

# Natural Pain Relief : Herbal Dark Chocolate For Menstrual Pain

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**Abstract:** *Individuals have a greater affinity for chocolate than for any other type of food, yet they often have a dislike for medications. Consequently, the objective of this study was to create a chocolate infused with herbal components, specifically designed to alleviate menstrual cramps. Primary dysmenorrhea (PD) is a common problem among women in their reproductive years that can negatively impact their quality of life. About 55% of women experience dysmenorrhea. One of the foods that can reduce menstrual pain is dark chocolate. Other herbal ingredients such as ginger, turmeric, mint leaves, almond, cinnamon and honey are also known to reduce pain. However, research on combination of dark chocolate with herbal ingredients has not been conducted. Therefore, this study aims to determine the effectiveness of dark chocolate with herbs in reducing menstrual pain. Dark chocolate can be used as an alternative to overcome pain during menstruation time because it contains many benefits in the health sector. Chocolate contains copper which used by the body to synthesize collagen and neurotransmitters called endorphins. Endorphin hormone would be a analgesic and natural sedative so as to reduce the intensity of pain such as menstruation pain. Dark chocolate contains more cocoa, making it the best choice to get the health benefits. A physiochemical analysis was conducted on herbal chocolate to identify the presence of proteins, carbohydrates, and glycosides, which indicate the existence of various biomolecular components within the chocolate. This makes chocolate a non-pharmacological alternative for alleviating dysmenorrhea. The purpose of this study was to investigate the influence of dark chocolate on reducing menstrual pain in primary dysmenorrhea.*

**Keywords:** Dysmenorrhea, dark chocolate, herb, ginger, menstrual pain, menstruation

## I. INTRODUCTION

Dysmenorrhea is primarily attributed to an imbalance of the hormone progesterone in the bloodstream.<sup>[1-3]</sup> This condition is characterized by an elevated production of prostaglandins in women experiencing dysmenorrhea compared to those who do not, resulting in intensified uterine contractions and excessive intestinal activity. Additional factors contributing to dysmenorrhea may include underlying medical conditions such as endometriosis, pelvic infections, uterine tumors, appendicitis, gastrointestinal disorders, and renal complications.<sup>[4]</sup>

The occurrence of dysmenorrhea is linked to the increased release of prostaglandin F2 $\alpha$  (PGF2 $\alpha$ ) and prostaglandin E2 (PGE2) within the uterus during the process of endometrial shedding, which subsequently elevates uterine tone and induces contractions.<sup>[5]</sup>

Research indicates that a significant number of women may suffer from dysmenorrhea. A preliminary investigation conducted at a public junior high school in Bandung revealed that out of ten female students, all reported experiencing menstrual pain (dysmenorrhea), which resulted in discomfort, abdominal pain radiating to the pelvic area, and negatively impacted their academic performance. According to the World Health Organization (2010), the prevalence of dysmenorrhea in women is about 90% and 55% in Indonesia.<sup>[6]</sup>

**Dysmenorrhea is categorized into two types:**

### Primary Dysmenorrhea:

Primary dysmenorrhea is defined as painful menses among females with normal pelvic anatomy, frequently beginning during adolescence. It is observed only in ovulatory cycles, frequently emerging within 6 to 12 months after menarche with no pathology or organic basis.

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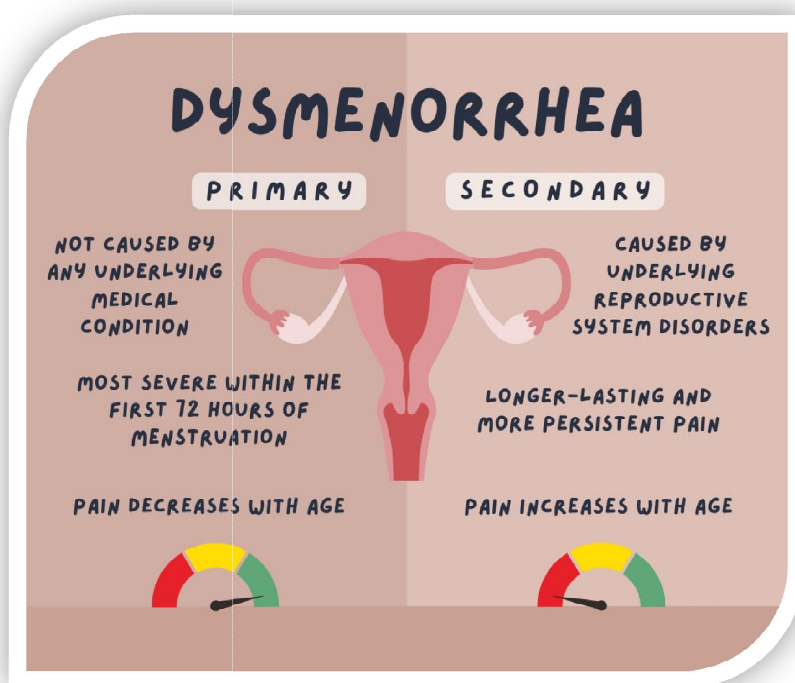
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Primary dysmenorrhea refers to menstrual pain resulting from prostaglandin levels associated with the ovulatory cycle. The cause of primary dysmenorrhea is not well established.

#### **Secondary dysmenorrhea:**

Secondary dysmenorrhea is a menstrual pain associated with underlying pathology and its onset might be years after menarche.

Secondary dysmenorrhea is linked to medical conditions such as endometriosis, adenomyosis, fibroids (myomas), and other pelvic disorders.<sup>[7-8]</sup>



Therapeutic approaches for dysmenorrhea can be categorized into pharmacological and non-pharmacological methods. Pharmacological treatments include medications such as paracetamol, hormonal contraceptives, and non-steroidal anti-inflammatory drugs (NSAIDs). NSAIDs are frequently utilized due to their ability to lower prostaglandin levels in menstrual fluid, diminish uterine contractions, and reduce menstrual flow. However, prolonged use of NSAIDs may lead to gastrointestinal complications, including bleeding.<sup>[9]</sup>

Non-pharmacological strategies for managing dysmenorrhea encompass the application of warm compresses, engaging in light physical activities such as muscle stretching, and ensuring sufficient rest. Certain foods are recognized for their potential to alleviate menstrual discomfort, including dark chocolate, ginger, cinnamon, turmeric, and various herbal ingredients like red ginger, Moringa, and mint leaves.<sup>[10]</sup>

Dark chocolate, derived from cocoa beans, is abundant in vitamins and minerals. It contains high levels of flavonoid polyphenols, particularly catechins, epicatechins, anthocyanidins, and proanthocyanidins, which are acknowledged for their anti-inflammatory and analgesic properties. These polyphenols exert an analgesic effect by inhibiting the cyclooxygenase enzyme, thereby reducing prostaglandin levels and alleviating pain.<sup>[11,12]</sup> Additionally, dark chocolate is rich in magnesium, which positively influences blood vessels and facilitates calcium entry into smooth muscle cells, affecting uterine muscle contraction, stress, and relaxation.<sup>[13]</sup> A prior study indicated that a dose of 35 grams of 72% dark chocolate could significantly decrease menstrual pain levels among Midwifery students in Banda Aceh within two hours. Similarly, another study demonstrated that a dose of 45.7 grams of 70% dark chocolate effectively reduced menstrual pain in Medical students from Lampung.<sup>[14]</sup>

The integration of various phytochemicals from either the same or different food sources can yield a synergistic anti-inflammatory effect.<sup>[15]</sup> A research study indicated that the combination of cocoa and omega-3 fatty acids can effectively inhibit inflammation and lower cardiovascular risk factors in humans.<sup>[16]</sup> Similarly, another study demonstrated that the pairing of dark chocolate with boiled carrot water produced a significant anti-inflammatory effect.<sup>[17]</sup> Collectively, the combination of dark chocolate with other herbal ingredients may enhance the pharmacological effects, particularly in terms of anti-inflammatory properties. Notable herbal plants recognized for their anti-inflammatory capabilities include red ginger, turmeric, Moringa, sambiloto, and honey. These plants can serve as components or mixtures in traditional medicine formulations.

Red ginger is rich in gingerol and shogaol, which are known to inhibit prostaglandins, thereby alleviating menstrual pain.<sup>[18]</sup> Turmeric contains curcumin, a compound that modulates the inflammatory response by regulating the activity of enzymes such as cyclooxygenase-2 (COX-2), lipoxygenase, and inducible nitric oxide synthase (iNOS), ultimately reducing and inhibiting uterine contractions.<sup>[19]</sup> Moringa leaves are recognized for their content of alkaloids, glycosides, phenols, saponins, and tannins, which confer analgesic properties by inhibiting COX-2 activity and alleviating pain.<sup>[20]</sup> Sambiloto is characterized by the presence of andrographolide and 14-deoxy-11,12-didehydroandrographolide, which exhibit analgesic and antipyretic effects. Honey is known to inhibit cyclooxygenase synthesis due to its flavonoid compounds and Vitamin E content. The flavonoids present can inhibit prostaglandin synthesis and regulate uterine smooth muscle, thereby reducing menstrual pain.<sup>[21]</sup> Vitamin E has the ability to inhibit the activity of phospholipase A and cyclooxygenase enzymes by preventing the post-translational activation of cyclooxygenase, thereby reducing the production of prostaglandins.<sup>[22]</sup> The anti-inflammatory properties of these components are well-documented. However, there is a scarcity of information regarding the combination of dark chocolate with herbal ingredients. Consequently, this study seeks to explore the effects of a beverage made from the combination of dark chocolate and herbal ingredients on late adolescents experiencing dysmenorrhea.

### **Aim and Objective:**

To create a tasty and effective herbal chocolate that harnesses the anti-inflammatory benefits of turmeric to alleviate menstrual cramps and other discomforts related to period pain. By fulfilling these goals, the herbal chocolate product aspires to positively influence women's well-being by offering a natural and efficient approach to managing period pain.

### **Physiology of Menstrual cycle:**

The menstrual cycle is a natural process. It is a complex cycle controlled by female hormones that cause regular bleeding (periods). Some women may experience menstrual problems (e.g. heavy bleeding). The entire duration of a Menstrual cycle can be divided into four main phases.

- 1) Menstruation (From day 1 to 5)
- 2) Follicular phase (From day 1 to 13)
- 3) Ovulation (Day 14)
- 4) luteal phase (From day 15 to 28)

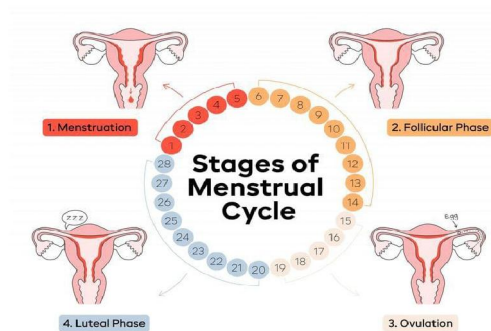
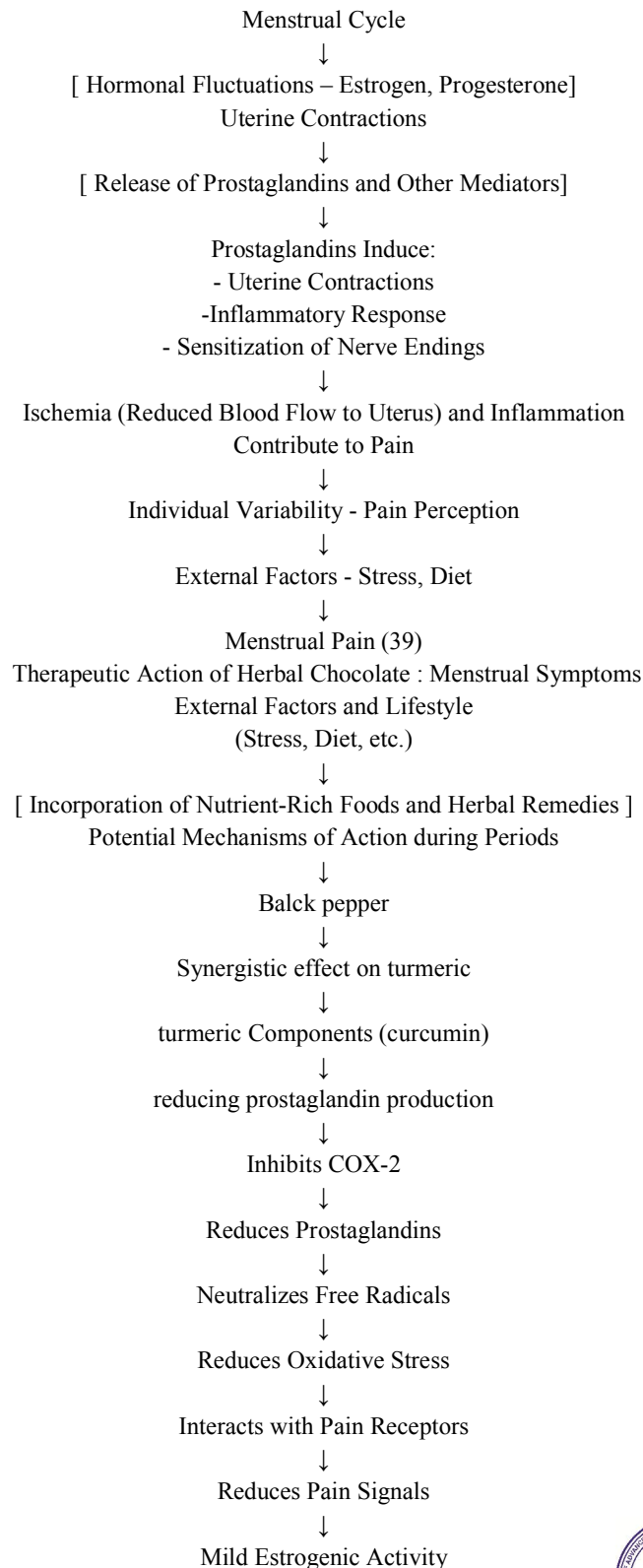
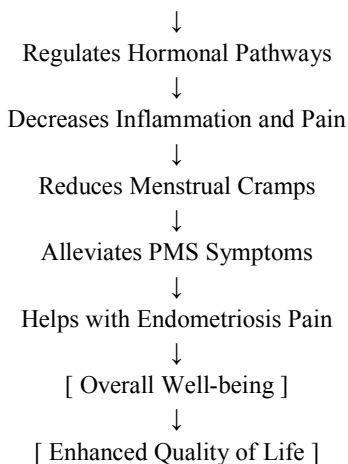


Figure of Stages of Menstrual Cycle

**Normal Menstrual Cycle:-**





### **Dark chocolate :**

characteristics of dark chocolate that could make it an effective option for alleviating menstrual discomfort:



### **Ideal Features of chocolate for menstrual cramps**

1. It should be crafted with a refined flavor.
2. It must be of superior quality.
3. Its texture ought to be entirely velvety.
4. It should present an authentic appearance.
5. It ought to dissolve easily in the hand or mouth.
6. It should exhibit an attractive hue.
7. It needs to be visually appealing.
8. It must be affordable.
9. It should be readily accessible.
10. It must provide good value for money.

### **Chemical Components:**

1. **Flavonoids:** Dark chocolate is rich in flavonoids, which possess anti-inflammatory and antioxidant effects.
2. **Phenylethylamine:** A natural substance that can enhance mood and may help alleviate stress and anxiety related to menstrual cramps.



3. Anandamide: A fatty acid neurotransmitter that can aid in diminishing pain and inflammation.
4. Magnesium: As a significant source of magnesium, dark chocolate can assist in relaxing the uterine muscles and minimizing cramping.
5. Copper: Exhibiting anti-inflammatory properties, copper can help decrease pain and inflammation.<sup>[28]</sup>

**Pharmacological Benefits :**

1. Pain alleviation: The flavonoids and anandamide found in dark chocolate can aid in lessening pain and inflammation.
2. Muscle relaxation: The magnesium in dark chocolate can facilitate the relaxation of uterine muscles and alleviate cramping.
3. Mood enhancement: Phenylethylamine and anandamide can aid in minimizing stress and anxiety linked to menstrual cramps.
4. Anti-inflammatory effects: The flavonoids and copper in dark chocolate can work to diminish inflammation and pain.

**Benefits for Menstrual Pain Relief :**

1. Alleviates menstrual cramps: The combination of flavonoids, magnesium, and anandamide in dark chocolate can help lessen menstrual cramps.
2. Mitigates bloating and breast sensitivity: The flavonoids and magnesium in dark chocolate can aid in reducing bloating and breast tenderness.
3. Enhances mood: The presence of phenylethylamine and anandamide in dark chocolate can help boost mood and lessen stress and anxiety.
4. Encourages relaxation: The magnesium and flavonoids in dark chocolate can promote relaxation and ease muscle tension.

**Suggested Dosage:**

1. Dark chocolate: 1-2 ounces (28-57 grams) each day
2. Cocoa concentration: 70% or more
3. Timing: During the menstrual cycle, beginning 1-2 days before the onset

**Advantages:**

- Alleviates Cramps and Spasms
- Decreases Pain Intensity and Duration
- Enhances Mood and Lowers Stress
- Encourages Relaxation and Sleep
- Natural, Non-Pharmacological Option to Painkiller

**Ginger :**

**Synonyms** - Zingiber, Zingiberis

**Biological Source** - Ginger is derived from the dried rhizomes of Zingiber officinale.

**Family** - Zingiberaceae

**Geographical Source** - Ginger originates from Southeast Asia, although it is also cultivated in the Caribbean islands, Africa, Australia, Mauritius, Jamaica, Taiwan, and India. Over 35% of the world's ginger production occurs in India.<sup>[23]</sup>



Ginger, scientifically known as *Zingiber officinale*, is a plant that has been utilized for many centuries in traditional medicine due to its anti-inflammatory, antioxidant, and pain-relieving properties.<sup>[24]</sup>

#### Chemical Components:

Ginger comprises various bioactive substances, including:

1. Gingerol: A polyphenolic compound that contributes to ginger's anti-inflammatory and pain-relieving characteristics.
2. Shogaol: A substance known for its anti-inflammatory and antioxidant effects.
3. Paradol: A compound that exhibits both anti-inflammatory and analgesic properties.<sup>[25]</sup>

#### Mechanisms of Action :

The analgesic effects of ginger can be explained by:

1. Inhibition of prostaglandins: Both gingerol and shogaol hinder the synthesis of prostaglandins, which are responsible for inducing pain and inflammation.
2. Antioxidant properties: The antioxidant capabilities of ginger assist in alleviating oxidative stress and inflammation.
3. Modulation of pain pathways: Ginger influences the brain's mechanisms for processing pain, thereby diminishing the sensation of pain.<sup>[26]</sup>

#### Pain Alleviated:

Menstrual discomfort: Ginger alleviates menstrual pain by inhibiting prostaglandin production and promoting relaxation of the uterine muscles.<sup>[27]</sup>

## II. CONCLUSION

Herbal chocolate formulations embody a harmonious blend of indulgence and health, offering a pleasurable experience enriched with the advantages of functional herbs and natural components. These products present an attractive alternative to traditional chocolates, especially for those seeking relief from specific ailments such as menstrual cramps or for individuals pursuing a more holistic wellness strategy. By emphasizing the use of natural ingredients and integrating pharmacologically active herbs, herbal chocolate serves as a beneficial addition to a balanced lifestyle. Whether utilized for alleviating menstrual discomfort or simply relished as a healthier option, these formulations illustrate that chocolate can provide both comfort and a means to enhance overall well-being.

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