Ann PUBLISHER Journal of Medicine and Health Sciences (Medisci)
e-ISSN 3046-7322
p-ISSN 3032-7326

The Effect of Lavender Aromatherapy on Reducing the Scale of Menstrual Pain in Adolescent Girls at Al Anwar Boarding School, Cirebon Regency

Nurazizah, Tonasih, Vianty Mutya Sari, Nunung Nurjanah
Muhammadiyah Ahmad Dahlan University, Cirebon, West Java, Indonesia
Corresponding Author Email: viantyummukayyisa@gmail.com

Abstract
Background: Based on data from the *World Health Organization* (WHO), the number of women with dysmenorrhea in the world is vast; on average, more than 50% of women in each country experience dysmenorrhea.
Objective: This study aims to determine the effect of lavender aromatherapy on reducing the severity of menstrual pain in adolescent girls.
Research Method: This study uses a quasi-experimental, two-group pretest-posttest design. The population in this study is adolescent girls aged 15-19 years at Al Anwar boarding school. by sampling using pretest and posttest data, and analyzed using *the Paired t Test*. So that 15 respondents will be researched.
Results: The results of *the paired sample t-test* showed a ρ-value of 0.000 < 0.05, which means that there was an effect before and after the administration of lavender aromatherapy on the reduction of the scale of menstrual pain in adolescent girls at Al Anwar Boarding School, Cirebon Regency.
Conclusion: This study found that the administration of lavender aromatherapy affected the reduction of menstrual pain in adolescent girls.
Implementation. It is hoped that young women at Al Anwar Islamic Boarding School who experience menstrual pain can use lavender aromatherapy to reduce the level of dysmenorrhea pain.

Keywords : Lavender Aromatherapy, Pain Scale, Adolescent Girls

INTRODUCTION

Humans are creatures that grow and develop. Adolescence is a transitional period from childhood to adulthood, usually from the age of 10 to the full age of 19. Adolescents experience three types of changes: psychosocial development, which indicates their efforts to find their identity, cognitive development, which indicates an improvement in their ability to think, and physical changes. Physical changes that occur in adolescents are a sign of puberty, which is caused by hormonal changes that can lead to changes in appearance (Panjaitan et al., 2020).

The first sign of puberty in adolescent girls is experiencing menstruation. Menstruation or menstruation is the decay of the uterine wall that contains blood and tissues that are connected to the entire body (Fatmawati et al., 2016). Here, menstruation occurs when sperm fertilize an egg, causing the endometrium to decay then called menstruation (Sinaga Ernawati, et. al., 2017).

Menstruation in Greek, "*dysmenorrhea*" means "difficult, painful, or abnormal," and "*meno*" means moon and "*rrhea*" means flow. Dysmenorrhea is a medical condition, a condition in which women experience pain during menstruation, which interferes with daily activities due to the pain felt This condition can last 2 days or more than the length of the menstrual day each month (Afiyanti, 2016).

There are two categories of dysmenorrhea: primary and secondary. Pain during menstruation that appears for no apparent cause is called piter dysmenorrhea. Pimer dysmenorrhea arises due to the age of the first period and is associated with an imbalance of hormones 2 ovarian sex steroids. While secondary dysmenorrhea is pain caused by gynecological diseases such as endometriosis or fibroids. It is a symptom, not a disease. which occurs due to abnormalities of the pelvic cavity that interfere with women's activities, often even interfering with school-age adolescents because it interferes with their daily activities (Tyas et al., 2018).

The verses of the Qur'an which are the basis of Islamic views to seek cure from various diseases, including menstrual pain are stated in surah An-Nahl (16:69):

ثُمَّ كُلِيْ مِنْ كُلِّ الثَّمَرٰتِ فَاسْلُكِيْ سُبُلَ رَبِّكِ ذُلُلًاۗ يَخْرُجُ مِنْ بُطُوْنِهَا شَرَابٌ مُّخْتَلِفٌ اَلْوَانُهٗ فِيْهِ شِفَاۤءٌ لِّلنَّاسِۗ
اِنَّ فِيْ ذٰلِكَ لَاٰيَةً لِّقَوْمٍ يَّتَفَكَّرُوْنَ ﴿٦٩﴾

"Then, eat (O bee) of all fruits and walk in the ways of your Lord which has been made easy (for you)." From his stomach came a drink (honey) that was variously colored. In it there is a cure for humans. Indeed, in such a thing there is a sign (of Allah's greatness) for the people who think.

Based on data from *the World Health Organization* (WHO), it also shows that the number of dysmenorrhea in the world is very large, on average more than 50% of women in each country experience dysmenorrhea. The prevalence of dysmenorrhea varies every year ranging from 28% to 77.7% worldwide. The prevalence of dysmenorrhea in Indonesia is 107,673 people (64.25%), consisting of 59,671 people (54.89%) experiencing primary dysmenorrhea and 9,496 people (9.36%) experiencing secondary dysmenorrhea, in Cirebon

showing that 34.2% of respondents experienced moderate pain and 28.9% experienced severe pain (Herawati, 2017).

The impact of dysmenorrhea pain on adolescent routines is very large, such as limitations in doing activities, especially when studying at school because it can interfere with activities, loss of enthusiasm for learning, decreased concentration, and even difficulty concentrating. Therefore, the material provided during learning is not well received or can even be the reason for absence from school (Fitri & Ariesthi, 2020).

Given the many negative effects caused by dysmenorrhea pain, treatment and treatment are needed to reduce those negative effects. The use of pharmacological treatments, such as the use of nonsteroidal anti-inflammatory drugs (NSAIDs), aims to inhibit cycloorganism enzymes, so that the production of prostaglandins, which cause pain, is reduced. However, the use of NSAIDs has side effects and can cause problems such as impaired kidney function, edema, hypertension, and gastrointestinal bleeding (Idacahyatietal., 2020).

It is better to use non-pharmacological treatments such as complementary therapy that has minimal side effects. This therapy is a development of traditional medicine combined with modern medicine, and has an impact on physical, mental, and spiritual aspects. This approach is in line with the principles of obstetrics that view humans holistically, as affirmed by Martha E. Rogers' theory, that humans are individuals who interact with each other with their environment (Diligent, 2020).

Non-pharmacological therapy is the use of aromatherapy. Aromatherapy is an alternative treatment that uses fragrances derived from aromatic compounds. The smell response resulting from aromatherapy stimulates the work of brain neurochemical cells. Therefore, a pleasant smell will stimulate the thalamus to secrete enfecalin which functions as a natural pain reliever and produces a feeling of calm (Marika et al., 2018). The administration of non-pharmacological therapy, which is usually carried out with pain complaints, is a deep breath relaxation technique. The administration of lavender aromatherapy is still rarely used as an alternative that can reduce pain because lavender aromatherapy is still not popularized as a form of treatment effort to reduce the pain response felt by many people.

Research conducted by Pustikawaty (2016), showed that lavender aromatherapy has an effect on reducing the pain scale of dysmenorrhea. This is because when a person inhales lavender aromatherapy, the volatile molecules in the oil are carried to the receptor cells in the nose. When the molecule attaches to the nose hair, an electrochemical message is transmitted through *the olfactory* duct to the brain and then to the limbic system. Where it will stimulate

the hypothalamus to release serotonin and endorphin hormones which produce a relaxed and calm taste.

Based on a preliminary survey that has been conducted at the Al Anwar Islamic Boarding School, there are 70 adolescent girls on May 27, 2025, it is known that many experience menstrual pain with different pain scales, 15 adolescents (50%) experience mild pain scales, 9 adolescents (30%) experience moderate pain and 6 adolescents (20%) experience severe pain. Adolescents are still ignorant of menstrual pain with moderate or severe pain scales experienced without making proper treatment efforts. Seeing the above problems, the researcher was interested in conducting a study entitled The Effect of Lavender Therapeutic Aroma on Reducing the Scale of Menstrual Pain at Al Anwar Boarding School, Cirebon Regency. The purpose of this study is to find out about the scale of menstrual pain in adolescent girls at the Al Anwar boarding school.

Based on the description that has been described, the author is interested in applying it with the title "The Effect of Lavender Aromatherapy on Reducing the Scale of Menstrual Pain at Al Anwar Boarding School in 2025".

LITERATURE REVIEW

Definition of Teenager

Adolescence is a phase in which the transition from childhood to adulthood occurs, usually at the age of 13-20, which involves changes in psychological, cognitive, and sexual aspects (Shalia, 2024). Menstruation is the process of bleeding from the uterus through the vagina, which generally occurs once a month and begins around the age of 12-15 years. The duration of menstruation usually lasts between 3-7 days (Sagala, 2022).

According to (WHO), adolescents are an age group between 10-19 years old, according to Indonesian Health Regulation Number 25 of 2015 adolescents are residents aged 10-18 years and according to the Population and Family Planning Agency (BKKBN) the age range of adolescents is between 10-24 years old and unmarried (Ministry of Health, 2015). Adolescence is a time when individuals develop from the first appearance of secondary sexual signs to reaching sexual maturity (Jannah, 2017).

Teenage Change

Adolescence occurs when children experience changes in body structure from children to adults (puberty) (Jannah, 2017). During this period, there are rapid physical changes accompanied by many changes, such as the reproductive organs (genital organs) to reach

maturity which is shown by the ability to carry out the functions of the reproductive organs (Jannah, 2017). Signs of changes that occur in growth include (Batubara, 2016):

Physiological Changes In Adolescents

Primary Sex Signs: Adolescent boys are able to perform reproductive functions after experiencing wet dreams. Adolescent girls as a sign of the maturity of the reproductive organs is the beginning of menstruation (menarche). Secondary Sex Signs: Teenage boys grow oranges, penis and testicles, bigger breasts, muscular bodies, growing mustaches and hair around the genitals, armpits, chest, hands, and legs. Teenage girls have fine hair around the armpits and vagina, wide hips, breast growth, larger and protruding nipples, and twin mammary glands, larger breasts

Psychological Changes in Adolescents. Changes related to psychiatry in adolescents are: Changes in sensitive or sensitive emotions, such as crying easily, anxious, frustrated, and otherwise being able to laugh for no apparent reason. It is especially common in young women. Easily reacts even 11 aggressively to external disturbances or stimuli that affect him, likes to seek attention and act without first thinking. As for the tendency to disobey parents, and it is more convenient to go with his tesssman than to stay at home. Intellectual development: Tends to develop abstract ways of thinking, likes to give criticism. Tends to want to know new things, so the behavior of wanting to experiment appears.

Menstruation in Adolescents

The word "menstruation" is derived from the word mensis, another term that refers to "moon," while the term in English "menses" means the period of menstruation, ovaries, and lining of the uterus. Menstruation is a physiological change that occurs in women regularly and is affected by reproductive hormones, usually lasting every month from adolescence to menopause. Menstruation is the release of the uterine lining accompanied by bleeding and lasts repeatedly every month, except during pregnancy (Irianti, 2019). Menstruation is regular bleeding from the uterus as a sign that the uterus has functioned properly (Maharani et al., 2016). Regular menstruation, also called Menstruation, is a biological reaction that must occur in women, where every month a woman will experience bleeding through the reproductive tract. This menstrual process does not occur in women who are pregnant. The normal menstrual cycle ranges from 28-29 days (Tambun, 2022).

Menstrual cycle

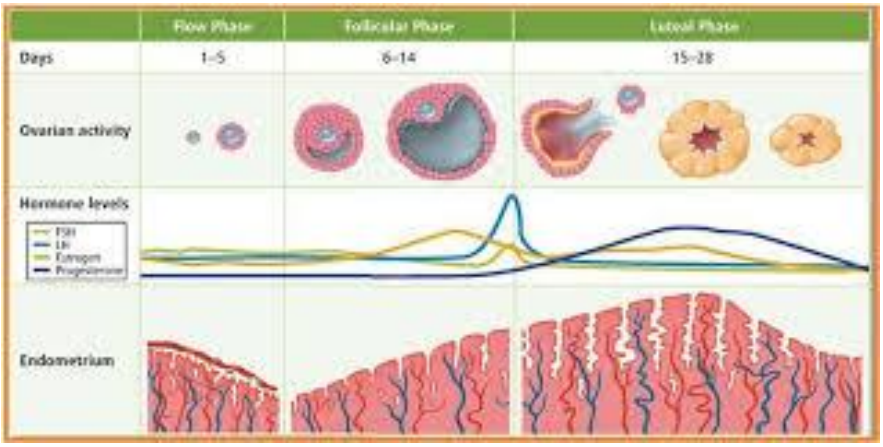

Figure 1 menstrual cycle

Source : (Luthfa, 2017)

The menstrual cycle is a complex event that occurs simultaneously in the *endometrium, hypothalamus, pituitary gland* and ovaries that are characterized by periodic uterine bleeding that begins about 14 days after ovulation (Dieny & Rahadiyanti, 2019). After the ovaries (ovaries) produce adequate estrogen to make a mature egg, a regular period of the menstrual cycle occurs and ovulation occurs. The purpose of the menstrual cycle is to bring a mature ovum and renew uterine tissue for preparation for growth, fertilization and pregnancy (Dieny & Rahadiyanti, 2019).

Irregular menstrual cycles at the beginning of menstruation due to immature hormones usually last about 21-42 days and two-thirds of women have regular menstrual cycles after two years from the first menstruation. Menstruation occurs every 28 days with a menstrual period of 2-7 days and normal menstruation of about 21-35 days (Irianti, 2019). The average menstrual duration is 5 days (from 1-8 days) and the average blood loss is 20-80 ml, female age, physical, emotional status and environment can also affect the menstrual cycle (Irianti, 2019).

The menstrual cycle is controlled by a number of hormones including estrogen and progesterone, these hormones are released cyclically by the ovaries during reproduction under the control of two gonadotropin hormones, namely *Follicle Stimulating Hormone* (FSH) and *Lutenizing Hormone* (LH) which is a stimulation of the hypothalamus, the hormone, the endometrial wall will change during the menstrual cycle (Dieny & Rahadiyanti, 2019). Menstruation is related to the cycle of formation of estrogen and progesterone by the ovaries, namely the endometrial cycle works through three stages, namely uterine endometrial proliferation, changes in secretion in the endometrium, and endometrial desquaation or commonly known as menstruation. The menstrual phase is divided into 4 phases according to Luthfa (2017), namely: Menstrual / Menstrual Phase: Progesterone and estrogen hormones

decrease, causing narrowing of blood vessels in the endometrium resulting in a decrease in oxygen supply, due to the absence of pregnancy, then cells decay, rupture of blood vessels in the endometrium causes blood from these cells to come out through the vagina, this event is called menstruation and the amount of blood that comes out during menstruation is between 10 to 80 ml. Follicular Phase: The pituitary gland (pituitary gland) secretes hormones called *Follicle Stimulating Hormone* (FSH), which stimulates the follicles in the ovaries to mature and the endometrium undergo a healing process. The time it takes for an egg to reach maturity is 13 days from the first day. This phase is affected by the hormone estrogen with the thickening of the endometrial lining and blood vessels and glands, the hormone estrogen is produced by the glands. Ovulation Phase: An increase in the hormone estrogen automatically increases LH (*Luteinizing hormone*) so that the follicle produces progesterone. LH Hormone (*Luteinizing hormone*) plays a role in the maturation of follicles and stimulates the occurrence of ovulation, i.e. the release of the ovum and ovaries. Mature eggs are released from the ovaries into the fallopian tubes (*Fallopian tubes*) and will last for 12-24 hours. Luteal Phase: The degraff follicle ruptures during the ovulation phase and then turns into a corpus rubrum that contains a lot of blood. LH Hormone (*Luteinizing Hormone*) causes the corpus rubrum to turn into the corpus luteum to produce the hormone progesterone which functions to prepare the endometrium to receive the embryo. The endometrium becomes thick and soft and is equipped with many blood vessels. The corpus luteum degenerates into the corpus albikans if pregnancy does not occur and makes the hormones progesterone and estrogen decrease and even disappear.

Menstrual Disorders

Based on menstrual blood volume, it can be classified into normal (spending 2-3 pads), hypermenorrhea (spending 5-6 pads), hypomenorrhea (spending 6 days), brachymenorrhea (35 days), amenorrhea (without menstruation for more than 3 months), irregular menstruation (Irianti, 2019). While bleeding and abnormalities outside of menstruation can be in the form of spots, *Dysfunctional uterine bleeding* (DUB), dysmenorrhea, and pre/postmenstrual tension (Tambun, 2022). The onset of menstruation or menstruation is a combination of genetic health and complex hormonal stimuli derived from the hypothalamic-pituitary-ovarian axial chain. Therefore, menstrual disorders and menstrual cycle disorders can occur from abnormalities of these two factors. Some forms of menstrual disorders and the menstrual cycle of active reproductive periods (Tambun, 2022): Abnormalities about the amount and duration of

bleeding (Hypermenorrhea or menorrhea, Hypomenorrhea); Menstrual cycle abnormalities (Polymenorrhea, Oligomenorrhea, Amenorrhea); Bleeding outside menstruation (Metroragia); Other conditions related to menstruation (Dysmenorrhea, pre-menstrual tension, Mastodynia, Ovulatory bleeding or mittelschmerz)

Basic Concepts of Dysmenorrhea

Dysmenorrhea is also known as *Cyclic Perimenstrual Pain And Discomfort* (CPPD), the term dysmenorrhea comes from the Greek language from the word "*dys*" which means difficult, painful, abnormal, "*meno*" means moon and "*rrhea*" means flowing. Dysmenorrhea is menstrual pain that is characterized as a brief pain before or during menstruation and lasts between one to several days during menstruation (Dewi, 2019). Dysmenorrhea or menstrual pain is one of the most common gynecological complaints among young women who come to the clinic or doctor, almost all women experience discomfort during menstruation such as feeling bad in the lower abdomen and usually accompanied by nausea, dizziness, and even fainting (Rustam, 2015).

The classification of dysmenorrhea is divided into 2, namely dysmenorrhea based on the type of pain and dysmenorrhea based on the presence or absence of abnormalities or causes (Tambun, 2022) : Dysmenorrhea by type of pain : Spasmodic dysmenorrhea . Spasmodic dysmenorrhea is pain in the lower abdomen that occurs before or immediately after the start of menstruation. Spasmodic dysmenorrhea can occur in young women as well as women aged 40 years and older. Signs of spasmodic dysmenorrhea, including fainting, nausea, vomiting, and spasmodic dysmenorrhea, can be treated or relieved by childbirth, although not all women experience it because of it (Irianti, 2019). Congestive dysmenorrhea: Congestive dysmenorrhea can be detected a few days before menstruation. Symptoms last 2 and 3 days to less than 2 weeks. When menstruation comes, it does not cause much pain, even after the first day of menstruation people with congestive dysmenorrhea will feel comfortable. Symptoms of congestive dysmenorrhea include soreness (pain in the thighs), pain in the breast area, tiredness, irritability, loss of balance, carelessness, and sleep disturbances (Irianti, 2019). Dysmenorrhea Based on the Presence or Absence of Abnormalities or Causes: Primary dysmenorrhea: Primary dysmenorrhea is a condition related to increased uterine activity due to increased production of prostaglandins. Primary dysmenorrhea is menstrual pain that is found in the absence of gynecological abnormalities in the genital organs, occurs at the age of 12-13 years and some time after menarche after 12 months or more (Dewi, 2019).

Dysmenorrhea is characterized by cramping pain that begins before or immediately after menstruation and continues for 48 to 72 hours (Dewi, 2019). The effect of primary dysmenorrhea is that when the menstrual process begins the prostaglandin substances produced by the uterus stimulate contractions to release the uterine lining, thus causing cramps. Prostaglandins trigger contractions and spasms of smooth muscles in the gastrointestinal tract, causing nausea, vomiting, and diarrhea (Sinaga, 2017).

Prostaglandins also trigger menstrual blood flow can worsen pain because blood clots or heavy menstrual blood flow must pass through the narrow opening of the cervix, stretching of the cervix by such flows causes women to feel intense pain and even fainting. Secondary dysmenorrhea: Secondary dysmenorrhea, also known as secondary dysmenorrhea, is menstrual pain based on pathological conditions such as adenomyosis, endometriosis, PID, endometrial polyps, uterine myoma, use of AKDR/IUD, or trauma, secondary dysmenorrhea is caused by pathological problems in the pelvic cavity. Secondary dysmenorrhea is menstrual pain that develops after primary dysmenorrhea, especially after the age of 25, pain is felt for more than 2-3 days during menstruation (Dewi, 2019).

Risk Factors for Dysmenorrhea

Risk factors for dysmenorrhea according to (Ammar, 2016): Dysmenorrhea at an early age. The reproductive organs have not functioned optimally and are not ready to undergo changes and there is still a narrowing of the cervix, resulting in pain during menstruation (Ammar, 2016). Have never been pregnant or given birth. Pregnant women usually have allergies related to nerves that cause adrenaline to decrease, as well as cause the cervix/cervical canal to dilate so that the sensation of menstrual pain is reduced and even disappears (Ammar, 2016). Menstrual length that is too long, more than normal (7 days). The length of menstruation is more than normal (7 days), menstruation causes uterine contractions, occurs longer causing the uterus to contract more often, and more prostaglandins are released. Excessive production of prostaglandins causes pain, while continuous uterine contractions cause blood supply to the uterus to stop and occur (Irianti, 2019). Age: Pain felt a few days before menstruation and during menstruation is usually due to an increase in prostaglandins. The older a person is, the more often he or she experiences menstruation and the more often he or she experiences menstruation, the cervix gets wider so that the secretion of prostaglandin hormones will decrease and dysmenorrhea will later disappear with decreased uterine nerve function due to aging (Irianti, 2019). Alcohol consumption: Alcohol is toxic to the body. The liver is

responsible for the destruction of estrogen for the body to secrete. The presence of alcohol in the body continuously can interfere with liver function so that estrogen cannot be secreted by the body so that estrogen that accumulates in the body can damage the pelvis (Irianti, 2019). Smokers: Smoking can increase the duration of menstruation and increase the duration of dysmenorrhea, because cigarettes contain substances that affect estrogen metabolism, while estrogen is in charge of regulating the menstrual process and estrogen levels must be sufficient in the body. If estrogen is not sufficient due to a disturbance of its metabolism, it will cause disorders in the reproductive organs including pain during menstruation (Ammar, 2016). Never Exercise: The incidence of dysmenorrhea will increase with a lack of menstrual diving activity and lack of exercise, this can lead to decreased blood circulation and oxygen. The impact on the uterus is that blood flow and oxygen circulation are reduced and cause pain and brain endowment production will decrease which can increase stress which can increase pain during menstruation (Ammar, 2016). Family history with dysmenorrhea: The results of the study show that family history or heredity has an influence on dysmenorrhea and increases the likelihood of dysmenorrhea (Ammar, 2016)

Management of Dysmenorrhea

The diagnosis of dysmenorrhea is divided into two actions, pharmacologically and non-pharmacologically according to (Irianti, 2019): Pharmacology of the Administration of Analgesic Drugs to treat menstrual pain such as novalgin, ponstan, acetaminophen, ibuprofen. This drug will be effective if taken 2 days before menstruation to 1-2 days during menstruation. Next. List of dosages of prostaglandin synthetase inhibitors which are treatments to reduce dysmenorrhea.

Table 2 Prostaglandi Inhibitor Dosage

Medication	Dosage
Aspirin	600-1200 mg every 4-6 hours of 300-
Fenoprofen (Nalfon)	600 mg every 6 hours (Advil, Motrin,
Ibuprofen (Advil, Motrin, Nuprin, Rufen)	Nuprin, Rufen) 400-600 mg every 6 hours
Mefenamic acid (Ponstel)	25-50 mg every 8 hours

Reviews (Anapro)	550 mg initially, then 275 mg every 8 hours
(Naprosyn)	550 mg initially, then 250 mg every 8 hours

Source : (Juliana, 2019)

Non-Pharmacology

Warm compresses. The hot temperature can minimize muscle tension, the pain will decrease once the muscles relax. Warm compresses can be done using a towel or bottle filled with warm water. Compression can be done on areas that feel cramped such as the abdomen or back waist (Kurniawati, 2018). Exercise: Exercising regularly can reduce the stress that arises from PMS (Pre-Menstrual Syndrome) etiquette or during menstruation. Exercising can also increase the production of brain endorphins which are useful as a natural pain reliever in the body (Kurniawati, 2018). Massage: According to Jannah, N (2017) massage therapy is a technique of manipulating soft tissues with pressure and movement. The control is done by using the hand by pressing or moving the hand in a certain area to give some effect. The goal of massage is to help the patient relax more and relieve pain. This therapy can be practiced on all parts of the body. One of the massages that can be used during dysmenorrhea is effluarge by massaging in the form of gentle, slow and continuous strokes. This technique can have a relaxing effect so that it can reduce pain. Relaxation: Relaxation is a natural method of overcoming pain, relaxation that can be done is by calming the mind then taking a deep breath for five seconds through the nose and can be exhaled slowly through the mouth, the body will stop the production of adrenaline hormones and hormones that cause stress in a relaxed state (Kurniawati, 2018). Various types of relaxation used include progressive muscle relaxation, meditation, music relaxation, aromatherapy relaxation and light stretching relaxation and yoga (Kurniawati, 2018). One of the types of aromatherapy relaxation that is beneficial for menstrual pain is lavender aromatherapy, lavender is effective in balancing emotions, and reducing pain because of the content of linalool which functions for relaxation. Performing Acupuncture and Acupressure: The purpose of acupuncture and acupressure is to balance excess hormones because dysmenorrhea is pain related to hormonal imbalance (Juliana, 2019).

Pain Intensity Scale

Pain is an unpleasant sensory and emotional experience related to the damage to actual and porential tissues allocated to a part of the body, often described in terms of destructive processes, tissues such as being stabbed, burning heat, wrapped like emotions, feelings of fear, nausea and fear (Judha et al., 2018). According to (Judha et al., 2018) measuring pain can be studied by looking at and measured based on the location of the pain, the duration of the pain (minutes, hours, days, or months), the rhythm/period (continuous, disappearing, increasing or decreasing intensity) and quality (pain such as being stabbed, burning, deep or superficial pain, or even as in a squeeze). **Numerical Rating Scale (NRS) and**To measure the level of primary dysmenorrhea using a numerical pain rating scale with a range of 1-10 the level of dysmenorrhea is measured by providing a sheet containing the NRS scale which is distributed to respondents when experiencing dimenorrhea. Respondents were asked to fill out a form before and after the intervention. NRS Pain Scale Measurement. (Judha et al., 2018)

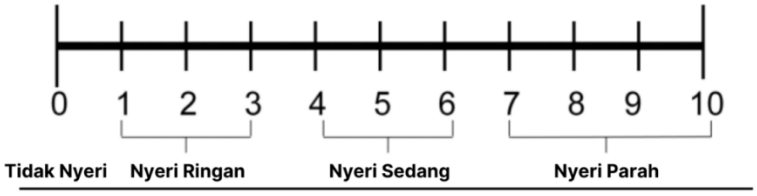

Figure 2 NRS Pain Scale Measurement

Source : Judha, 2018

Description :

0 : Painless

1-3 : Mild Pain

4-6 : Moderate Pain

7-10: Severe Pain

Lavender Aromatherapy

This plant belongs to the Lamiaceae family which originates from the southern region of the Mediterranean to tropical Africa and east to India, namely spreading from the Canary Islands, North and East Africa, southern Europe and the Mediterranean, and Arabia. Lavender flowers have 25-30 species, some of which are Lavandula angustifolia, lavandula lattifolia, lavandula stoechas (Fam. Lamiaceae). (Ramadhan, R.M and Zattira, 2017).**:**Based on research,

in 100 grams of lavender flowers Lavandula angustifolia) is composed of several contents, such as essential oils (1-3%), alpha-pinene (0.22%), camphene (0.06%), beta-myrcene (5.33%), cymene (0.3%), limonene (1.06%), cineol (0.51%), linalool (26.12%), borneol (1.21%), terpinine-4-ol (4.64%), linalyl acetate (26.32%), geranyl acetate (2.14%), and caryophyllene (7.55%). So it can be concluded that the main ingredients of lavender flowers are linalyl acetate and linalool7 (C10H18O). (Ramadhan, R.M and Zattira, 2017).

Aromatherapy is a treatment technique with the aroma of essential oils from the process of distilling various parts of plants, flowers, and trees, each of which contains different therapeutic properties. 7,8 The essential oil of the lavender flower Lavandula angustifolia) exerts a sedative effect because it contains the main active ingredient namely linalool (C10H18O). (Ramadhan, R.M and Zattira, 2017). Lavender aromatherapy is widely used in the clinical fields of obstetrics and psychotic gynecology. Lavender aromatherapy is used as a treatment to manage pain, reduce pain after cesarean section, reduce depression and anxiety in postpartum mothers, and reduce dysmenorrhea (Maharani, Fatmawati and Widyaningrum, 2016). In lavender aromatherapy, the main ingredients are linalyl acetate and linalool, where linalyl acetate functions to relax and relax the nervous and muscular working system that is under tension while linalool acts as a relaxant and sedative so that it can reduce pain (Irianti, 2019). Inhaling lavender aromatherapy for 10 minutes is able to relax and reduce pain during menstruation, overcome emotional imbalance and overcome anxiety of sore muscles and facilitate menstruation because lavender contains linalool. (Irianti, 2019). Lavender Aromatherapy is given once when the respondent experiences dysmenorrhea with a duration of 15 minutes (Vitrianingsi, 2019). The use of a diffuser or aromatherapy stove uses 1-6 drops of lavender essential oil.

RESEARCH METHODS

The type of research used in this study is *Quasi Experimental* with *a one-group pretest-posttest research design* , which is an experimental design by measuring the intensity of the pain scale of adolescent girls before and after intervention (treatment) to identify the effect of lavender aromatherapy on the reduction of menstrual pain in adolescent girls, before and after intervention. This design is described as follows:

Table 4. The design of this research can be described as follows:

Pre-test	Actions	Post test
O1	X	O2

Source : Sugiyono, 2018

Description :

O1 : observation of pain levels before aromatherapy lavender

X : Actions / Actions of Lavender Aromatherapy

O2 : observation of pain level after aromatherapy

The effect of treatment on this design is (O2-O1) (Sugiyono, 2018). The thing that is tested is the difference between O2 and O1. If there is a difference where O2 is greater than O1, then lavender aromatherapy has a positive effect on adolescent menstrual pain in adolescent girls, and if O2 is less than O1, it has a negative effect. Variable X (Lavender Aromatherapy) is valid as a *treatment*. The above illustration explains the absence of a random system because the subjects have already been formed in one group.

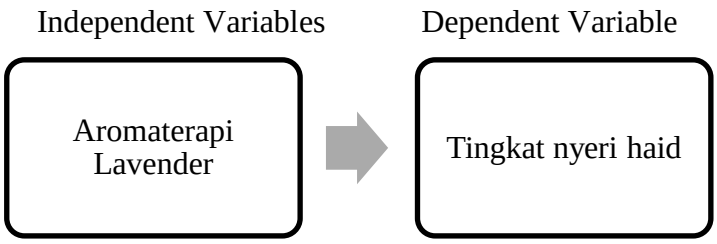

Figure 4 . Research Variables

source (Nursalam, 2015)

RESULTS OF RESEARCH AND DISCUSSION

Research Results

Univariate Analysis

Frequency Distribution of Menstrual Pain Scale in Adolescent Girls Before Lavender Aromatherapy

Table. 7 Distribution of Menstrual Pain Scale Frequency in Adolescent Girls Before Being Given Lavender Aromatherapy at Al Anwar Boarding School, Cirebon Regency

Pain Scale	n	%
No Pain	0	0
Mild Pain	4	26.7
moderate pain	11	73.3

Total	**15**	**100**

Based on Table 7, it can be seen that the scale of menstrual pain before the administration of lavender aromatherapy was mostly 11 adolescent girls (73.3%).

Distribution of the frequency of menstrual pain scales in adolescent girls after lavender aromatherapy.

Table 8 Distribution of Frequency of Menstrual Pain Scale in Adolescent Girls After Being Given Lavender Aromatherapy at Al Anwar Boarding School, Cirebon Regency

Pain Scale	n	%
No Pain	11	73.3
Mild Pain	4	26.7
moderate pain	0	0
Total	**15**	**100**

Based on Table 8, it can be seen that the scale of menstrual pain after lavender aromatherapy was mostly painless as 11 adolescent girls (73.3%).

Normality Test

Based on the table. 9 Results of the Normality Test of Menstrual Pain in Adolescent Girls Before Being Given Intervention Obtained a Significance of 0. 067 and after being given an intervention, a significance of 0.231. The significance level in the normality test is >0.05, because the value obtained from the results of the normality test before and after the intervention is given a sig value of > 0.05, it can be said that the data is distributed normally, so the data analysis is then carried out by testing the effect using the test *Paired Sample T-Test*.

Table. 9 Normality Test of Lavender Aromatherapy On Reducing the Scale of Menstrual Pain in Adolescent Girls at Al Anwar Boarding School Cirebon Regency

Decreased Pain Scale	Statistic	Df	Sig
Before Intervention	0.561	15	0. 067
After the Intervention	0.561	15	0.231

Bivariate Analysis

The Effect of Lavender Aromatherapy on Reducing the Scale of Menstrual Pain in Adolescent Girls

Table. 10 Effects of Lavender Aromatherapy on Reducing the Scale of Menstrual Pain in Adolescent Girls at Al Anwar Boarding School, Cirebon Regency

Menstrual Pain	Red	N	Standard Deviation	95% Confidence Interval of the Difference		Sig. (2-tailed)
				Lower	Upper	
Before intervention	2.73	15	0. 458	2.48	2.99	0.000
After the intervention	1.27	15	0. 458	1.01	1.52	

Based on Table 10, the results of the study show that the *paired sample t-test* obtained *ρ-value* 0.000 < 0.05, which means that there is an effect before and after the administration of lavender aromatherapy on the reduction of the scale of menstrual pain in adolescent girls at Al Anwar Boarding School, Cirebon Regency.

DISCUSSION

Levels of Menstrual Pain in Adolescent Girls Before Lavender Aromatherapy

Based on the results of the study, it was shown that the scale of menstrual pain before lavender aromatherapy was mostly moderate pain as many as 11 adolescent girls (73.3%). The results of this study are in line with the research conducted by Ramadhania (2019), the results of the study were 23 respondents of midwifery students at Ngudi Waluyo University before being given lavender aromatherapy, most of them experienced *moderate-intensity dysmenorrhea* pain , namely 19 people (82.6%), with a moderate pain scale (4 – 6), namely pain in the lower abdomen, pain spreading to the waist, slightly disturbed activity and disturbed study concentration. Meanwhile, the other 4 people (17.4%) experienced controlled severe pain with a pain scale (7 – 9), namely severe pain and cramping in the lower abdomen until it spread to the waist, thighs or back, feeling dizzy and nauseous, weak body and disrupted activities. Another study conducted by Fransiska (2023) on the effect of lavender aromatherapy on the reduction of primary *dysmenorrhea* pain in adolescent girls at SMA Negeri 1 Godean,

it was found that *the level of dysmenorrhea* pain before being given lavender aromatherapy was 5.90.

Dysmenorrhea is painful menstruation caused by uterine muscle spasms Indrayani (2023). Among women, *dysmenorrhea* pain is normal and can occur in those who are menstruating or menstruating. Conditions like this occur temporarily at the start of menstruation, are experienced in a short time and do not interfere with activities too much. After a while, menstrual pain will disappear on its own Syaflindawati (2020). Based on the researcher's assumption that judging from the average, the average level of *dysmenorrhea* scale 6 is included in the level of pain *dysmenorrhea* that cannot be ignored for a long time, but can still be active. The level of *dysmenorrhea* experienced by adolescent girls can be caused by physical factors such as lack of movement or lack of physical and psychological activities such as stress due to lessons or in a state of carrying out exams at their school and many tasks from the school. This pain felt before and during menstruation often appears with symptoms of weakness, and a slight dizziness. This *dysmenorrhea* forces young women to rest and often abandons their activities for several hours.

Levels of Menstrual Pain in Adolescent Girls After Lavender Aromatherapy

Based on the results of the study, it shows that the scale of menstrual pain after lavender aromatherapy has a significant increase, this can be seen from the percentage with the value of After intervention, the majority of adolescent girls had mild pain (73.3%) and 4 adolescent girls had no pain (26.7%). The results of this study are in line with the research conducted by Ramadhania (2019), showing that the *dysmenorrhea* After being given aromatherapy, most of the students experienced a decrease in pain to mild pain, namely 21 students (91.3%). Meanwhile, 2 students (8.7%) experienced moderate pain. There were 4 students who experienced severe pain, after being given lavender aromatherapy, 2 students experienced a decrease in pain to mild pain and 2 others still experienced moderate pain. The results of another study conducted by Pustikawaty (2020) stated that after the administration of aromatherapy, there was a decrease in the pain scale, namely (6.3%) experienced moderate pain, 75% of respondents experienced mild pain and 18.3% of respondents did not experience pain. The results of this study are in line with the research of Fransiska, (2023) that the administration of lavender aromatherapy to 21 respondents who suffered from pain *Scarlet Witch* Before Given lavender aromatherapy averaged controlled levels of severe pain. Then after being given lavender aromatherapy, there was a decrease to moderate pain. According to

Fransiska (2023), lavender aromatherapy has the benefit of providing a sense of calm, a sense of comfort, reducing stress, and one of the efforts to relax yourself. Lavender aromatherapy is used by inhaling through the nose which can then increase calmness in a minimum of 10 minutes so that inhaled aromatherapy can produce a feeling of relaxation or calm. Based on the researcher's assumption that the menstrual pain felt by the respondents decreased due to inhaling lavender aromatherapy during menstruation and being able to resume activities as usual. Therapy using lavender aromatherapy is very easy to do and effective in reducing dysminor pain because it is able to provide a relaxing effect on tense muscles. In addition, research suggests that relaxation therapy using lavender aromatherapy is very good. It is used to reduce dysminor pain in female students compared to pain-reducing drugs because lavender aromatherapy candles have almost no harmful effects and its affordable price can still be used for adolescent girls.

The Effect of Lavender Aromatherapy on Reducing the Scale of Menstrual Pain in Adolescent Girls

The results showed that the *paired sample t-test* obtained *a ρ-value* of 0.000 < 0.05, which means that there was an effect before and after the administration of lavender aromatherapy on the reductionof the menstrual pain scale in adolescent girls at Al Anwar Boarding School, Cirebon Regency. In line with research conducted by Mokoginta (2021) which showed that there was an effect of lavender aromatherapy on reducing the level of menstrual pain in SMA Negeri 1 Kotamobagu students with *a p-value* of 0.000 (< 0.05). This research is supported by the results of research by Tinah Purwaningsih, et al. (2023), adolescents show that there is a decrease in menstrual pain between before and after lavender aromatherapy. After Lavender aromatherapy, most of the respoden experienced mild pain (scale 1-3). Another study was conducted by Indah et al (2020), on 33 respondents who experienced dysmenorrhea pain. Showing that menstrual pain after being given lavender aromatherapy decreased with a *p-value* of 0.000 (< 0.05), meaning that there was an effect of lavender aromatherapy on reducing the level of dysmenorrhea pain. In the study, it was conveyed that when a person inhales lavender aromatherapy, the volatile molecules in the wax are transported to receptor cells in the nose then these molecules attach to the nose hair, electrochemical messages are sent to the brain through the olfactory tract and then to the limbic system, the hypothalamus is stimulated to release the hormones serotonin and endorphins thus causing a feeling of relaxation and calm.

The administration of lavender aromatherapy can alleviate the level of dysmenorrhea experienced by adolescent girls. Inhaling lavender aromatherapy as one of the aromatherapies in reducing dysmenorrhea pain caused by the content in lavender is linalool acetate The able to relax and relax the working system of nerve veins and tense muscles. Lavender as aromatherapy has sedative, hypnotic and anti-neurodepressive effects that are good for humans. In addition, the techniques used in administering lavender aromatherapy have an important effect on reducing dysmenorrhea pain Nuraeni (2021). Someone who Inhale Lavender aromatherapy is a volatile molecule from the oil that is carried to the receptor cells in the nose. When these molecules stick to the fine hair in the nose, an electro-chemical message is transmitted through the duct *Olfactory* to the brain and then to the limbic system stimulates the hypothalamus to release the hormone serotonin and the hormone endrofin, which functions the hormone serotonin can improve mood while the hormone endorphins are natural painkillers and produce a feeling of relaxation, calm and happiness. One of the treatments for dysminore is using lavender aromatherapy where lavender aromatherapy is able to trigger the hormone endhoprin to come out which is a natural killer for pain (C. Indah & Dwi, 2020). Based on the researcher's assumption that in treating dysmenorrhea pain problems, lavender aromatherapy can be used as a non-pharmacological way. This is evidenced by the results of research that has been conducted by researchers where before being given lavender aromatherapy, the level of pain in adolescent girls had a level of mild pain and moderate pain, then after being given lavender aromatherapy, the level of pain in adolescent girls decreased to no pain and mild pain. Lavender flowers contain linalyl acetate and linalool which are able to provide a sense of relaxation and calm so that it can reduce the pain of dysminore felt. Lavender aromatherapy is one of the easy and simple ways for young women to do when overcoming menstrual pain and can be developed in the world of obstetrics.

Research Limitations

The limitations of this study include that the room used is an open room with a lot of ventilation so that it allows air to enter and exit the room, because the Islamic boarding school does not provide a School Health Unit (UKS) room.

CONCLUSION

1. An overview of the scale of menstrual pain before lavender aromatherapy is administered at the Al Anwar Boarding School, Cirebon Regency in 2025, obtained by the majority of Moderate Pain.
2. The description of the scale of menstrual pain after lavender aromatherapy was given at the Al Anwar Boarding School obtained the majority of mild pain.
3. There is an effect of giving lavender aromatherapy on reducing the scale of menstrual pain in adolescent girls at the Al Anwar Islamic Boarding School, Cirebon Regency in 2025.

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