PREVENTION OF DISMENORRHEA

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ABSTRACT

Dismenorrhea is a medical condition characterized by severe uterine pain during menstruation that manifests as cyclical lower abdominal pain. Dismenorrhea is classified into primary dismenorrhea in the absence of pathology and secondary dismenorrhea in the event of an identifiable pathological condition. About 40-70% of women of childbearing age suffer from dismenorrhea accompanied by associated psychological, physical, behavioral, and social distress. This is the main cause of the decline in the quality of life of adolescents. The pathophysiological process due to increased myometrium activity caused by excessive production of prostaglandins that cause ischemia. Risk factors are very important in enforcing the diagnosis of dismenorrhea and also in distinguishing between primary and secondary dismenorrhea. Mainstay treatment is generally supportive by relieving symptoms in primary dismenorrhea and surgical treatment may be recommended for secondary dismenorrhea. Therefore, patients with primary dismenorrhea may only require simple non pharmacological and analgesic therapies, whereas patients with secondary menorrhea require treatment for major problems.

Keyword: dismenorea; non pharmacological management

INTRODUCTION

Adolescence must be passed by every human being and is a development process. Dewi (2012, quoted by Harahap & Lismarni, 2013) states that adolescence runs between the ages of 12-21 years, marked by changes in physical, psychological and psychosocial aspects. For adolescents, reproductive health is an important issue to pay attention to, especially young girls, because it will affect the quality of the family in the future (BKKBN, 2003; quoted by Salbiah, 2015). One of the biological signs of youth is the occurrence of menstruation. Menstruation is monthly bleeding that occurs when the uterine endometrium sheds and is excreted through the vagina (Sloane, 2004). The ideal age for menstruation according to Bagga and Kulkarni (2000, quoted by Wulandari & Ungsianik, 2013) is between

11-13 years and if less than 11 years old are adolescents with fast *menarche* but if more than 13 include adolescents with slow *menarche.*

Young women often complain of pain during menstruation or *dysmenorrhea* (Salbiah, 2015). This pain is felt in the lower abdomen, starting 24 hours before menstruation comes and lasting the first 12 hours of menstruation (Hapsari & Anasari, 2013). Dysmenorrhea is classified into primary dysmenorrhea (without gynecological abnormalities) and secondary dysmenorrhea (with gynecological disorders) (Nugroho, 2012; Yuliana, 2013; Anisa, 2015). Primary dysmenorrhea is more common in adolescents (Anisa, 2015). Dysmenorrhea generally occurs 1-2 years from *menarche,* other sources say 2-3 years or 3-6 years from menarche (Kasdu, 2005; quoted by Harahap & Lismarni 2013; Yuliana, 2013).

The incidence of dysmenorrhea in the world is very large. More than 50% of women in each country experience dysmenorrhea (Fajaryati, 2012). WHO (2012, quoted by Savitri, 2015) states that the incidence of dysmenorrhea in women is 1.769.425 people (90%) with 10-15% experiencing severe dysmenorrhea. The results of research by Mahmudiono (2011, quoted by Harahap & Lismarni, 2013) that young women aged 14-19 years with primary dysmenorrhea in Indonesia are around 54.89%. In Palembang in 2007 the incidence of dysmenorrhea in SMP Negeri 3 Palembang was 54.89% and SMP Negeri 28 Palembang was 66.3% (Khotimah, Kirnantoro & Cahyawati, 2014).

Dysmenorrhea affects the activities of women, especially young women. People with dysmenorrhea will rest and stop doing their activities. Women who experience dysmenorrhea become moody, irritable and unable to interact effectively with others (Anisa, 2015). Students who experience dysmenorrhea cannot concentrate on learning and learning motivation decreases because of the pain they feel (Harahap & Lismarni, 2013). Nanthan (2005, quoted by Ningsih, Setyowati & Rahmah, 2013) states that from 30–60% of young women who experience primary dysmenorrhea, 7–15% do not go to school or do activities. This is supported by Laszlo, *et al.* (2008, quoted by Ningsih, Setyowati & Rahmah, 2013) from 30-90% of women who experience dysmenorrhea, as many as 10-20% complain of severe pain and inability to move or cannot go to school. The results of research conducted

by Sharma (2008, quoted by Harahap & Lismarni, 2013) of the total respondents who attend school, 35% stated that these adolescents usually do not come to school during the dysmenorrhea period and 5% stated that they come to school but these adolescents only sleep in class. Annathayakheisha (2009, quoted by Harahap & Lismarni, 2013) states that this problem disturbs at least 50% of women during reproductive years and 60-85% in adolescence, resulting in many school absences.

Harahap & Lismarni (2013) state that pain management can be treated with pharmacological or non-pharmacological therapy. Pharmacologically, pain is treated with analgesics. Nonpharmacological therapy can be by giving warm compresses, exercise, relaxation to improve nutritional intake such as: consuming fibrous foods and drinking lots of water (Anisa, 2015; Harahap & Lismarni, 2013; Taber, 2005 & Muhammad, 2011; quoted by Ningsih, Setyowati & Rahmah, 2013). The provision of non-pharmacological therapy is more recommended in order to reduce the effects of addiction and the side effects of drugs that are harmful to patients (Harahap & Lismarni, 2013).

DISCUSSION

Menstruation or *menarch* or menstruation or menstruation is a normal physiological process for women, except during pregnancy. Menstruation is a sign of the fertile cycle and is a characteristic of female maturity which is marked by the process of removing blood from the uterus accompanied by periodic pieces of the lining of the uterine wall during the reproductive age (Sophia, Sarumpaet & Jemadi, 2013; Wahyuni & Indahsari, 2014; Maulana, 2009; quoted by Marni & Ambarwati, 2015). Menstruation occurs in women aged 11 years and lasts until the age of 45-55 years (Sophia, Sarumpaet & Jemadi, 2013). If menstruation starts less than 11 years of age, it is said to experience rapid *menarche* and it is said to be slow if it exceeds the age of 13 years (Wulandari and Ungsianik, 2013).

Menstruation is bleeding that occurs when the mucous membrane lining the uterus (endometrium) breaks down and is excreted through the cervix and vagina along with old blood and mucus (Smeltzer & Bare, 2002; Sloane, 2004). The shedding of the endometrial lining is due to the absence of conception, so that the

ovum disintegrates and the endometrium which has been thickened and condensed becomes hemorrhagic (Smeltzer & Bare, 2002). Menstruation as a result of hormones, namely a decrease in estrogen and progesterone levels (Bobak, Lowdermilk & Jensen, 2005).

Menstrual Cycle

The menstrual cycle or menstrual cycle is the ripening and release of an ovum that occurs cyclically (Corwin, 2009). The menstrual cycle consists of hormonal activity in the ovaries and anterior pituitary gland, as well as changes that occur in the ovaries and uterus (Scanlon & Sanders, 2007). The menstrual cycle is controlled by the hypothalamus and anterior pituitary gland by a feedback pathway between the brain and ovaries that involves circulating estrogen levels (Andrews, 2010). The menstrual cycle ranges from approximately 28 days during the reproductive years, although normal cycles vary with the longest cycles of 40-42 days and the shortest being 18-21 days (Smeltzer & Bare, 2002; Sloane, 2004). The duration of menstruation or the discharge of this blood lasts from 3-7 days or 4-5 days or 5-7 days with a lot of blood coming out of 50-60 ml or 50-150 ml (Sherwood, 2001; Smeltzer & Bare, 2002; Marlinda, Rosalina & Purwaningsih, 2013; Saputri, et al., 2013).

The menstrual cycle is related to the ovarian cycle and endometrial cycle (Sloane, 2004), as follows:

a. Ovarian Cycle

The ovarian cycle consists of a follicular (preovulatory) phase which includes a period of follicular growth; the ovulation phase which is the culmination point in ovulation; and the luteal (postovulatory) phase is a period of activity of the corpus luteum.

1. The Follicular (Preovulatory) Phase

Follicle formation depends on the release of FSH and LH from the anterior pituitary. FSH begins to increase slightly on the first day after menstruation begins. LH levels show a moderate increase. Under the influence of FSH and

a small amount of LH, 6-12 primary follicles begin to develop during the first week of the menstrual cycle.

At the onset of the second week, the growth of one follicle dominates and the other begins to decline in a process known as atresia (only one follicle will continue to grow while the other is destroyed). The dominant follicular granulosa cells react to FSH and LH by releasing estrogen. The second group of follicular cells, called theca cells, grow around the granulosa layer. Estrogen secretion accumulates in the follicle to form an antrum (cavity). Increased estrogen levels act locally to increase the number of FSH receptors in the follicle, which when bound by FSH further increases estrogen secretion and triggers a positive feedback cycle. Towards the end of the second week of the menstrual cycle, the ovum completes its first meiotic division. As a result of this meiotic division, one daughter cell becomes a mature ovum, which contains 46 chromosomes (23 pairs). Other daughter cells, called polar bodies, are discarded (Corwin, 2009).

2. Ovulation Phase

   Around day 12 of the menstrual cycle there is a drastic (6-10-fold) increase in LH release from the anterior pituitary. This is called the preovulatory LH surge. FSH also increases to a lesser degree. The increase in LH levels triggers a noticeable late growth of the follicle, which begins to swell due to the accumulated secretions. Currently, LH begins to convert theca cells from estrogen-producing cells to progesterone-producing cells. On day 13, estrogen levels fell and progesterone levels began to rise. On day 14, the follicle that continues to swell starts to secrete secretions and then bursts, which releases the ovum into the abdominal cavity. Some of the granulosa cells are also released and these cells continue to wrap around the ovum (Corwin, 2009).

3. The Luteal Phase (Postovulatory)

After ovulation, the granulosa and theca cells enlarge and undergo a luteinization process, turning into yellowish cells that contain fat. The complex of garnulose and theca cells left from the follicular rupture is called the corpus luteum. The corpus luteum continues to secrete large amounts of progesterone and estrogen which act as negative feedback to the hypothalamus to lower FSH and LH. However, the formation of esterogen and progesterone by the corpus luteum appears to be partially affected by the LH which is still present but decreased in levels. Within 10 days, the levels of FSH and LH are very low and, if the ovum is not fertilized, the corpus luteum degenerates. As the corpus luteum degenerates, progesterone and estrogen levels fall rapidly and reach their lowest point on the last day (day 28) of the menstrual cycle. The absence of progesterone triggers menstruation (Corwin, 2009).

b. Endometrial (Uterus) Cycle

The endometrium cycles as the uterine endometrium prepares to provide nutrition and maintain the ovum if it is fertilized. The events in the endometrial cycle are related to the hormonal and morphological events in the ovarian cycle. The endometrial cycle consists of menstrual phases; the proliferative phase associated with the follicular phase in the ovary; and the secretory (progestation) phase, related to the luteal phase in the ovaries.

1. Menstrual phase

The menstrual phase occurs when there is no process of fertilization of the ovum by sperm, so the corpus luteum will stop the production of estrogen and progesterone. The fall in estrogen and progesterone levels causes the ovum to escape from the thickened uterine wall (endometrium), then causes the endometrium to shed, so that the walls become thin. The shedding of the endometrium containing blood vessels causes bleeding during the menstrual phase (Aryulina, et al., 2007). The shed endometrium is repaired through cell division in the basal layer which is influenced by estrogen from

the developing follicles in the ovaries, this happens when menstruation is still ongoing (Sloane, 2004).

2. The Poliferative Phase

   The proliferative phase lasts until ovulation occurs. The endometrium that proliferates from the basal layer again becomes thick and well vascularized. Esterogen also causes the growth of progesterone receptors on endometrial cells. Tubular glands grow in the superficial layer. The glandular cells proliferate rapidly, but do not accumulate much secretion. Spiral arterioles protrude between the glands to supply endometrial and glandular cells (Sloane, 2004).

3. Secretory Phase

   During the secretory (progestation) phase, progesterone stimulates continued growth of the superficial layer. The glands enlarge and secrete nutrients (glycogen and fat) to maintain embryonic development when growth has occurred. The spiral arterioles become convoluted (multiple). The endometrium is ready for implantation. If fertilization does not occur, the endometrium regresses. The corpus luteum degenerates; reduced estrogen and progesterone levels. The spiral arterioles, now hormone-unsupported, constrict and dilate intermittently. This constriction reduces blood flow and causes ischemia and death (necrosis) of the surrounding tissue and glands. As the arterioles dilate, blood comes out of the integrated areas. Endometrial tissue fragments, glandular gland secretions, mucus and a little blood will be released in the uterine cavity. Bleeding (menses) lasts for 4 to 5 days and the cycle will restart (Sloane, 2004).

Menstrual Disorders

Some of the disorders that occur during menstruation (Nugroho, 2012) are as follows:

1. Hypermenorrhea; Hypermenorrhea is a bleeding disorder / a lot of menstruation (6-7 pads / day and every wet bandage all. Caused by uterine disorders (uterine myoma, hypoplasia, infection), blood disorders and hormonal disorders.
2. Hypomenorrhea; slight menstrual bleeding, change sanitary napkins 1-2 times / day, menstrual length 1-2 days. Caused by a deficiency of estrogen and progesterone.
3. *Menorrhagia;* menstrual bleeding that is profuse than normal or longer than normal. Caused due to uterine hypoplasia, asthenia, during or after suffering from disease, uterine infections and disorders of the growth of cervical tissue such as uterine myoma and uterine polyps.
4. Amenorrhea; is the absence of menstruation for 3 months or more. There are 3 types of amenorrhea, namely primary amenorrhea, namely women who have not menstruated at the age of 18 years or more; secondary amenorrhea is the loss of menstruation after menstruation; and physiological amenorrhea is amenorrhea that occurs in the state before puberty, in pregnancy, during lactation and menopause. Amenorrhea is caused by abnormalities of the gland in the brain, abnormalities of the ovaries, damage to the mucous membrane of the uterus, chronic diseases and nutritional disorders.
5. *Pseudoamenorrhea* is a condition in which women who are menstruating but menstrual blood do not come out because of the closed of the genital tract. This disorder has symptoms of cyclic pain without menstruation and shows a blood-covered bulge that is covered in bluish color due to the blood pooling behind it.
6. Metroragia; irregular bleeding and has nothing to do with menstruation. This disorder is caused by a pregnancy such as abortion or pregnancy outside the womb. Metroragia outside of pregnancy is caused by wounds that do not heal (uterine cavernous, cervical Ca), inflammation and hormonal.
7. *Dysmenorrhea;* painful menstruation that occurs without signs of infection or pelvic disease (Corwin, 2009). Dysmenorrhea is a common occurrence for women who are menstruating (Purwanti, Puspita & Pranowowati, 2013). This

is because during menstruation, women experience increased levels of prostaglandins (a substance related to stimulation of pain in the human body) and an imbalance in progesterone levels (Purwanti, Puspita & Pranowowati, 2013; Harahap & Lismarni, 2013). This condition causes typical pain in the lower abdomen, nausea, back cramps and headaches, causing discomfort to interfere with activities (Purwanti, Puspita & Pranowowati, 2013; Harahap & Lismarni, 2013; Apriliani, 2013; quoted by Efriyanthi, Suardana & Suari, 2015).

8. Polimenorrhea is a disturbance in the menstrual cycle, with a cycle span of <24 days.
9. Oligomenorrhea is a disturbance in the menstrual cycle, with a cycle span > 31 days.

Dysmenorrhea

Dysmenorrhea is classified into primary *dysmenorrhea* and secondary dysmenorrhea. Primary dysmenorrhea is pain during menstruation that is found without any abnormalities in the genitalia, while secondary dysmenorrhea is pain during menstruation caused by gynecological disorders such as chronic salpingitis, endometriosis, uterine adenomyosis, uterine cervical stenosis, and others (Winkjosastro, 2008 ; quoted by Harahap & Lismarni, 2013).

Dysmenorrhea is often classified as mild, moderate, or severe based on the relative intensity of pain (Madhubala & Jyoti, 2012). The pain can have an impact on the ability to perform daily activities. The pain intensity according to the *Multidimensional Scoring of Andersch and Milsom* classifies dysmenorrhea pain as follows.

a. Mild dysmenorrhea is defined as menstrual pain without any restriction of activity, no need for analgesic use and no systemic complaints.
b. Moderate dysmenorrhea is defined as menstrual pain that affects daily activities, needs analgesics to relieve pain and there are some systemic complaints.

c. Severe dysmenorrhea is defined as menstrual pain with severe limitations in daily activities, analgesic response to minimal pain relief, and the presence of systemic complaints such as vomiting, fainting, and so on.

Types of Dysmenorrhea

Dysmenorrhea is divided into two, namely primary dysmenorrhea and secondary dysmenorrhea. Primary dysmenorrhea is menstrual pain that is not based on a pathological condition, while secondary dysmenorrhea is menstrual pain that is based on pathological conditions such as the discovery of endometriosis or ovarian cysts (Larasati & Alatas, 2016). Primary dysmenorrhea is associated with uterine muscle contraction (myometrium) and prostaglandin secretion, while secondary dysmenorrhea is caused by pathological problems in the pelvic cavity (Ningsih, Setyowati & Rahma, 2013).

A. Primary dysmenorrhea

Primary dysmenorrhea is pain during menstruation that is found without any abnormalities in the genital organs (Harahap & Lismarni, 2013; Hermawan (2012) quoted by Lestari (2013). Primary dysmenorrhea generally occurs after 1-2 years of menarche or other sources say in 2-3 years from menarche (Kasdu, 2005; quoted by Harahap & Lismarni, 2013). Primary dysmenorrhea is menstrual pain that is not accompanied by a history of pelvic infection or a normal pelvic state characterized by symptoms of headache, nausea, vomiting, and pain. back (Sibagariang, 2016).

Primary Dysmenorrhea Etiology

Several important factors play a role as the cause of primary dysmenorrhea (Sukarni & Margareth, 2013; quoted Pertiwi, 2015), namely:

1. Psychiatric factors: adolescents who are emotionally unstable, especially if they are not enlightened about the menstrual process will easily develop dysmenorrhea.

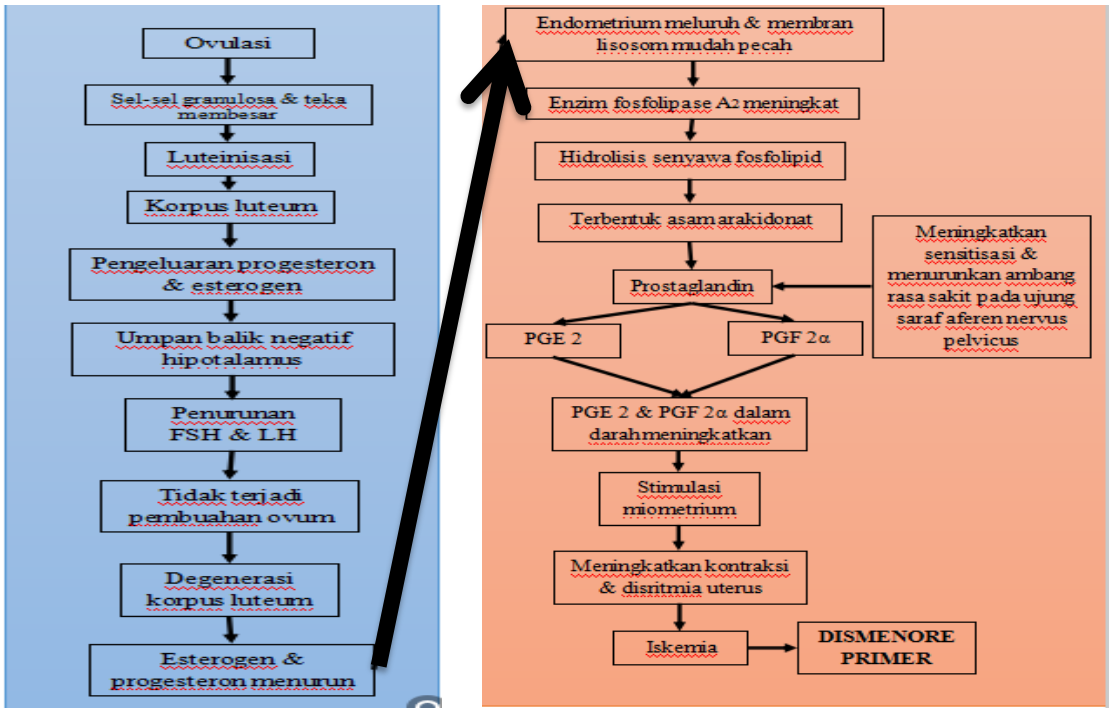
2. Constitutional factors: factors that can reduce resistance to pain, such as anemia, chronic disease and so on can affect the onset of dysmenorrhea. This factor causes decreased resistance to pain.
3. Obstructive factors: in women with a hyperanteflexed uterus, cervical canal stenosis may occur. Myoma submucosum stemmed or endometrial polyps can cause dysmenorrhea because the uterine muscles continue to contract violently to expel the abnormality.
4. Endocrine factor: endometrium in the secretion phase will produce prostaglandin F2 which causes contraction of smooth muscles. Prostaglandins if released into the bloodstream in excessive amounts will cause dysmenorrhea accompanied by common effects such as diarrhea, *nausea*, vomiting and *flushing.*
5. Allergic factors: these factors were found after observing a relationship between dysmenorrhea and urticaria, *migraine* or *bronchial* asthma.

Pathophysiology of Primary Dysmenorrhea

Primary dysmenorrhea is pain that occurs due to high levels of prostaglandins that cause the uterus to continue to contract excessively and lead to arteriolar vasopasm (Smeltzer & Bare, 2002). After ovulation in response to progesterone production, the fatty acids in the cell membrane phospholipids increase. Arachidonic acid is released and starts the prostaglandin cascade in the uterus (Anisa, 2015). Endometrial cells release prostaglandin F2α which is a cyclooxygenase (COX-2) which causes hypertonus and vasoconstriction in the *myometrium* resulting in ischemia and pain in the lower part of the stomach (Marlina, 2012). Prostaglandin F2α (PG F2α) is a strong myometrial stimulant and vasocontrictor found in the endometrium (Pertiwi, 2015). PG F2α causes myometrial hypertonus and vasoconstriction which will lead to ischemia and pain. PG F2α levels are higher during the first two days of menstruation in women with primary dysmenorrhea (Anisa, 2015). The concentration of *vasopressin* and *leukotriene* was also found to be higher in women with heavy menstrual pain than in women with mild pain (Anisa, 2015).

Scheme

Pathophysiology DimenorePrimer



Source: Modification TheorySmeltzer & Bare (2002); Potter & Perry (2005); Corwin (2009); Sloane (2004); Sudarma (2009)

Symptoms and Effects of Dysmenorrhea Primary

Symptoms of primary dysmenorrhea are pain in the midline of the lower abdomen that can spread to the waist and quadriceps, the waist which starts to appear several hours before or simultaneously with the start of menstruation (Anisa, 2015). The pain appears at 24 hours and after 2 days disappears (Sukarni & Magaret, 2013; quoted Pertiwi, 2015). The initial onset of primary dysmenorrhea usually occurs within 6 to 12 months after menarche with the duration of pain generally 8 to 72 hours (Latthe, Champaneris & Khan, 2012). Pain is felt the most severe on the first or second day, along with the maximum release of prostaglandins into menstrual fluid, the pain comes and goes, feels sharp, stabbing, feels squeezed or very painful (Anisa, 2015) can cause multiple seizures and is usually limited to lower abdomen, but spreads to the waist and thighs (Winkjosastro 2008; quoted Harahap & Lismarni 2013).

The form of dysmenorrhea that many teenagers experience is stiffness or spasms in the lower abdomen. It feels so uncomfortable that it causes irritability,

irritability, headache, nausea, vomiting, weight gain, flatulence, back pain, headaches, acne, tension, lethargy, and depression, back leg pain, irritability, shock and decreased awareness (Baradero, Dayrit & Siswandi, 2007 cited Ramadani, 2014; Mitayani, 2011; Anisa, 2015; Hendrik, 2006). This symptom comes the day before menstruation and lasts 2 days until the end of the menstrual period (Marlina, 2012). Based on research by Parker, Sneddon & Arbonc (2010), there are several psychological disorders, namely 73% reported feeling angry, 65% depressed, 52% feeling very sad, 32% feeling overwhelmed, and 25% feeling like hiding.

Dysmenorrhea causes problems of physical, psychosocial, and spiritual complaints (Joshi, Kural, Agrawal, Noor, & Patil, 2015; Khamdan et al., 2014; Umeora & Egwuatu, 2008). Remajaputri who experience primary dysmenorrhea choose to be absent from school or work, unable to concentrate in the learning process, decreased motivation to learn due to pain (Widjanarko, 2006 quoted by Harahap & Lismarni, 2013; Prawirohardjo (2005) quoted by Ningsih, Setyowati & Rahmah (2013) ; Gumanga & Aryee, 2012; Harel, 2006; Chia et al., 2013). Another impact of dysmenorrhea is the tendency to withdraw from daily activities when experiencing dysmenorrhea (Proctor & Farquhar, 2006), lack of appetite, sleep disturbances, helplessness, even depression (Harel, 2006) diarrhea, headaches, nausea, emotional changes, requires adequate rest, disturbed daily activities, decreased achievement in adolescents in school and disturbed social interaction (Pertiwi, Wahid & Marlinda, 2015), reducing women's quality of life (Kumbhar et al., 2011), hyperemesis gravidarum (Enakpene, Dalloul, Petterkin , Anopa, & Muneyyirci-Delale, 2012)

Premenstrual symptoms can be both physical and psychological. Physical symptoms found a few hours before or when menstruation begins until the second or third day of menstruation, including back pain, headache, swollen breasts, flatulence and vomiting (Charu, Amita, Sujoy & Thomas, 2012; Faramarzi & Salmalian, 2014; Kiesner, 2009), back pain , weakness, sweating, symptoms in the gastrointestinal and central nervous system such as drowsiness, dizziness, headaches and poor concentration (Dawood, 2006), abdominal pain (Adinma &

Adinma, 2008). Psychological disorders in the form of mood disorders can be found in adolescents with dysmenorrhea (Kiran et al., 2012), anxiety, sleep disorders and increased pain and physical thresholds (Charu, Amita, Sujoy & Thomas, 2012; Faramarzi & Salmalian, 2014)

Primary Dysmenorrhea Risk Factors

Risk factors for primary dysmenorrhea (Anisa, 2015; Sukarni & Margareth, 2013; quoted by Pertiwi, 2015) include age less than 20 years, women who have never given birth (nulliparous), obesity (overweight), premenstrual syndrome, BMI (Mass Index Body) are low, a diet related to food or nutrition, smoking, a positive family history of dysmenorrhea, long menstrual periods or prolonged menstrual flow, lack of exercise, low socioeconomic status and psychological or social stress. Young age is associated with dysmenorrhea. The symptoms of dysmenorrhea in adolescents are more pronounced than in adult women. However, there are studies that have found that age is not a risk factor for dysmenorrhea in women (Sukarni and Margareth, 2013; quoted by Pertiwi, 2015).

Early menarche age (<12 years); Women with menarche under 12 years of age or early menarche have a 23% higher chance of developing dysmenorrhea than women with menarche at the age of 12-14 years because they experience prolonged exposure to prostaglandins that cause cramps and pain in the stomach (Marlina, 2012; Charu, Amita, Sujoy & Thomas, 2012). Increased production of the hormone estradiol by the body has a role in regulating the onset of puberty in women, it can be triggered by the high intake of meat and milk from cows that are injected with growth hormone to increase milk production (Daniel & Balog, 2009). The next factor is smoking has a negative effect on the human body, in heavy smokers it can increase the duration of dysmenorrhea, this is related to an increase in the volume and duration of bleeding during menstruation. One recent study found dysmenorrhea is also associated with increased environmental tobacco smoke exposure (Sukarni & Margareth, 2013 quoted by Pertiwi, 2015). The nicotine content in cigarettes can induce vasoconstriction thereby increasing the duration of dysmenorrhea (Anisa, 2015).

Psychological factors such as anxiety and tension can also contribute to dysmenorrhea and as women age, pain tends to decrease and eventually goes away after childbearing (Smeltzer & Bare, 2002). Women who have a family with dysmenorrhea complaints of dysmenorrhea are usually 3 times more likely to experience dysmenorrhea than women without a family history of dysmenorrhea, this is due to genetic factors that influence it (Charu, Amita, Sujoy & Thomas, 2012; Kural, Noor, Pandit, Joshi & Patil, 2015). Women with a body mass index (BMI) less than normal body weight and *overweight* (overweight) are more likely to suffer from dysmenorrhea, this is because women with a BMI less than normal weight are found to have a chronic lack of energy which causes a lack of resistance to taste. pain, whereas women who are overweight tend to have excess fat which can lead to hormones that can disrupt the reproductive system during menstruation so that it can cause pain (Charu, Amita, Sujoy & Thomas, 2012; Manorek, Purba & Malonda, 2014).

According to Singh *et al.* In the results of his research, women who have a habit of eating *junk food* suffer from dysmenorrhea because of the nutritional content of fatty acids that can interfere with progesterone metabolism in the luteal phase of the menstrual cycle, the effect is an increase in prostaglandin levels which will cause pain during dysmenorrhea (Singh, Kiran & Singh, 2008; Astuti, 2014; Lakkawar, Jayavani, Arthi, Alaganandam & Vanajakshi, 2014; Chen, et al, 2000). Research reports that women who have a bleeding duration of more than 5 to 7 days will suffer 1.9 times more dysmenorrhea, caused by psychological factors related to emotional and physiological levels due to excessive uterine muscle contraction as a result of which the endometrium produces higher prostaglandins (Kural, Noor). Pandit, Joshi & Patil, 2015). Women who are exposed to cigarette smoke include passive smokers and consume coffee, including dysmenorrhea due to nicotine and caffeine, which are vasoconstrictor, resulting in reduced blood flow to the endometrium and causes cramps and has anti-estrogenic properties (Chen, et al, 2000; Li *et al.* , 2009) The condition of *alexithymia,* namely someone with difficulty identifying feelings and emotional stimuli contributes to suffering from primary dysmenorrhea (Faramarzi & Salmalian, 2014).

B. Secondary dysmenorrhea

Secondary dysmenorrhea is menstrual pain which usually lasts after 25 years for 2-3 days during the cycle and women who experience secondary dysmenorrhea generally have irregular menstrual cycles. To find out the cause, a laparoscopic examination is needed (Mitayani, 2011; Proctor & Farquhar, 2006). Secondary dysmenorrhoea pain is more likely to occur simultaneously or be associated with other gynecological symptoms, such as irregular cycles, heavy menstruation, dyspareunia, vaginal discharge, bleeding between menses and bleeding after intercourse (Stewart & Deb, 2014).

There are a number of clinical conditions with underlying pelvic abnormalities that can cause secondary dysmenorrhoea, namely endometriosis, chronic pelvic inflammatory disease, adenomyosis, intrauterine polyps, submucosal fibroids and intrauterine contraceptives (Wallace, Keightley & Gie, 2010; Wong, 2008; Lowdermilk, Perry, & Cashion, 2013). Increased levels of prostaglandins (including prostaglandin F2) that cause secondary dysmenorrhea in women with endometriosis (Koike, Ikenoue, Mori, 1994). Dysmenorrhea pain secondary to chronic pelvic inflammatory disease is caused by the release of inflammatory mediators, prostaglandins, scar tissue formation and abnormal uterine contractions, whereas adenomyosis due to tonic uterine contractions through destruction of the endometrial gland and in intrauterine polyps, submucosal fibroids and intrauterine contraceptives can also cause dysmenorrhea abnormal uterine contractions in an attempt to remove it (Wallace, Keightley & Gie, 2010). Less common causes of secondary dysmenorrhea include Allen-Masters syndrome (secondary scarring from laceration of a wide ligament, usually during labor), congenital uterine abnormalities, cervical stenosis, Asherman's syndrome, uterine retroversion, ovarian cysts, ovarian tumors and pelvic congestion syndrome (Wallace, Keightley & Gie, 2010; Wong, 2008; Lowdermilk, Perry, & Cashion, 2013). The theory of the causes of pain in all of these conditions is related to the production of abnormal uterine contractions (Wallace, Keightley & Gie, 2010). A small proportion of adolescent girls will experience secondary dysmenorrhoea, which is mostly caused by endometriosis, ovarian cysts, congenital abnormalities

in the urogenital tract, adnexal, rectovaginal, and uterine pain associated with cervical excitation or acute or chronic pelvic inflammatory disease (Stewart & Deb, 2014).

Management

Pharmacology

Management for primary dysmenorrhea, treatment is based on etiologic control with cyclooxygenase inhibitors and ovulation inhibition while secondary dysmenorrhea targets the cause (Stewart & Deb, 2014). The most common pharmacological treatments for dysmenorrhoea are NSAIDs such as ibuprofen or mefenamic acid, which inhibit cyclooxygenase, resulting in lower levels of prostaglandins and less intense myometrial activity (uterine contractions) (Daley, A.J (2008). Oral contraceptive pills (OCP) are also commonly prescribed for the management of dysmenorrhoea which causes low levels of prostaglandins and myometrial activity, thereby reducing menstrual pain (Dawood, 1990; Rosenwaks, Seegar-Jones, 1980; Stromberg, et al, 1984), however, this regimen does not relieve pain in all women, (Dawood, 1990; Henzl, 1985; Lundstrom, Green, 1978) because it is influenced by age, socioeconomic status, lifestyle, parity and stress). Currently do not recommend OCP in the treatment of primary dysmenorrhea (Proctor, Roberts, Farquhar, 2001). and some women may not want to use OCPs for religious, moral, or health reasons, or if they wish to become pregnant (Dawood, 1990; Henzl, 1985; Lundstrom, Green, 1978).

Treatment of dysmenorrhea is necessary to rule out secondary causes of dysmenorrhea such as pelvic infections, sexually transmitted diseases, endometriosis, subfertility, abdomino-pelvic surgery and difficulty in childbirth which can present with additional symptoms of deep, inter-menstrual dyspareunia, post-coital bleeding, and subfertility. Previously, it is necessary to determine the factors that worsen or improve symptoms, because secondary dysmenorrhoea is not effective using simple treatments such as non-steroidal anti-inflammatory drugs (NSAIDs) and combined oral contraceptives (COCP) (Wallace, Keightley & Gie, 2010). Social and family history should be considered as they may have a direct or

indirect cause and help in optimizing treatment. The underlying causes of secondary dysmenorrhea such as fibroids, intrauterine contraceptives, and ovarian cysts including endometriomy are best assessed by ultrasound. Transvaginal ultrasound is preferred over transabdominal because it offers greater resolution and can also be used as an extension of a pelvic exam to determine uterine tenderness and mobility. Three-dimensional ultrasound offers benefits for assessing organs in the coronal plane and, therefore, proves to be useful in the diagnosis of endometrial pathologies. Four-dimensional ultrasound may play a role in assessing the frequency and intensity of myometrial activity associated with dysmenorrhoea. In certain cases, laparoscopy and hysteroscopy to confirm or clarify the diagnosis may be required (Wallace, Keightley & Gie, 2010). Although treatment is available, relatively few women consult a doctor about their symptoms, preferring not to use medication, or to self-medicate using nonpharmacologic interventions.

Non Pharmacology

Massage therapy

The relaxing effect can be obtained with massage therapy so that it can increase oxygen circulation in the tissues so that it can reduce pain (Apay, Arslan, Akpinar, & Celebioglu, 2012; Azima, 2015). In the case of dysmenorrhea, the application of massage is applied to the abdominal area by placing the abdominal muscles relaxed, then warm the hands and rub the stomach by applying oil to the area above the symphysis and above the umbilicus with a circular massage clockwise using the right palm joined with the left hand. for 15 minutes carried out from two days before the estimated menstruation and can be combined with the use of essential oils or lavender aromatherapy (Bakhtshrinin, Abedi, Yusefijoy, Razmjoee, 2015; Eryilmaz & O zdemir, 2009; Azima, Bakhshayesh, Kaviani, Abbasnia, & Sayadi, 2015; Han, Hur, Buckle, Choi, & Lee, 2006). application of lavender oil during massage on the skin surface is stated to increase muscle relaxation, blood supply to the surrounding tissue and increase its elasticity (Atarha, Vakilian, Ruzbehani, Bekhradi, 2009; Choi, 2009)

Acupressure

The application of emphasis on meridian acupuncture points that can improve blood circulation and reduce pain (Chen & Chen, 2010), namely by the interaction between nociceptors and non-nociceptors and descending control of the central nervous system so as to produce analgesia through activation of nerve descending activity directly or it does not directly block nociceptors on the spinal lamina and may also activate the endogenous opioid system (Kaptchuck, 2002). The application of acupressure at the Sanyinjiao point (SP6) singly or in combination with the Zuehai point (SP 10) for 120 cycles with a duration of pressing by the thumb for eight seconds and two seconds for rest to relieve pain and anxiety during dysmenorrhea, zusanli pressure point which applies it as combination with Hegu and sanyijiao points in digestive problems during dysmenorrhea (Ajorpaz, Hajbaghery, & Mosaeby, 2011; Chen & Chen (2010) or emphasis on six points on the auricular area (Yeh, Hung, Chen, Wang, 2013) applied independently during 20 minutes in the first three days of menstruation by respondents for six months of observation with previously all respondents had been trained in independent application (Chen & Chen, 2010). Besides that, the emphasis on CV4 and CV2 points for 15 minutes (Behbahani, 2016), LR3 point (Bazarganipour, 2010)

Aroma therapy

Aromatherapy is a technique to reduce dysmenorrhea by using essential oils of *lavender, cary sage, rose* (Han et al., 2006) through topical applications or by inhalation (Han *et al.*, 2006; Apay et al., 2012; Bakhtshrinin, Abedi, Yusefijoy, Razmjoee, 2015; Matsumoto, Asakura, & Hayashi, 2013; Rose, Ambika, & Williams, 2013) or a mixture of cinnamon oil, rose, clove, also lavender in almond oil (Marzouk, El Nemer, & Baraka, 2013). The aroma of the inhaled oil will react to the olfactory nerves which will be delivered to the central nerve and affect the mind to achieve relaxation, while application to the skin allows the oil to be absorbed from the pores into the blood vessels and gives a muscle relaxing effect (Hur, Song, Lee, & Lee, 2014). Another effect of aromatherapy can reduce both psychological and physical stress, namely reducing anxiety and reducing pain sensations and

increasing parasympathetic nerve work and increasing calmness within at least 10 minutes (Lee, Choi, Posadzki, & Ernst, 2012; Bakhtshrinin, Abedi, Yusefijoy, Razmjoee, 2015; Matsumoto, Asakura, & Hayashi, 2013; Choi, 2009; Bahrainy, Nagi, Manani, 2011). Aromatherapy oil can be given topically or inhaled and can be absorbed by the blood vessels and the oil content can last for 90 minutes (Bakhtshirin, *et al*, 2015). The use of inhaled aromatherapy oils when a woman experiences premenstrual period syndrome (PMS) can affect the nervous system and improve emotions that tend to be unstable during menstruation (Matsumoto, 2013). The lavender scent that is inhaled and then captured by the olfactory nerve will be transmitted to the central nervous system and limbic system, the center of the autonomic function of emotions by modulating the activation of cyclic adenosine monophosphate (cAMP) which gives a sedative effect (Matzumoto, Asakura, Hayashi, 2013) . Aromatherapy of ginger and peppermint reduces moderate to severe dysmenorrhea by giving a topical spread of ginger or peppermint aromatherapy oil for 15 minutes can reduce pain sensation and its location, relieve anorexia or digestive problems such as diarrhea or constipation, affect mood, reduce gas production and flatulence by relaxing the esophageal sphincter reduces nausea, dizziness, and headaches (Rizk, 2013).

Music therapy

Listening to music for 30 minutes either during menstruation or since seven days before menstruation can suppress physical and psychological symptoms that arise (Kushalappa, Lakshmanagowda, Shwetha, & Brathi, 2015). Music as a medium to improve, maintain, develop mental, physical, and emotional well-being by inhibiting the process of delivering pain stimuli through the *spinal cord* so that the brain no longer continues the perception of pain so that it has a psychobiological effect on stress conditions in the body, and affects the autonomic nervous system and hormones. body (Thoma *et al.*, 2013 (Tamsuri, 2006) (Djohan, 2009). Listening to music 30-60 minutes a day can help increase relaxation hormones and reduce oxytocin (Kushalappa, Lakshmanagowda, Shwetha, & Brathi, 2015; Nelson, 2014; Nilsson, 2009).

Temperature Therapy

Alternatives reduce dysmenorrhea by means of a warm pillow and warm compresses on the abdominal area so as to increase learning activities (Kim & Jeumg, 2013; Emmanuel et al., 2013; Akin, Price, Rodriguez, Erasala, Hurley & Smith, 2004; Akin, Weingand, Hengehold. Goodale, Hinkle & Smith, 2001; Potur & Komurcu, 2014) which aims to relax the muscles in the abdomen so that oxygen flow can be better including the uterus

Sports

Yoga corrects the imbalance of the autonomic nervous system and controls excess sympathetic nerve activity so that it can control hyperactivity and dysrhythmic contractions of the uterus that trigger dysmenorrhea in the menstrual period, the effect of Yoga provides more control over the parasympathetic nerves so that the uterus can be more stable (Tejwani & Tejwani, 2015). Yoga can also help balance the flexibility of the muscles of the body, respiration, and mind so that the body and mind are harmonized in dealing with pain because it suppresses prostaglandins and inflammatory mediators (Ekta, Kamalesh, Kousik, & Tapas, 2014), besides that the implementation of the yoga movement can also be applied while being effective in dealing with stress (Nag, Chakravarthy, & Burra, 2013), producing endorphins can also reduce pain because it causes vasodilation, and reduces ischemia, suppresses prostaglandin work and closes its flow in the blood to the pelvic organ tissue and it is advisable to wear clothes that are not tight, keep breathing, and the stomach is not full of food (Renuka & Jeyagowri, 2015). The application of yoga for 20 minutes every morning or evening since the lutheal phase or about 14 days before menstruation can help reduce pain (Rakhshaee, 2011).

Apart from yoga, there are other forms of exercise that have been shown to reduce primary dysmenorrhea, including stretching exercises (Abbaspour, 2006; Motahari & Tabari, 2017; Shahr-Jerdy, 2012). Abbaspour's research (2006) proves that stretching exercises by lying face up with legs and knees bent, doing abdominal exercises about 10 times, standing holding the back of a chair; lift one heel off the floor, then the other, repeat 20 times, stand holding the back of the

chair then do 5 deep knee bends, the last movement is done while lying on your back lift and bring your knees to touch your chin, 10 times, this series of exercises is done twice a day for 20 minutes proven effective in reducing dysmenorrhea. Research by Motahari & Tabari (2017) with similar results but doing slightly different exercises, namely five minutes of warm-up in a standing position and then six abdominal and pelvic stretching exercises for 10 minutes. this program is carried out for 15 minutes, three times a week. Further research by doing stretching exercises with six exercises in the abdominal area, pelvis and groin for three days a week and twice a day for 10 minutes was able to reduce dysmenorrhea (Shahr-Jerdy, 2012).

Nutrition and Herbs

Leaving breakfast and nutritional deficiency status can affect the hypothalamic-pituitary-ovarian and increase the incidence of dysmenorrhea. In addition, consuming lots of sweet foods can interfere with the absorption of vitamins and minerals, fatty foods and fast food with servings of three times a week or more, causing excessive coffee (Unsal, Ayranci, Tozun, Arslan, & Calik, 2010; Eittah, 2014; Fujiwara & Nakata, 2007; Lakshmi, 2013). Diet regulation in cases of dysmenorrhea can be done by reducing the consumption of foods with excessive arachidonic acid content such as butter, oil, coconut, chicken, because it triggers prostaglandin production (Hudson, 2007). Menstrual pain solutions are foods that contain omega 3 and omega 6 contained in fish, eggs, soy or in the form of dietary supplements, other ingredients sourced from seeds, nuts, vegetables and fruit are also important because they contain magnesium, calcium, potassium, fiber, vitamin E and B complex, zinc and magnesium, it is important to consume calcium in the form of milk or cheese or supplements, fibrous foods from vegetables and fruits and water at least eight glasses per day when menstruating because it can have a relaxing effect on muscles (Hansen & Knudsen, 2013; Hudson, 2007; Sangestani, Khatiban, Marci, & Piva, 2015; Razzak, Ayoub, Taleb, & Obeidat, 2010; Fjerbæk & Knudsen, 2007; Ningsih, Setyowati, & Rahmah, 2011) Source of material Traditional foods that have been tested in clinical trials can also be used

as a solution to treating dysmenorrhea, namely curcumin (Khayat, Fanaei, Kheirkhaa, Moghadam, Kasaeian, Javadimehr, 2015) and ginger (Awed, El-saidy, Amro, 201 3; Ozgoli et al, 2009).

CONCLUSION

Dysmenorrhea has significant physical, behavioral, psychological and social impacts, affecting 40-70% of women of childbearing age. This is the main cause of the quality of life of adolescents generally. The exact pathophysiological process is not fully understood but may reflect increased myometrial activity caused by an overproduction of prostaglandins leading to ischemia. The main treatment is generally supportive in relieving symptoms with pharmacological and non-pharmacological

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