing the intake of complex carbohydrates, like walnuts, almond, broccoli, olives, beans and lentils, oats, and legumes, it would help increasing serotonin's precursor – tryptophan – levels, therefore, rise the neurotransmitter's effects. (Gudipally & Sharma, 2022.) Nevertheless, recommendation of a balanced diet that support overall health would be more beneficial than specific restrictive dietary changes (Schuiling & Likis, 2017, p.556-573).

6.4 Aerobic exercise

Aerobic exercise is defined as a type of repetitive, structured physical activity that requires the body's metabolic system to use oxygen to produce energy (Physiopedia, n.d.). For example, walking, long distance running, swimming, hiking are aerobic exercises. The American college of sport and medicine guidelines recommend healthy adult between 18 and 65 years old to do moderate physical activity intensity at least 150 minutes per week or vigorous intensity 75 minutes per week (ACSM, 2018). A systematic review analysed the effect of aerobic exercises, such as swimming, running, or walking, in PMS symptoms and compared it to a control group or other intervention method. They found that aerobic exercise, performed 3 to 5 times a week, during at least 30 minutes could improve physical and psychological PMS symptoms,

especially physical symptoms such as headache, bowel disturbances, abdominal bloating, menstrual cramps, and backache. However, the risk of bias was moderate due to outcome assessors or blinding participants factors. (Ravichandran & Janakiraman, 2022.)

Another study compared the effect of various level of aerobic exercise intensity on PMS symptoms and found that moderate (60-80% of HRmax) and high-intensity (80-90% of HR max) groups showed greater effects on different themes, such as negative effect, concentration, pain, and behavioural change, while the mild-intensity (35-60% of HRmax) group showed a significant effect on reducing pain and concentration difficulties. This suggests that a higher intensity could have a global effect on the symptomatology. (Vishnupriya & Rajarajeswaram, 2011.) Furthermore, it has been demonstrated that aerobic exercise of moderate intensity increases beta-endorphins circulating levels, a peptide hormone that, when absent or diminished, can cause multiple symptoms that show similarities with PMS – anxiety, craving, backache, menstrual cramps, headache, and depression. Thus, the increased levels of beta-endorphins generated by moderate intensity aerobic exercise could alleviate these symptoms. (Ravichandran & Janakiraman, 2022). Also, as mentioned in the physiopathology part, both autonomic nervous systems are somehow altered during PMS and a disturbance of the hypothalamus-pituitary-adrenal (HPA) axis seems to occur in women with PMS/PMDD during the mid-luteal phase. It will express its way by an altered cortisol awakening response, leading to an unhealthy stress response to external factors. (Hou et al., 2019.) If the body is not able to create an adapted stress-response, it will lead to stress related symptoms, such as anger, mood swing, anxiety, craving, sadness, depression, fatigue, and others. “Performing aerobic exercise at an intensity of at least 60% of maximum capacity of oxygen uptake leads to elevated levels of cortisol for at least 2 hours after exercise. Thus, cortisol inhibits hypothalamus and pituitary glands and restores homeostasis for healthy stress response.” (Ravichandran & Janakiraman, 2022.)

However, regularity is an important factor to alleviate premenstrual symptoms. People who train from time to time experience more symptoms than people

who train regularly, or even those who don't train at all. (Mohebbi Dehnavi et al., 2018.)

6.5 Strength training

“Strength training, also known as resistance exercise, increases muscle strength by making muscles work against a weight or force” (Physiopedia, n.d.-c). Few are the studies exploring the effects of strength training on premenstrual disorders at the moment. One recent study conducted by El Deeb et al. (2020), explored the effects of resistance training versus whole body vibrations in adolescents with PMS and found that both techniques, associated with a daily supplement intake of magnesium and Vitamin B6, are effective in managing PMS symptoms after 12 weeks compared to the control group that only received the supplement intake. The implementation of the study was three times per week, 40 minutes including warm up and cool down, with 60 to 70% of 1RM for each exercise, 3-4 sets with 12 reps. (ElDeeb et al., 2020.)

Other studies comparing the effects of strength training versus stretching or aerobic exercise found, regardless of the intervention type, a reduction of physical and behavioural symptoms after, respectively, 8 and 12 weeks of intervention program (Pearce et al., 2020). This suggests that regardless of the intervention method, physical activity in general has a positive impact on PMS symptoms management. Strength training helps to manage pain, improves feelings of well-being, self-esteem and body image, and releases endorphins. It also improves the sleep pattern and increases the gastrointestinal transit speed, suggesting that muscle strengthening could directly target the main symptoms occurring during the luteal phase of the menstrual cycle. (Physiopedia, n.d.-b.) In addition, resistance training decreases the sympathetic system, increases immune functionality, affects the hypothalamus-pituitary-adrenal axis response, and increases serotoninergic system leading to an appreciation of more satisfying life by a reduced anxiety and depression pattern for women with PMS symptoms (ElDeeb et al., 2020). Consequently, strength training is an alternative to be considered in the treatment of

premenstrual disorders, but further studies could be carried out to further explore the specific effect on these women.

However, it is important to notice that each individual is unique, with its own factors – genetics, personal pathologies (PCOS, endometrioses…), birth control methods – therefore, each woman will experience her menstrual cycle differently. The strength training program has to be adapted throughout the menstrual cycle and one's energy level depending on hormonal fluctuations. A study carried out in 2014 by Sung et al. (2014) compared the impact of resistance exercise training during the two phases – follicular (FT) and luteal (LT) – of the menstrual cycle. Findings revealed that, with the exact same program – same intensity and frequency – eumenorrheic women acquired more muscle power – measured by maximum isometric force (FT: +267N / LT: +188N) – and muscle cross sectional area – measured by ultrasound imaging (FT: +0,57cm / LT: +0,39cm) – during the follicular phase compared to the luteal phase. These results can be correlated to the hormonal fluctuation that happens during the menstrual cycle. Oestrogen and testosterone, dominant hormones during the follicular phase are known to have anabolic effects, therefore they promote the protein biosynthesis process that tend to increase the number and/or size of myofibrils and increase the insulin sensitivity. On the contrary, progesterone, the dominant hormone during the luteal phase has a catabolic effect, inducing an antagonistic effect by negatively affect the insulin sensitivity, and decrease the ability to build muscles. This study also demonstrates that after three months of strength training program, the level of oestrogen and progesterone tend to increase, leading to a balance hormonal state. Moreover, oestrogen has beneficial effects on muscles by improving the intrinsic quality of muscle fibres, which might lead to a higher strength gain. (Sung et al., 2014.)

In conclusion, applying these results into practical implementation would suggest adapting the strength training program according to both phases of the menstrual cycle and overall energy levels (Table 4). Women could take advantage of the oestrogenic effect during the follicular phase to develop their muscle mass by lifting heavy weights and having a volume of repetitions more

suited to their fitness level. In the luteal phase, during the third week, they could continue with the hypertrophic volume and, finally, during the premenstrual phase, reduce the muscle load by doing body weight or using elastic bands. (Sung et al., 2014.)

Keeping this in mind, it should be strongly emphasized that regularity is as important – if not more important – to symptom regulation than the content and resistance level, as mentioned in the previous paragraph. Mentioning to patients that muscle mass and strength increases less during the luteal phase than during the follicular phase, could lead to absenteeism during this stage. Thus, patient education on strength training has to clearly encompass both components of intensity modulation and regularity.

Table 4. Strength training goals according to menstrual cycle phases. (Sung et al., 2014)

Follicular phase		**Luteal phase**	
Week 1 Early FP	Week 2 Late FP	Week 3 Early LP	Week 4 Late LP
Heavy weightlifting	Hypertrophic training	Hypertrophic training	"Deload" with body weight or resistance band exercises
4-6 reps	8-10 reps	8-10 reps	Reduce volume and weight according to fitness energy level

6.6 Cognitive Behavioural Therapy (CBT)

Dilbaz & Aksan (2021) describe Cognitive behavioural therapy (CBT) as a technique that aims to help people identify and change destructive or disturbing negative thoughts patterns. "CBT focuses on women's beliefs and responses to physical changes" (Hunter et al., 2002). The Royal college of obstetrician and gynaecologists (RCOG) indicates, with the higher evidence level, that "CBT should be consider routinely as a treatment option for women with severe PMS" (Green LJ, 2017). CBT corresponds mainly to talking

therapy, associating self-positive talk, relaxation, and coping strategies. (Kimiyaee Asadi et al., 2016.)

A study carried out by Hunter et al. (2002) compared SSRI (fluoxetine) and CBT treatments in women with PMDD. The results showed an equal short term significant effect for both treatments with, however, a lasting long-term effect for CBT method one year after follow-up. Since taking SSRIs is not a trivial matter - taking a pill, adverse effects - CBT could be a good alternative treatment of premenstrual disorders. (Hunter et al., 2002.)

Cognitive behavioural therapy physiologically reduces stress hormones, increases immune system and general health. To understand their pathology help women to increase their coping abilities to improve their daily functioning. (Askari et al., 2018.) The support of relatives and family plays an important role in the effectiveness of treatment, and CBT can help to improve communication between women and their partner, leading to a better support, perception of the relationship and behavioural coping post intervention (Ussher & Perz, 2017). CBT can also be associated to mindfulness therapy and combine meditation, cognitive behavioural exercises, as well as discussion sessions, to have better outcomes in the PMS treatment and the menstrual dysfunction (Askari et al., 2018).

6.7 Yoga

Yoga is a practice that reunites physical, mental, and spiritual components and aims to create a union between the body, the mind, and the spirit. It is a practice that originates from ancient India. By building strength, stamina but also improving flexibility, coordination and balance, the yoga is a “complete” sport with many benefits. (Yogapedia, 2020.)

A recent study demonstrates that yoga influences multiple factors, physical and psychological, and can alleviate most of the premenstrual symptoms. It has the benefits of acting on the body and the mind at the same time. Thus,

by enhancing motivation, general mood and reducing depression, anxiety, and irritability, it increases the women's quality of life and general health. Furthermore, the study also found that yoga give access to a better and healthier work productivity for women with PMS, as well as an improvement into the daily routine, the social activities, and the relationships. (Chang et al., 2023.)

Moreover, by improving the activity of the parasympathetic system and reducing the activity of the sympathetic system, yoga practice enhances the immune system and reduces the inflammatory mediators as well as the physiological stress (Physiopedia, n.d.-b). Women with PMS will generally have a reduced capacity to activate their parasympathetic nervous system, therefore yoga can be efficient to regulate the physiological autonomic system. In addition, the results of a study suggested that yoga has positive effect on brainwave activities and enhances the production of alpha brainwaves. These are associated with the relaxation, creativity, improved mood, peacefulness and above all, an increase in the release of serotonin. (Tsai et al., 2018.)
In conclusion, yoga could be implemented as a complementary treatment method in PMS, two to three times a week, within an average of 12 weeks where each session lasts approximately 30-60 minutes. Different types of yoga practice exist and can be mix together, depending on the therapist preferences. (Jose et al., 2022.)

6.8 Jacobson' (PRT) relaxation technique

The Jacobson's relaxation technique, also known as progressive relaxation therapy (PRT), is a method of relaxation that focuses on the mind-body connection. By tightening a specific group of muscles and then relaxing it, it helps the patient to be aware of its body and its physical sensations. This technique is performed from the feet to the head and can be practiced with a therapist or at home once the technique is well understood. The patient is invited to perform a series of muscle contraction-relaxation exercises while laying on their back, with their eyes closed. (Jose et al., 2022.) According to Edmund Jacobson, the funder of this technique, any anxiety, physical tension or even

thoughts would express its way by increasing musculature tension. Hence, by targeting directly the muscles, it will treat the anxiety or the physical tension. (Chaloult et al., 1990.) Several studies found a significant reduction of PMS symptoms with the Jacobson's relaxation technique and define it as a great tool to cope with stress and deal with stressors. Through physiological effects, this technique helps women with PMS to get relaxed physically and mentally by decreasing the heart rate and the respiratory rate, by ameliorating the blood pressure and increasing the peripheral temperature. Therefore, it relieves the PMS symptoms and improves the overall well-being. (Jose et al., 2022.)

The principles of this method are to ask the patient to contract successively the main group muscles, starting with the limbs, then the trunk and ending with the face. The patient should learn to localise the different muscle groups, to feel the voluntary contraction and the sensation of relaxation and well-being that happens after the muscle relaxation. The contraction phase should last three to five seconds, meanwhile the relaxation phase lasts fifteen to twenty seconds. The whole session lasts twenty minutes and can be repeat twice a day, every day. (Chaloult et al., 1990.)

6.9 Soft tissue mobilization

Soft tissue mobilization is a term used to describe different type of manual therapy, mobilizing the connective tissues, such as muscles, ligaments, and skin. It helps to release the tension in the muscles and to remove the waste accumulated in certain areas. (Physio.co.uk, 2023.)

In their study, Hernandez-Reif et al. (2000) found that massage therapy has an immediate effect on the anxiety level and improves the mood in women diagnosed with PMDD. It has also found that massage therapy, practiced 30 minutes, twice a week, for at least 5 weeks, can have a long-term effect on the pain reduction and the water retention. (Hernandez-Reif et al., 2000.) More specifically, a massage of the lower abdomen or the lower back with essential oils can reduce pain and muscle spasms. The application of 2 to 3 drops of

essential oils to a base oil, e.g., almond or coconut oil, by massaging clockwise the abdomen is recommended. Different types of essential oil can be used for this purpose, e.g. lavender, geranium, evening primrose oil. (Lepczynski et al., 2023.)

Besides, the “myofascial release technique (MRT) is a physiotherapy technique that aims to mobilize soft tissue, increase fascial mobility, reducing adhesions and pain. The technique consists in applying a continuous pressure directly or indirectly on the fascia layers.” (Ovgun & Tuzun, 2023.) The pressure applied will ameliorates the blood flow, eliminates the toxins accumulated – like prostaglandins, responsible of uterus spasms – thus, relieves pelvic and back pain during the premenstrual period. Also, by relaxing the muscles fascia and reducing the sensitivity, the pain threshold increases. Then, it alleviates women’s pain and give them a better quality of life. (Ovgun & Tuzun, 2023.)

7 CONCLUSION

In conclusion, an integrative approach should be considered in pathologies multifactorial like premenstrual disorders, combining different treatment methods to treat the patient in they globality. Patient education plays a role in establishing a relationship of trust between the physiotherapist and the patient. Being listened, and talking about their experiences is important for the effectiveness of the treatment. Having a balance diet, with high concentration in serotonin can alleviate the symptoms. The practice of an aerobic activity at moderate intensity has benefits on the symptoms – psychological and physical –, it increases beta-endorphins production, and enhances a healthy stress response, which is lacking in women with PMS. The application of strength training restores a balanced hormonal state, regulates the healthy stress response, and increases the serotoninergic system, acting on the symptoms. The Cognitive Behavioural Therapy (CBT) has long term effects on the symptoms. Yoga and Jacobson’s relaxation technique, as practices that connect body and

mind, relieve premenstrual symptoms, boost serotonin production, and have positive effect on the daily functioning. And soft tissue mobilisation alleviates mainly physical symptoms such as back pain and pelvic pain.

Most studies showed, that regardless of the intervention method, they all have a positive impact on the PMS symptomatology and the improvement of women's quality of life. From the research findings, being regular and practicing the chosen method within the whole menstrual cycle – not only during the premenstrual period – is important for the effectiveness of the treatment, especially if it concerns physical activity such as yoga, aerobic exercise, or strength training. Each therapy method has its own effect on the symptoms, acting either on the psychological or physical – or both – symptoms (e.g., yoga acts on both symptomatology; soft tissue mobilisation alleviates pelvic and back pain etc). Therefore, the physiotherapist can select, according to the patient's symptomatology and preferences, the appropriate treatment method among the different tools available.

8 THESIS PROCESS AND METHODS

8.1 Thesis process and schedule

Below is the thesis process schedule (Table 5). The beginning of the thesis process was not easy, as the first topic chosen by the author had to be abandoned due to a mis-organization. However, the author learned a lot from this experience and, end of May 2023, the choice of the actual topic became obvious, as it brought together two fields that were important to the author: women's health and physiotherapy. During the first half of June 2023, relevant information was gathered from the literature review and the author could take advantage of the summer break 2023 to start the writing process. The written part has been smooth, efficient and by the end of September, the theory background was already well advanced. In October, the author planned the

workshop and created the PowerPoint. After the 30th of October, the collected feedback from the workshop have been analysed and the discussion part of the thesis was written. During the thesis method, meetings with the thesis tutor and other students were held. The thesis has been finished on time and presented the 22nd of November 2023.

Table 5. Thesis process

Task	Date
Selecting the topic	29th of May, 2023
Research about the topic	Previous personal research and May-June 2023
Thesis plan presentation	2nd of June, 2023
Thesis agreement signed	14th of June, 2023
Gathering of literature review and writing process	June-July-August-September 2023
Creation of the study material (PowerPoint and Workshop)	October 2023
Workshop day	30th of October, 2023
Piloting and feedback	End of October-beginning of November 2023
Submission of the final written thesis report to supervisor teacher and opponent	13th of November, 2023
Thesis final presentation	22nd of November, 2023

8.2 Workshop and study material

The research method is action type research with the creation of a workshop after collecting the theoretical background. The workshop was held at SAMK on the 30th of October, open and limited to fifteen physiotherapy students. A Google form has been sent and in total, eight students enrolled to participate. The eight students showed up on the workshop day. Data collections were collected from a feedback questionnaire, given on paper where the students had to answer a few questions concerning the workshop and the topic itself.

For the presentation, a PowerPoint has been created and shared to students with further information by email afterward.

The workshop session involved mostly a theoretical part with a description of the menstrual cycle and the premenstrual syndrome. Before this, the author asked the students how many of them have heard about premenstrual syndrome before. Five out of eight answered affirmatively. However, some of them declared afterward in the feedback that they actually have misinterpreted the accurate definition of premenstrual syndrome. Then, after the theoretical part, a quiz was implemented with different stations in the classroom corresponding to the eight treatment methods. Students were divided into pairs and had to move from one station to another with their pair, answering few questions about each physiotherapeutic tool. The idea behind this quiz was to make them realize their actual knowledge and pre-idea of the tool itself and activate their self-thinking before going through these tools, one by one, together.

Participants were asked to fill a feedback questionnaire at the end of the workshop. The questionnaire was constituted of five questions to assess if the aim of the thesis has been reached. The aim was to increase the knowledge of SAMK physiotherapy students about premenstrual syndrome and inform them about the role the physiotherapist can play in relieving symptoms. The first question asked how much they feel they benefit from the workshop. Three out of eight students (37,5%) found that they benefit a lot from the workshop, four out of eight (50%) benefit quite a lot and one (12,5%) found they benefit moderately. Unfortunately, the latter did not detail why they benefit moderately or what could have been improved. The second question asked them to rate on a scale from 1 to 10, 10 being the highest score, if what they have learned during the workshop was evidence-based information enough and to be a value for them. Four out of eight (50%) rated 10; three out of eight (37,5%) rated 9 and one (12,5%) rated 8 concerning the evidence-based information and the value provided in the workshop. They all agreed (100%) they will use one of these methods if they meet a client with PMS disorder in their future practice, and each of them gave diverse choice about the selected method they would most likely use. In the last question, the author asked the students

to describe what they liked or disliked about the workshop. Most of the answers said the pace and the PowerPoint itself were pleasant to watch, clear enough. One of them mentioned they would like to talk more deeply about the treatment benefits but unfortunately, time was limited to cover everything.

Based on the feedback, the aim of the thesis was achieved. However, according to oral feedback received at the end of the workshop, doing more practical part during the workshop, for example with the demonstration of a method, could be implemented for a future workshop.

9 DISCUSSION

Women's health is an unfamiliar topic for physiotherapy students, and it is not covered in SAMK curriculum. Few notions of pelvic floor rehabilitation are mentioned within a course. A previous thesis, made by a student from SAMK, talked also about pelvic floor muscles rehabilitation, but the project targeted the clients, not the students. Nowadays, more women are joining the physiotherapy field and are maybe more inclined to select this category of clients. In addition, half of the clients in physiotherapy are women. A deeper knowledge about the menstrual cycle and its disorders are the basis to understand how women's body work physiologically and the differences with men. It will then help to adapt the physical activity and other physiotherapy methods according to women's needs.

As mentioned in the introduction, eighty percent of women are having premenstrual symptoms throughout their reproductive life, and almost half of them are experiencing premenstrual disorders. This suggests that physiotherapists may meet women as clients who come for another reason but who also have premenstrual syndrome, which may affect the rehabilitation in one way or another. Opening the discussion about this topic and stopping the taboo around it could help to treat more appropriately this population.

In a majority of cases, premenstrual syndrome is treated with medication and managed by physicians. The nonpharmacological approaches that physiotherapy can offer are not yet seriously considered or well known in the field or among the general population. This is why the aim of this thesis was to target the SAMK physiotherapy students. To first inform the students about this topic and the possibilities to act as physiotherapist would increase their curiosity about the subject and their willingness to look deeper for information. It offers them an idea of the different available options for relieving symptoms, which they can use in their future practice to inform women about these methods and implement them.

Gathering information from the literature review was a smooth process, even though it was difficult to not dive too deep into the research. The pathophysiology part has been challenging for the author since many theories were enumerated and still uncertain in general, even in the medical world. But, knowing the pathophysiology is, to the author's opinion, important to implement the adequate treatment. In addition, the author was surprised of the quantity of evidence-based articles available about this topic in the current literature and realised afterward that it could have been narrowed to one method. However, from the author's point of view, it was important to first explore all the methods a physiotherapist could use to relieve symptoms in order to open the discussion on this subject. An idea for future thesis could be to select one method and explore specifically the impact of it on the premenstrual syndrome.
The author was also surprised to find that as many interventions as the ones presented in this thesis are actually effective in managing PMS symptoms and having a real impact in women's lives. It increased the willing to share these findings to others. The treatment methods analysed in this thesis are the author's choice, but other methods can be explored as well (for example, TENS, US, pain management with cold and warm exposure).

Also, most of the studies analysed were done on women with regular menstrual cycle, without birth control or gynaecologic pathologies. The reader has

to keep this information in mind when willing to apply the findings with their clients.

Finally, this thesis process helped the author to grow as a physiotherapist student, with the creation of a workshop for the first time and a deep analysis of the literature review throughout this process. The author has based part of the theory on the book “Women’s gynaecologic health” by Schuiling and Likis, borrowed from the school library and collected evidence-based articles mainly on PUBMED and Finna. Most of the articles selected were published between 2013 and 2023, but some articles published earlier have been retained by the author due to their relevance. An Excel document was created to classify each method, gather information relating to the articles, in order to facilitate the process.

To the author’s opinion, the objectives were reached and based on the student’s feedback, the aim of the thesis was achieved with the implementation of the workshop. On second thought, maybe the creation of a study learning material by using for example the H5P, would have been better to reach a maximum of students, since some of them were unable to attend to the workshop for logistical reasons. But implementing and creating the workshop, sharing the information found from the literature review directly to the students was rewarding for the author. Also, the possibility to include this learning material to a study course would have been preferable to keep the information available at any time but this topic could not fit to any course in the current curriculum. This may be a suggestion in the curriculum for the new physiotherapy students.

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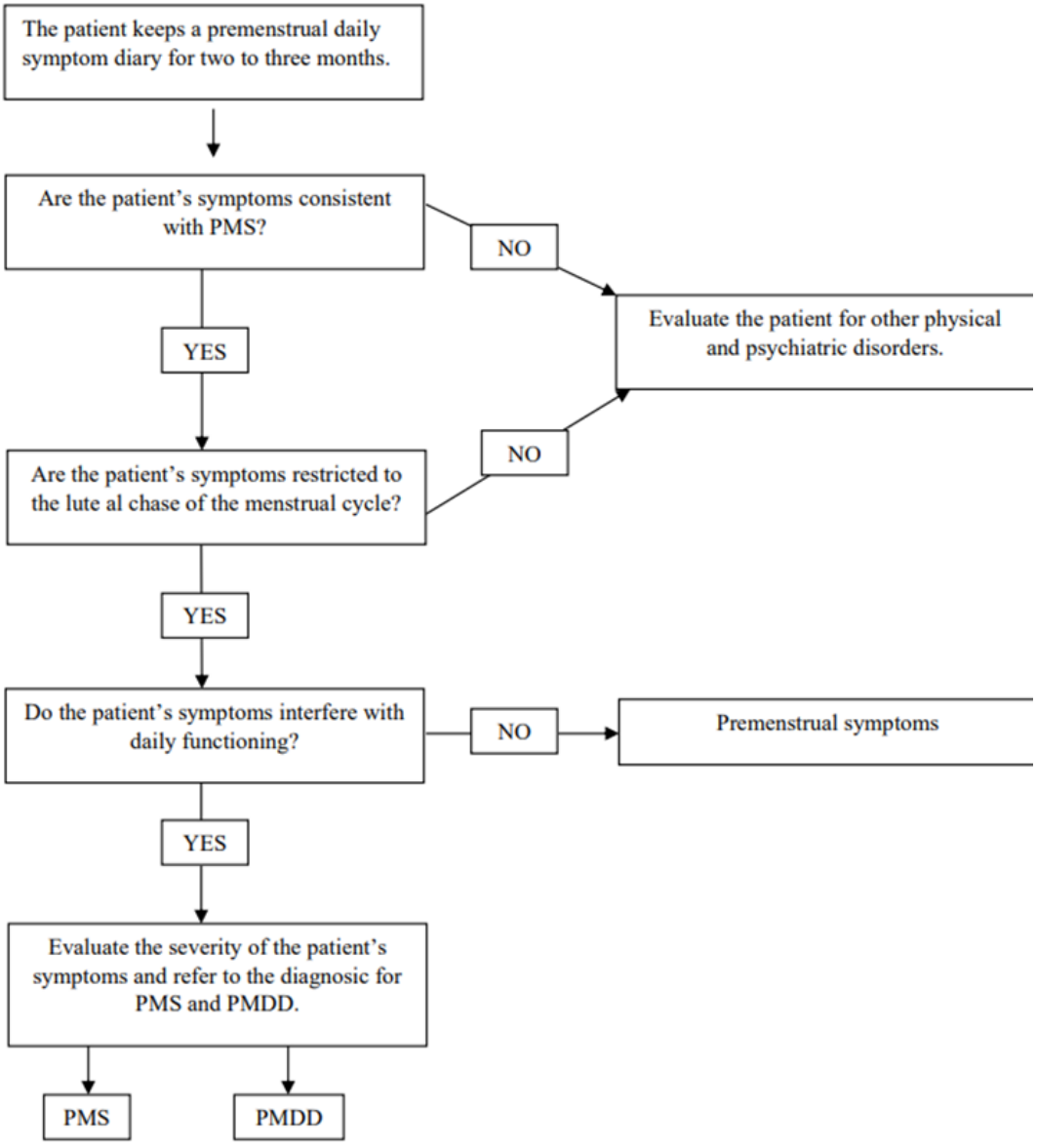
APPENDIX 1: ALGORITHM FOR USE IN DIFFERENTIATING PREMENSTRUAL SYMPTOMS, PREMENSTRUAL SYNDROME (PMS), AND PREMENSTRUAL DYSPHORIC DISORDER (PMDD). (DICKERSON ET AL., 2003)



APPENDIX 2: PMS SYMPTOMS TRACKER & COPE DIARY

PMS symptoms tracker calendar:

Use this chart to track your PMS symptoms.

	Day																																																
Symptoms	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45
period																																																
acne																																																
breast swelling and tenderness																																															
feeling tired																																															
having trouble sleeping																																															
upset stomach																																															
cramps																																															
bloating																																															
constipation																																															
diarrhea																																															
headache																																															
backache																																															
appetite changes or food cravings																																															
joint or muscle pain																																															
trouble concentrating or remembering																																															
tension, irritability, mood swings, or crying spells																																															
anxiety																																															
depression																																															
other symptoms:																																															
other symptoms:																																															
other symptoms:																																															

COPE diary calendar :

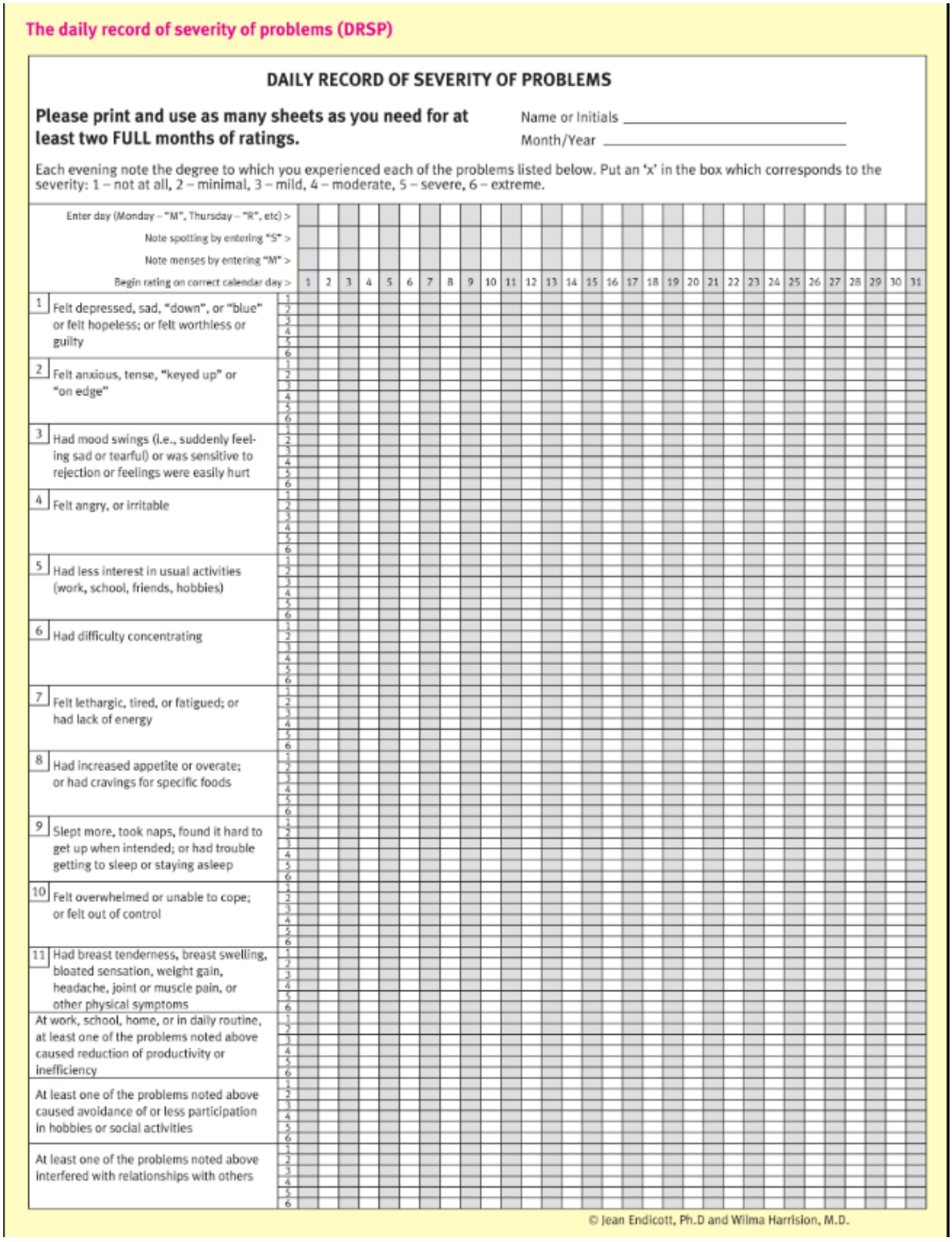
Calendar of Premenstrual Experiences

Bleeding																																																
Cycle day	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40								
Date																																															
Weight																																															
SYMPTOMS																																															
Acne																																															
Bloatedness																																															
Brest tenderness																																															
Dizziness																																															
Fatigue																																															
Headache																																															
Hot flashes																																															
Nausea, diarrhea, constipation																																															
Palpitations																																															
Swellings (hands, ankles, breast)																																															
Angry outburst, arguments, violent tendencies																																															
Anxiety, tension, nervousness																																															

APPENDIX 3: MENSTRUAL DIARY AND DRSP

Menstrual diary PDF link: [Menstrual diary of premenstrual symptoms.pdf]

DRSP questionnaire:



The daily record of severity of problems (DRSP)

DAILY RECORD OF SEVERITY OF PROBLEMS

Please print and use as many sheets as you need for at least two FULL months of ratings.

Name or Initials _____

Month/Year _____

Each evening note the degree to which you experienced each of the problems listed below. Put an 'x' in the box which corresponds to the severity: 1 – not at all, 2 – minimal, 3 – mild, 4 – moderate, 5 – severe, 6 – extreme.

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
	Enter day (Monday – "M", Thursday – "R", etc) >																															
	Note spotting by entering "S" >																															
	Note menses by entering "M" >																															
	Begin rating on correct calendar day >																															
1	Felt depressed, sad, "down", or "blue" or felt hopeless; or felt worthless or guilty	1 2 3 4 5 6																														
2	Felt anxious, tense, "keyed up" or "on edge"	1 2 3 4 5 6																														
3	Had mood swings (i.e., suddenly feeling sad or tearful) or was sensitive to rejection or feelings were easily hurt	1 2 3 4 5 6																														
4	Felt angry, or irritable	1 2 3 4 5 6																														
5	Had less interest in usual activities (work, school, friends, hobbies)	1 2 3 4 5 6																														
6	Had difficulty concentrating	1 2 3 4 5 6																														
7	Felt lethargic, tired, or fatigued; or had lack of energy	1 2 3 4 5 6																														
8	Had increased appetite or overate; or had cravings for specific foods	1 2 3 4 5 6																														
9	Slept more, took naps, found it hard to get up when intended; or had trouble getting to sleep or staying asleep	1 2 3 4 5 6																														
10	Felt overwhelmed or unable to cope; or felt out of control	1 2 3 4 5 6																														
11	Had breast tenderness, breast swelling, bloated sensation, weight gain, headache, joint or muscle pain, or other physical symptoms	1 2 3 4 5 6																														
	At work, school, home, or in daily routine, at least one of the problems noted above caused reduction of productivity or inefficiency	1 2 3 4 5 6																														
	At least one of the problems noted above caused avoidance of or less participation in hobbies or social activities	1 2 3 4 5 6																														
	At least one of the problems noted above interfered with relationships with others	1 2 3 4 5 6																														

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APPENDIX 4: WOMEN'S QUALITY OF LIFE QUESTIONNAIRE (WHQ)

Title: The women's quality of life questionnaire

Please answer "YES" or "NO" to the following questions based on how you have felt during the last week of your life. Mark "N/A" if the question does not apply to you (for example, if it asks about children, but you have none).

Question		Answer		
		Yes	No	N/A
1[a]	I have had to stay in bed or a chair for most of the day most days. [P]			
2[a]	I have been limited in doing either my work or other daily activities. [P]			
3[a]	I have had pain on a regular basis. [P]			
4	My health has been excellent. [P]			
5[a]	I have avoided contact with my friends and relatives. [P]			
6[a]	Pain has interfered with my daily activities. [P]			
7[a]	I have been very nervous. [P]			
8[a]	I have worried that I am losing my health. [P]			
9[a]	I have worried about things happening to my relatives or friends without good reason. [P]			
10[a]	I have frequently felt anxious. [Y]			
11[a]	I've often felt tense. [Y]			
12[a]	I've often felt irritable. [Y]			
13[a]	I've felt depressed. [Y]			
14	I have been happy, satisfied, or pleased with my personal life. [S]			
15	I have felt emotionally stable and sure of myself. [S]			
16[a]	I have had difficulty coping with my children. [C]			
17[a]	My partner and I have had difficulty talking about anything. [C]			
18[a]	My partner and I have not been getting along as well as we usually do. [C]			
19[a]	Physical or emotional problems have interfered with my family life. [C]			
20[a]	I have had real problems interacting with my family. [C]			
21[a]	Because of my physical or emotional condition, I have had trouble meeting the needs of my family. [C]			
22[a]	I've felt that I might harm my children. [C]			
23[a]	I have had more than the usual number of arguments with people. [C]			
24	I have felt peaceful. [S]			
25[a]	I have had trouble feeling peace of mind. [Y]			
26	I have felt a sense of harmony with myself. [S]			
27	I felt close to my partner (or the person who is my main support). [C]			
28	I was satisfied with my sex life. [C]			
29[a]	I have felt sad. [Y]			
30	I was able to enjoy life. [S]			
31	I was content with the quality of my life. [S]			
32	My general outlook was good. [S]			
33[a]	I have had difficulty performing the work or other activities that I usually do (for example, it took extra effort). [Y]			
34[a]	I have felt downhearted and blue. [Y]			
35[a]	I have felt worn out. [Y]			
36[a]	I have been in pain. [P]			
37[a]	I have been under or felt that I was under strain, stress, or pressure. [Y]			
38	I have been proud of how I've been coping with life. [S]			
39	I accepted myself. [S]			
40	I have been a happy person. [S]			

Source to be cited with any use of this tool: Gehlert et al. (2006) J Clinical Epidemiology 59: 525–533.