



## DYSMENORRHEA IN ADOLESCENT FEMALE: REVIEW ARTICLE

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### Abstract.

**Background:** Dysmenorrhea is the most common gynecologic complaint among adolescent and young adult females. Dysmenorrhea in adolescents and young adults is usually primary (functional), and is associated with normal ovulatory cycles and with no pelvic pathology. Potent prostaglandins and potent leukotrienes play an important role in generating dysmenorrhea symptoms.

**Aim:** this paper aimed to review the topic by discussing its most recent definitions, pathophysiology, epidemiology, clinical presentation and management, as well as to offer a most current view on endometriosis in adolescents.

**Summary:** Adolescents and young adults with symptoms that do not respond to treatment with NSAIDs for 3 menstrual periods should be offered combined estrogen/progestin oral contraceptive pills for 3 menstrual cycles. Adolescents and young adults with dysmenorrhea who do not respond to this treatment should be evaluated for secondary causes of dysmenorrhea. The care provider's role is to explain about pathophysiology of dysmenorrhea to every adolescent and young adult female, address any concern that the patient has about her menstrual period, and review effective treatment options for dysmenorrhea with the patient.

**Keywords:** Dysmenorrhea—Adolescents—Young adults.

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### Introduction:

Dysmenorrhea is an important topic in adolescent medicine due to the large impact it has on the quality of life of teenage and young adult women. Studies have shown that dysmenorrhea is the leading cause of recurrent short term school absence in adolescent girls and that the prevalence of primary dysmenorrhea in this group varies from 16% to possibly as high as 93% (1).

Dysmenorrhea holds significant importance in the field of adolescent medicine as it greatly affects the quality of life for teenage and young adult women. Research has indicated that dysmenorrhea is the primary cause of frequent, short-term school absences among adolescent girls, and its prevalence in this group ranges from 16% to potentially as high as 93% (2).

This paper aimed to review the topic by discussing its most recent definitions, pathophysiology, epidemiology, clinical presentation and management, as well as to offer a most current view on endometriosis in adolescents.

### Definition

The term dysmenorrhea, derived from Greek, translates to "abnormal monthly flow." It is a prevalent condition experienced by a significant

number of women in their reproductive years, affecting up to 90% of them (3).

Dysmenorrhea can be classified into two categories based on its underlying causes: primary dysmenorrhea (PD) and secondary dysmenorrhea (SD) (4).

Primary dysmenorrhea, commonly observed in adolescent girls and women during their reproductive years, refers to painful menstrual cramps originating from the uterus in the absence of any underlying organic gynecological cause. Traditionally attributed to psychogenic factors, it is now more associated with biochemical causes, particularly an excess of prostaglandins and vasopressin (5).

On the other hand, secondary dysmenorrhea is linked to evident pelvic pathology and can occur years after menarche. It is commonly associated with conditions such as endometriosis, pelvic inflammatory disease, ovarian cysts, adenomyosis, and uterine myomas (6).

### Prevalence and burden of dysmenorrhea

Dysmenorrhoea is the most common gynaecological condition in women of childbearing age and can be associated with significant morbidity. The

prevalence of dysmenorrhoea varies from 45% to 95%, worldwide (7).

In adolescent girls and young women, dysmenorrhea is the most prevalent menstrual symptom with prevalence rates ranging from 50% to 90% (8).

Obstetricians-gynecologists should be prepared to diagnose and treat dysmenorrhea due to its high prevalence and the interference it can cause in daily life (9). The burden of dysmenorrhea surpasses that of any other gynecological complaint, making it the leading cause of gynecological morbidity among women of reproductive age worldwide. It also has significant societal implications, leading to a loss of productivity and being recognized as the most important cause of chronic pelvic pain by the World Health Organization (10).

Chronic pelvic pain and dysmenorrhea are often underestimated conditions (11). Prevalence rates vary due to differences in assessment methodologies, population selection, age groups, ethnicity, and variations in pain perception among different communities (12).

In Egypt, studies have shown a prevalence of dysmenorrhea among school students ranging from 74.6% to 94.4% (13). Severe pain, affecting 3% to 33% of women, can render them incapacitated for several days each menstrual cycle, leading to absences from school or work. Dysmenorrhea has a significant impact on women's lives, restricting daily activities, affecting academic performance in adolescents, disrupting sleep quality, and contributing to mood disorders such as anxiety and depression (10).

Several factors were identified as being associated with an increased risk of dysmenorrhea. These risk factors include age, smoking, efforts to lose weight, higher body mass index (BMI), depression/anxiety, earlier age at menarche (onset of menstruation), nulliparity (never having given birth), longer and heavier menstrual flow, a family history of dysmenorrhea, and disruption of social networks (14).

#### **Pathophysiology**

The exact cause of primary dysmenorrhea remains uncertain. However, it has been observed that hyperproduction of uterine prostaglandins, particularly PGF<sub>2a</sub> and PGE<sub>2</sub>, is responsible for increased uterine tone and strong contractions, leading to the characteristic symptoms of dysmenorrhea (15).

Women affected by dysmenorrhea tend to have higher levels of prostaglandins, with the highest levels observed during the first two days of menstruation. The production of prostaglandins is influenced by progesterone levels, and a drop in progesterone levels prior to menstruation leads to an increase in prostaglandin levels. Since the exposure of the endometrium to the luteal phase is crucial for progesterone production, dysmenorrhea occurs primarily in ovulatory cycles. This may explain why

dysmenorrhea typically begins shortly after menarche and why inhibiting ovulation often provides relief. However, it is important to note that other factors beyond endocrine factors can also contribute to the perception and severity of pain associated with dysmenorrhea (10).

Since the 1960s, several theories have emerged to explain the cause of dysmenorrhea, encompassing psychological, biochemical, and anatomical factors. The anatomical theory focused on abnormalities in uterine position, as well as the shape and length of the cervix (16).

Primary dysmenorrhea is not linked to any identifiable organic gynecological causes and was traditionally attributed to psychogenic factors. However, current understanding emphasizes the biochemical causes, primarily an excess of prostaglandins and vasopressin (17).

Although the exact underlying cause of primary dysmenorrhea is not fully elucidated, several factors contribute to its development. One such factor is increased intrauterine pressure. In women without dysmenorrhea, the basal uterine tonus is below 10 mmHg, with rhythmic synchronized contractions every 10 minutes. In contrast, women with primary dysmenorrhea exhibit basal uterine tonus exceeding 10 mmHg, with four to five uncoordinated contractions every 10 minutes. During these contractions, pressure can reach 150 to 180 mmHg. When uterine pressure surpasses systemic arterial pressure, anaerobic metabolites are released due to ischemia, stimulating nerve fibers and leading to dysmenorrhea (18).

#### **Clinical Features**

In primary dysmenorrhea, the pain typically starts 1 to 2 days before the onset of menstruation or just after the menstrual flow begins. The pain usually lasts for a duration of 8 to 72 hours (4).

The level of pain experienced in dysmenorrhea can vary among women, ranging from slight discomfort to moderate or severe discomfort (4).

Apart from pain in the lower abdomen or pelvis, dysmenorrhea is commonly accompanied by various symptoms that can be divided into two main categories: physical and psychological symptoms. Physical symptoms typically fall into three subcategories: systemic, gastrointestinal, and elimination-related symptoms. Systemic symptoms include headache, lethargy, fatigue, sleep disturbances (either excessive sleepiness or insomnia), breast tenderness, a feeling of heaviness in the lower abdomen, backache, as well as pain in the knees, inner thighs, muscles, joints, and swollen legs. Gastrointestinal symptoms may involve changes in appetite, such as an increase or decrease, along with nausea, vomiting, and bloating. Elimination-related symptoms consist of constipation, diarrhea, frequent urination, and sweating (19).

In addition to physical symptoms, individuals with dysmenorrhea may also experience psychological symptoms. These can include mood disturbances such as anxiety, depression, irritability, and nervousness. Research has shown that females with dysmenorrheic pain have a higher prevalence of depression, anxiety, and somatic symptoms compared to those without dysmenorrhea. The presence of both dysmenorrhea and psychological symptoms may indicate a neurological condition contributing to menstrual pain, and the co-occurrence of these symptoms could be influenced by shared genetic factors (4).

While both primary and secondary dysmenorrhea share menstrual pain as the main symptom, specific symptoms related to certain gynecological conditions, such as pain during bowel movements and sexual intercourse in cases of endometriosis, have been identified (20). This means that distinguishing between primary and secondary dysmenorrhea is not straightforward, and a differential diagnosis is necessary to confirm or rule out an organic cause associated with dysmenorrhea in suspected cases of secondary dysmenorrhea (5).

#### **Diagnostic Evaluation**

Typical symptoms of primary dysmenorrhea can lead to a diagnosis based solely on the patient's medical information, without the need for a physical or pelvic examination (4). In cases of primary dysmenorrhea, the physical examination usually appears normal. For adolescents and women exhibiting characteristics of primary dysmenorrhea, a pelvic examination is typically unnecessary. However, a pelvic examination is recommended for sexually active adolescents and women suspected of having secondary dysmenorrhea or those who do not respond to treatment.

Clinicians should consider the possibility of secondary dysmenorrhea if patients report severe dysmenorrhea immediately after menarche, progressively worsening dysmenorrhea, abnormal uterine bleeding (such as heavy or irregular bleeding), mid-cycle or acyclic pain, infertility, lack of response to initial treatment, family history of endometriosis, renal or other congenital anomalies, or dyspareunia. It is important for healthcare providers to be aware of cultural differences in

attitudes towards menstruation, particularly among adolescents, as this may influence their comfort level in discussing menstrual-related symptoms. Parental influence and the patient's perception and reporting of pain can also play a role in diagnosis and management (21).

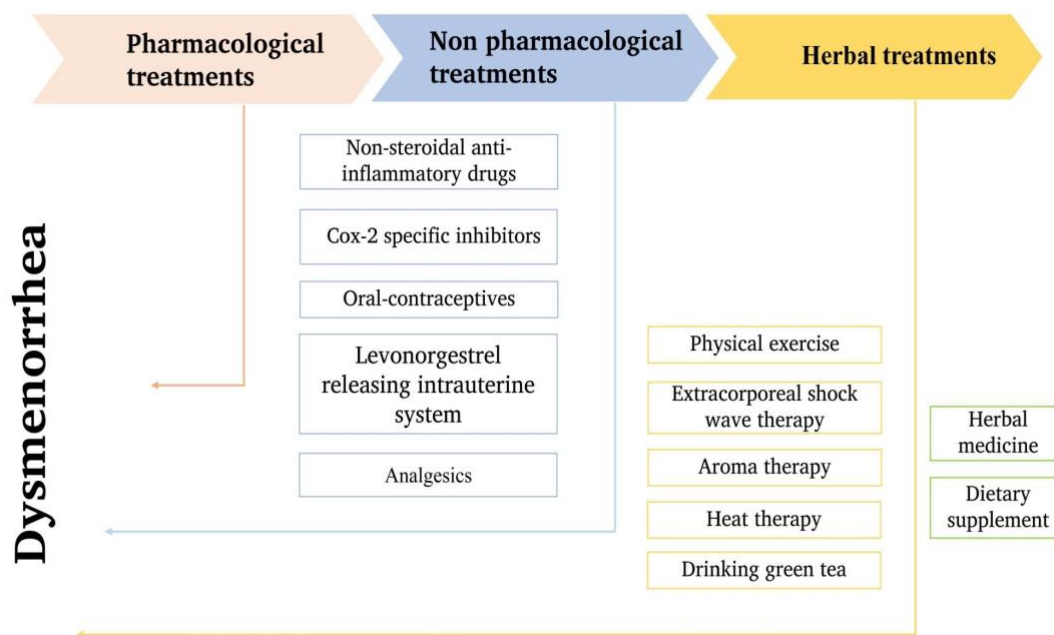
Ultrasound is the recommended initial imaging modality for detecting underlying factors contributing to secondary dysmenorrhea, including obstructive reproductive tract anomalies, uterine fibroids, and adnexal masses such as endometriomas. While ultrasound can aid in diagnosing ovarian endometriomas, it is not effective for detecting nonovarian endometriotic lesions. It's important to note that a normal pelvic ultrasound or physical examination does not rule out the possibility of endometriosis (9).

In cases where torsion of the adnexa, adenomyosis, or deep pelvic endometriosis is suspected, or if transvaginal ultrasound findings are inconclusive, additional imaging modalities such as magnetic resonance imaging (MRI) or Doppler ultrasound may be necessary. However, using MRI as an initial screening tool is not cost-effective. Although MRI is comparable to ultrasound in diagnosing ovarian endometriomas, it is not reliable for identifying peritoneal endometriotic lesions or determining the extent of the disease (9).

Pregnancy tests using urinary human chorionic gonadotropin ( $\beta$ -HCG) are useful when there is a suspicion of pregnancy based on the patient's history. In cases where sexually transmitted infections (STIs) or pelvic inflammatory disease (PID) are suspected, endocervical or vaginal swabs may be necessary. Cervical cytology samples may be required if there is a clinical indication and history suggestive of suspected malignancy (22). Laparoscopy may be considered when all non-invasive investigations have been conducted, and the cause of dysmenorrhea remains unknown (16).

#### **Management**

When a patient's medical history indicates primary dysmenorrhea, it is recommended to start empiric treatment to alleviate the pain. Both medical interventions and complementary and alternative therapies are viable options for pain relief (9).



**Figure 1: Possible treatment for dysmenorrhea pharmacological treatment and non-pharmacological treatment (23)**

### Pharmacological Treatment

Nonsteroidal anti-inflammatory drugs (NSAIDs) are the primary treatment choice for dysmenorrhea and have proven to be highly effective compared to placebo or other therapies. The mechanism of action of NSAIDs involves inhibiting the cyclooxygenase enzyme, which in turn blocks the production of prostaglandins, providing pain relief (16).

Among NSAIDs, there is no conclusive evidence that one is safer or more effective than another, although fenamates (such as mefenamic acid) may have slightly better efficacy due to their dual action of blocking prostaglandin production and inhibiting their action. Ibuprofen and fenamates are recommended as preferred options in terms of safety and effectiveness (24).

Paracetamol is an alternative treatment option when NSAIDs are contraindicated, and combining paracetamol with caffeine and/or pamabrom (a short-acting diuretic) has shown reduced pain in some studies (25). It should be noted that approximately 20% of patients with dysmenorrhea may not respond to NSAID treatment. While COX-2 selective NSAIDs can be used, their cardiovascular side effects should be considered, and they do not offer superior efficacy or tolerability compared to nonselective NSAIDs. Additionally, the use of COX-2 selective NSAIDs and their inhibition of prostaglandins have been associated with delayed ovulation (16).

OCPs have been found to be effective in reducing dysmenorrheic pain in adolescents when compared to a placebo. Women who use OCPs have been

observed to have lower levels of prostaglandins in their menstrual fluid. Additionally, users of contraceptive pills tend to experience significantly lower rates of dysmenorrhea and require less additional pain relief. Progestin-only pills (POPs) primarily work by causing atrophy of the endometrial lining and inhibiting ovulation (16).

According to **Al-Jefout and Nawaiseh (8)**, progestin-only pills (POPs) are more appropriate for individuals with secondary dysmenorrhea caused by endometriosis. However, their effectiveness in treating primary dysmenorrhea is uncertain.

### Non-pharmacological Treatment

Non-pharmacological approaches for managing primary dysmenorrhea involve implementing lifestyle and dietary modifications. These strategies include making changes to one's dietary patterns, such as reducing salt intake and limiting the consumption of animal fat while increasing the intake of complex carbohydrates and fiber. Engaging in regular physical activity, reducing stress levels, and receiving psychological support are also important. Lifestyle, nutrition, and overall well-being play crucial roles in effectively managing menstrual symptoms (26).

Maintaining a well-balanced diet that is rich in essential vitamins and minerals are commonly advised for improved overall health. These lifestyle choices have also shown benefits in reducing the severity of dysmenorrhea, as suggested by **Nagy and Khan, (16)**.

Various forms of exercise are generally recommended due to their numerous health

advantages and minimal or no associated risks. Engaging in regular physical activity has been found to help decrease the intensity of dysmenorrhea, although there is no specific evidence regarding the type of exercise or specific duration. Moderate exercise is particularly recommended for obese women, as noted by **Matthewman (27)**.

Heat therapy has proven to be effective in reducing dysmenorrheic pain when compared to nonsteroidal anti-inflammatory drugs (NSAIDs), and it is often a preferred and easily accessible treatment option for many patients due to its lack of side effects. Nevertheless, high-quality studies are still needed to further explore its efficacy (**16**).

The effectiveness of acupuncture, although supported by a limited number of studies, lacks active comparisons and robust methodological techniques, as highlighted by **Shetty et al. (28)**.

Herbal products have shown effectiveness in treating menstrual pain and its associated symptoms. Various herbal plants possess antispasmodic, anti-inflammatory, and nutritional properties, and they exert their effects through different mechanisms. The specific mechanisms of action of many herbs used for dysmenorrhea are not fully understood. These herbs work by either inhibiting the synthesis of prostaglandins or reducing muscle spasms and inflammation (**23**).

Surgical therapies, including uterine nerve ablation and presacral neurectomy, have been suggested for primary dysmenorrhea. However, a systematic review found insufficient evidence to recommend their use for dysmenorrhea. It is important to note that definitive and irreversible procedures like ablation and hysterectomy should not be considered in adolescents (**9**).

The review also highlighted that conflicts between adolescents and their parents can contribute to medication nonadherence. These conflicts may stem from parents who struggle to involve the adolescent in decision-making, hindering self-management and the transition of treatment responsibilities. Conversely, lack of support and involvement from parents can also contribute to nonadherence. It is important for healthcare professionals to address these issues with patients and engage in discussions to identify potential challenges and explore strategies to overcome them (**9**).

Once treatment adherence is confirmed, an alternative hormonal method may be considered for an additional three months (**9**).

#### **Approach to Adolescents and Young Adults with Dysmenorrhea**

Evaluation of the adolescent or young adult with dysmenorrhea starts with a history that is obtained privately and confidentially. The patient should be asked about age at menarche, menstrual pattern, onset and character of menstrual cramps and other menstruation associated symptoms, response to

analgesic medication, sexual activity, sexual abuse history, contraception, condom use, history of sexually transmitted diseases, vaginal discharge, school performance and school/work absenteeism, and family history of menstrual disorders (**29**).

The Cox Menstrual Symptoms Scale can be used to assess frequency and severity of dysmenorrhea symptoms. Pelvic examination is not necessary if the patient has never been sexually active, and if the history suggests primary dysmenorrhea. Because of the risk of pelvic inflammatory disease in a sexually active adolescent, an interim pelvic examination should be performed if the patient develops new-onset or more severe dysmenorrhea. Pelvic and rectal examinations should be performed in adolescents with a history suggestive of secondary dysmenorrhea (**7**).

In addition, girls should be encouraged to increase consumption of fish such as salmon, tuna, mackerel, and herring, which are rich in very long chain omega-3 polyunsaturated fatty acids (**30**). A review of effective treatment options for primary dysmenorrhea should be provided. Response to treatment is an important component of the evaluation, because dysmenorrhea resulting from endometriosis is less likely to respond to NSAIDs than is primary dysmenorrhea. If the pain does not improve with oral contraceptives, laparoscopy is indicated to evaluate for endometriosis. Pelvic magnetic resonance imaging is indicated to exclude an obstructive pelvic anomaly.

#### **Prognosis**

With appropriate treatment, the prognosis for primary dysmenorrhea is generally favourable. Mild to moderate dysmenorrhea typically responds well to nonsteroidal anti-inflammatory drugs (NSAIDs). Severe dysmenorrhea may also respond to NSAIDs but may require higher doses or combination/adjuvant therapy. In cases of persistent dysmenorrhea, it is important to investigate for potential secondary causes. The prognosis of secondary dysmenorrhea depends on the type, location, and severity of the underlying cause (**16**).

Educating and raising awareness among young women regarding the significance of maintaining a balanced and healthy diet is crucial in order to prevent and alleviate the severity of dysmenorrhea, as suggested by **Bajalan et al. (31)**. Adjustments in vitamins and dietary intake have been linked to a reduction in menstrual pain.

Furthermore, incorporating regular physical activity into one's routine has proven effective in mitigating complications associated with dysmenorrhea. Exercise serves as a non-specific analgesic by enhancing blood circulation in the pelvic region and triggering the release of beta-endorphins. The primary objective of dysmenorrhea treatment is to alleviate pain and enhance the overall quality of life for patients. Therefore, appropriate administration

of analgesics enables women to carry out their daily activities (16).

### Summary

Dysmenorrhea is defined as the presence of painful cramps of uterine origin that occur during menstruation. Dysmenorrhea can be divided into two broad categories of primary and secondary. Primary dysmenorrhea is described as recurrent, cramping pain occurring with menses in the absence of identifiable pelvic pathology. Secondary dysmenorrhea is menstrual pain associated with underlying pelvic pathologies such as endometriosis, uterine myomas, pelvic inflammatory disease, ovarian cyst, intra-uterine adhesions and cervical stenosis. The most common symptoms of dysmenorrhea are cramps lower abdominal pain, back pain, nausea/vomiting and headache.

A high proportion of female secondary school students were suffered from primary dysmenorrhea. Students with younger age, long duration of menstrual flow, irregular cycle, family history of dysmenorrhea, and breakfast skipping were more likely to develop primary dysmenorrhea.

Dysmenorrhoea may negatively affect women's quality of life. Primary care physicians are well positioned to proactively explore the symptoms and provide appropriate education and management. In the initial evaluation of dysmenorrhoea, it is important to determine if it is primary or secondary in nature. If secondary dysmenorrhoea is suspected, the patient should be referred to a gynaecologist for further evaluation.

Holistic approach of patients with dysmenorrhoea includes symptomatic treatment as well as consideration of the psychosocial issues that often accompany the disorder. NSAIDs are the recommended first-line treatment for primary dysmenorrhoea. Combined hormonal or progesterone-only contraceptives can be used in those who desire contraception. Most adolescents will have primary dysmenorrhoea. Referral to a gynaecologist should be considered if symptoms do not improve with treatment after three menstrual cycles, as these patients are more likely to be diagnosed with an organic cause.

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