

# The Effect of Mindful-START Training on Pain Level in Indonesian Adolescents Girl with Primary Dysmenorrhea

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## Abstract

Dysmenorrhea is the most common gynaecological symptom reported by women. In addition to the distress associated with dysmenorrhea, surveys have shown significant socio-economic repercussions. The purpose of this study was to analyze the effect of Mindful-START on pain level in adolescent girls with primary dysmenorrhea. This is an experimental study using a randomized pre-test and twice posttest with control group design. In total, 40 respondents in the intervention group were divided into four small groups that were practicing the Mindful-START exercises six times during three weeks. We used the VAS and menstrual diary questionnaire for evaluating the mindful-START effect on the pain level. The participant's experience in practicing mindful-START training interventions was explored using an interview. Data were analyzed using the Wilcoxon test and revealed that the level of pain after practicing Mindful-START was significantly lower than before practicing Mindful-START ( $p=0.001$ ). Mindful-START can be promoted as a complementary treatment for pain that can improve the quality of life of adolescents girls with primary dysmenorrhea.

**Keywords:** mindfulness, dysmenorrhea, pain, quality of life, adolescent girls

## 1. Introduction

Dysmenorrhea is derived from a Greek root meaning difficult menstrual flow. Dysmenorrhea is the most common gynecological symptom reported by women (Burnett & Lemyre, 2017). It was reported that most of Australian women (72%) of reproductive age in a recent nationally representative sample suffering dysmenorrhea, and 15% of cases caused severe pain. Other representative samples report rates ranging from 17% to 81%. In addition to the distress associated with dysmenorrhea, surveys have shown significant socio-economic repercussions: over 35% of female high school students report missing school due to menstrual pain, and 15% of working Hungarian women of reproductive age reported that painful menstruation limited daily activity (Marjoribanks et al., 2010; Proctor, 2006). Validated symptom measures are fundamental to understand women's symptoms of dysmenorrhea, in Indonesia the prevalence of dysmenorrhea is 64.25% which consists of 54.88% of primary dysmenorrhea and 9.36% suffered secondary dysmenorrhea (Chen et al., 2015; Saputri & Musfiroh, 2015). Some factors related to primary dysmenorrhea are psychological factors and high prostaglandins (Marjoribanks et al., 2010; Wang, 2004).

The impact of dysmenorrhea can make a woman unable to move frequently and maximally, thus requiring pain medication (Wanderley et al, 2013). Interrupted activity due to dysmenorrhea causes women to experience a decreased quality of life. 40-90% of women where 1 in 13 are affected by dysmenorrhea do not attend work and school for about one day to three days every month (Iacovides, 2013). There are two ways to reduce dysmenorrhea that is by pharmacology and non-pharmacology (Paulo et al., 2013). NSAIDs become to be a very effective treatment for dysmenorrhea, even though women using them need to be aware of the substantial risk of adverse effects. There is still not enough evidence to determine which NSAID is the safest and most effective to the healing of dysmenorrhea (Marjoribanks et al., 2010). The simplest non-pharmacological way is to

try to divert pain in other activities, warm compresses, adequate sleep, massage, or light exercise (Burnett & Lemyre, 2017; Jaafarpour et al., 2015; Mirabi et al., 2014). Pain management with non-pharmacology is safer to use and does not cause side effects (Burnett & Lemyre, 2017). The preliminary study was conducted on seven female students and revealed three female students reported reduced dysmenorrhea for 50 minutes after sleeping but and felt less pain for 50 minutes but then the pain recurred. Three female students overcome dysmenorrhea by taking mefenamic acid drugs, and one female student reduces pain by drinking warm water, but the pain has still recurred too.

The condition of primary dysmenorrhea will get worse if accompanied by unstable psychological conditions, such as stress, depression, anxiety, and excessive sadness (Wang, 2004). Over 30 years ago, treatments based cognitive behavioral therapy (CBT) being important or famous in chronic pain treatment (McCracken & Vowles, 2014). Research can be developed to overcome primary dysmenorrhea caused by stress factors is mindfulness. Mindfulness practice is an alternative in reducing or overcoming concerns about events that have already occurred and events that will come. 135 first-year university students who live in residence completed questionnaires consist of individual coping stress and differences in mindfulness, also perceived stress. The result of the study revealed significant positive relationships between mindfulness and rational coping, and significant negative relationships with emotional and avoidant coping and perceived stress. This study improve our understanding of how mindfulness relates to coping styles (Palmer & Rodger, 2009). Mindfulness therapy is proven effective in changing individual problems with the suffering they experience. mindfulness intervention program reflect diminished levels of stress and cortisol concentration (Holdevici & Crăciun, 2015). Mindfulness-based training in this research is called Mindful-START which is an abbreviation of mindfulness, S (Stop), T (Take a deep breath), A (Accept), R (Relax and religious), and T (Thanks).

This training (mindful-START) is a mindfulness action procedure combined with aromatherapy and Benson's relaxation techniques with dhikr. Mindfulness is a life-enhancing practice that enables us to expand our conscious awareness and ever-present. Mindful awareness allows us to become more delicate to what is occurring in the present moment, both within ourselves and also in the outside world. Mindfulness has been associated with better psychological and physical health; although, the mechanisms of these benefits are not fully understood. Students with higher dispositional mindfulness reported significantly less perceived stress and had lower overall mean diurnal cortisol. Mindfulness was associated with greater psychological well-being (Zimmaro et al., 2016). The results showed that the high spiritual value was also received by the high-value attention of mindfulness. The individual is conditioned to undertake the activity of realizing the breath coming in and out of his body during remembrance; this condition is fundamental in the practice of mindfulness. Psychoreligious therapy consists of prayer to increase endurance (immunity) which will accelerate the recovery process. Pray and relaxation improve stress perception so that the Hypothalamic Pituitary Adrenal (HPA) axis produces the hormone cortisol in balanced levels. Cortisol in a balanced level will improve various body metabolic processes. In addition to mindful with religiously, aromatherapy can also reduce the level of someone who reduces pain during menstruation. Aromatherapy can provide stimulatory effects, provide a calming sensation, reduce stress, relaxation of the mind and the physical in the body so that it can reduce tension in a person (Frost & Ostrovsky, 2019; J. A. Song et al., 2018). Essential oil such as lavender will increase alpha waves in the brain, and these waves will make the body relax. The effectiveness of mindful-START to overcome dysmenorrhea is not yet known; therefore, researchers intend to conduct a study entitled "The Effect of Mindful-START on pain level in Indonesian Adolescents girl with Primary Dysmenorrhea". The purpose of this study is to determine the Effect of Mindfulness on pain level in Adolescents girl with Primary Dysmenorrhea.

## **2. Methods**

This is a quasi-experimental design using randomized pre-test and 2x post-test with control group design to evaluate the effect of Mindful-START on the level of pain in adolescents girl with primary dysmenorrhea. Participants of the study were female students of STIKES Duta Gama Klaten who had dysmenorrhea with regular menstrual cycles, and willing to participate the study. Students who did not attend the pre-test and did not follow the study completely were not included. Before the study, the participants received information regarding the study and free to decide their participation, as stated in the informed consent.

The study used instructional records for mindful-START therapy procedures. Participant was asked to choose one answers about the state of menstrual pain before and after receiving mindful-START therapy. The implementation of interventions in this study included a pre-test, intervention and post-test. In total, 40 respondents in the intervention group were divided into four groups (in order to easy to practice Mindful-START exercises) six times in three weeks. The procedure for mindful-START practice following 30 minutes of recorded instruction. The time allocated for each meeting is 60-90 minutes and consists of four steps, understanding the problem, how to solve the problem, determining how to solve the problem and practice the action to solve the problem. Numerical Rating Scale (NRS) was used to measure menstrual pain as a substitute for the word descriptor tool about how severe the pain felt by respondents with a scale of 0-10, the greater the number the more severe the pain rate. The

subject’s experience in undergoing mindful-START training interventions was explored by the interview method. Bivariate analysis using a Wilcoxon test was done to determine the differences of pain levels before and after the treatment within the group, which the p-value < .05 showed a significant difference.

**Ethical Consideration**

This research has been approved by the Health Research Ethics Committee (KEPK) Faculty of Public Health Diponegoro University No. 377/EA/KEPK-FKM/2019. The researchers ensured that all respondents had obtained the appropriate informed consent.

**3. Result and Discussion**

**1. Characteristics of respondents**

From 80 respondents, the majority of respondents in this study were 18 years old. Most respondents have a height between 151-160 cm Based on the data, it can be seen that the weight of most respondents in this study was between 51-60 kg. The data in Table 1 shows that the majority of respondents with BMI in the normal group. Most respondents get their first menstruation at the age of 12-13.

Primary dysmenorrhea is pain that comes from having a menstrual period, or “menstrual cramps.” Often, primary dysmenorrhea begins soon after a girl starts having menstrual periods. In many women with primary dysmenorrhea, menstruation becomes less painful as they get older. This kind of dysmenorrhea also may improve after giving birth (Ali et al., 2010; Chen et al., 2015; Habibi et al., 2015).

Table 1.Characteristics of respondents

| number | characteristic        | Intervention group<br>N=40 |      | Control group<br>N=40 |      |
|--------|-----------------------|----------------------------|------|-----------------------|------|
|        |                       | f                          | %    | f                     | %    |
| 1      | Age                   |                            |      |                       |      |
|        | 17                    | 5                          | 12.5 | 4                     | 10   |
|        | 18                    | 31                         | 77.5 | 33                    | 82.5 |
|        | 19                    | 4                          | 10   | 3                     | 7.5  |
| 2      | Age of menarche       |                            |      |                       |      |
|        | 10-11                 | 10                         | 25   | 13                    | 32.5 |
|        | 12-13                 | 30                         | 75   | 27                    | 67.5 |
| 3      | height                |                            |      |                       |      |
|        | 140-150 cm            | 4                          | 16.4 | 5                     | 12.5 |
|        | 151-160               | 30                         | 61.6 | 29                    | 72.5 |
|        | >161                  | 6                          | 22.0 | 6                     | 15   |
| 4      | weight                |                            |      |                       |      |
|        | 40-50 kg              | 12                         | 30   | 11                    | 27.5 |
|        | 51-60 kg              | 28                         | 70   | 29                    | 72.5 |
| 5      | Body Mass Index (BMI) |                            |      |                       |      |
|        | Thin                  | 9                          | 27.0 | 13                    | 32.5 |
|        | Normal                | 31                         | 73.0 | 27                    | 67.5 |

|   |                 |    |    |    |      |
|---|-----------------|----|----|----|------|
|   | Overweight      | -  | -  | -  | -    |
|   | Obesity         | -  | -  | -  | -    |
| 6 | Level of stress |    |    |    |      |
|   | poor            | 28 | 70 | 29 | 72.5 |
|   | good            | 12 | 30 | 11 | 27.5 |

About 70% of respondents are at the level of severe pain. Primary dysmenorrhea usually is caused by natural chemicals called prostaglandins. Prostaglandins are made in the lining of the uterus. Pain usually occurs right before menstruation starts, as the level of prostaglandins increases in the lining of the uterus. On the first day of the menstrual period, the levels are high. As menstruation continues and the lining of the uterus is shed, the levels decrease. Pain usually decreases as the levels of prostaglandins decrease (Potur et al., 2014; Aktas, 2015). Primary dysmenorrhea has nothing to do with gynecological abnormalities; this is painful menstruation that is found without abnormalities in the actual genital organs. Primary dysmenorrhea arises in adolescence, which is about 2-3 years after menarche (Proctor, 2006). The older a person is, the more often he experiences menstruation, and the more extensive the cervix, the flow of the hormone prostaglandin will decrease. Also, primary dysmenorrhoea will later disappear with decreasing uterine nerve function due to ageing (Novia, 2008). According to Junizar, et al. (2001) primary dysmenorrhea generally occurs at the age of 15-30 years and often occurs at the age of 15-25 years which then disappears in the late 20s or early 30s. The results showed that the age of the study respondents ranged from 17-20.

**2. The Pain level of adolescents who experience primary dysmenorrhea in the intervention and control groups during the pre-test and post-test**

The pain level of adolescents who experience primary dysmenorrhea in the intervention and control groups before the intervention is analyzed frequently. The analysis results are presented in the following table:

Table 2. The pain level of adolescents who experience primary dysmenorrhea in the intervention and control groups during the pre-test and post-test

| Pain Level     | Pre-test           |      |               |      | Post-test          |      |               |      |
|----------------|--------------------|------|---------------|------|--------------------|------|---------------|------|
|                | Intervention Group |      | Control Group |      | Intervention Group |      | Control Group |      |
|                | f                  | (%)  | f             | %    | f                  | %    | f             | %    |
| Severe(6-10)   | 23                 | 57.5 | 28            | 70.0 | 15                 | 37.5 | 27            | 67.5 |
|                | 17                 | 42.5 | 12            | 30.0 | 25                 | 62.5 | 13            | 32.5 |
| Moderate (2-5) | 40                 | 100  | 40            | 100  | 40                 | 100  | 40            | 100  |

Table 2 explains that the pain level of adolescents who experience primary dysmenorrhea in the intervention group and the control group is mostly in the severe category of 57.5% in the intervention group and 57% in the control group (pre-test). The pain level of adolescents who experience primary dysmenorrhea in the intervention group at the time of the post-test majority is in the moderate category (62.5%), while the majority of the control group in moderate category is become higher (32.5%). Post-test is conducted when the respondent is in the middle of the midterm so that stress is possible when the exam affects the level of pain of the respondent in the control group without mindful-START treatment. We all know that stress will increase the occurrence of primary dysmenorrhea and decrease the quality of life (Sari, 2015; Wang, 2004). Mindful-START is a combination of mindfulness, aromatherapy, and Benson's relaxation techniques which are able to reduce the scale of primary dysmenorrhea. When the pain decreases, quality of life can be improved — one of the benefits of mindfulness in reducing pain (Y. Song et al., 2014; Zeidan et al., 2010). The nature of mindfulness or one's tendency to be mindful will correlate with lower pain sensitivity, and the deactivation of brain circuits which is

called default mode networks will be higher. The default mode network consists of several areas of the brain that are interconnected and active in a state of rest - that is when someone is not paying attention to the outside world which stimulates attention and focuses on their internal state. Thus, on balance, MBSR appears to be beneficial in a variety of medical settings. In terms of mechanisms of effectiveness, the MBSR program gives supportive interaction between group members to practice and apply mindfulness in habitual condition. this interactional support may be expected to the positive health effects (Lengacher, 2009). People who have a tendency to mindfulness also feel less pain (McCracken & Vowles, 2014). The intervention group experienced a decrease in pain scale. Benson's relaxation techniques will affect the sympathetic and parasympathetic nervous system, causing muscles to relax and pain to be reduced. Benson's relaxation is relaxation that involves beliefs followed by an acceleration of the state in order to be relaxed (a combination of relaxation and belief). Benson's relaxation will multiply the benefits (because it is added with belief) compared to just using the relaxation response.

In addition to Benson's relaxation and mindfulness, some previous study shows that relaxation is a good treatment for spasmodic dysmenorrhea. In contrast, none of the treatments was effective for congestive dysmenorrhea (premenstrual syndrome). A successful psychological treatment for the premenstrual syndrome still unclear(Amodei et al., 1987; Ortiz et al., 2015). Morbidity of dysmenorrhea can be significant and can be associated with anxiety and depression. Current pharmacologic therapies include non-steroidal anti-inflammatory drugs (NSAIDs) and hormonal contraceptives. However, while both are effective for dysmenorrhea, they have significant adverse effects and contraindications that may prevent their use in many patients. Two recent systematic reviews and meta-analyses found that aromatherapy was effective in the management of dysmenorrhea. Aromatherapy has been used in United States academic centers as minimally invasive primary or adjunctive interventions to manage pain and other symptoms. aromatherapy can balance and encourage the health of body, mind, and spirit. Essential oils that have been used to treat dysmenorrhea include lavender, rosemary, peppermint oil, cinnamon, clove, rose, clary sage, nutmeg, fennel, marjoram, thymus Vulgaris, zataria multiflora, and rosaceous extract. Aromatherapy can be beneficial for reducing pain and can provide relaxation (Frost & Ostrovsky, 2019; J. A. Song et al., 2018; Sut & Kahyaoglu-Sut, 2017). mindful-START which is a combination of relaxation, mindfulness, aromatherapy and religiosity can alleviate complaints experienced during menstrual pain.

**3. Differences in the level of pain in adolescents with primary dysmenorrhea in the intervention and control groups**

The difference in the level of pain in adolescents who experience primary dysmenorrhea at the pre-test and post-test in the control group and the pre-test and post-test in the intervention group is implemented using the Wilcoxon test. The results of the analysis can be seen in the following table:

Table 3. Differences in the Pain level of adolescents with primary dysmenorrhea in the intervention and control groups at the post-test

| Differences in the level of pain | n  | (Minimum-maximum) | p-value |
|----------------------------------|----|-------------------|---------|
| Post-test control                | 40 | (3.35-4.65)       | 0.01    |
| post-test intervention           | 40 | (2.26-2.77)       |         |

Table 3 show that the p-value is 0.01. P-value <0.05 can be concluded that there is a significant difference between the control group and the intervention group. According to the basis of decision making in the Wilcoxon test, it can be concluded that Ho is rejected and Ha is accepted. In post-test control group, most of the respondents are in 3.35-4.65 of pain level, means that post-test control are in moderate category (3-5). Difference in the level of pain in intervention group show that most of them are in moderate category <3. The results indicate that there is a significant effect of mindful-START training on reduce the pain level in adolescents who experience primary dysmenorrhea. This finding, however, confirmed the previous study, which stated that a brief 3-day mindfulness meditation intervention was effective at reducing pain ratings and anxiety. Although mindfulness was initially believed to be a way to help medical patients, especially in patients with chronic pain and to manage stress (Kabat-Zinn 1990), now awareness-based interventions have been applied effectively in a variety of clinical conditions,

including anxiety and depression. Mindfulness intervention led to greater improvement in psychological comorbidity with chronic pain, such as depression (Zeidan et al., 2010). There is enough evidence that mindfulness-based interventions (MBIs) such as meditation, yoga, and stress reduction lower the perception of pain, increase mobility, improve functioning and well-being. By integrating MBIs and other therapeutic interventions in a multi-disciplinary pain management plan, clinicians can improve treatment outcomes and potentially decrease pain-related medication utilization (Majeed et al., 2018).

In this study, it is explained that the level of pain of adolescents before being given Mindful-START training is in the severe category. Research that has been done shows that dysmenorrhea can reduce the quality of life of a woman because of the pain. The result of the interview shows that Students who experience dysmenorrhea will decrease their learning concentration due to menstrual pain felt. Other study show that, if a student experiences dysmenorrhea, their learning activities at school are disrupted, and this often makes them absent from school (Potur et al., 2014). In addition, the quality of life decreases. For example, one of the student in our study who experiences dysmenorrhea cannot concentrate on learning and her motivation to learn will decrease because of the dysmenorrhea felt during the teaching and learning process. Through this mindful-START procedure, the participants are expected to be able to interpret the positive and negative events so that they can be grateful for the pleasure given by God. They can overcome feelings of anxiety and improve their well-being by increasing the self-awareness of the therapeutic participants (Palmer & Rodger, 2009; Zimmaro et al., 2016). This spiritual support (Relax and Religious) can help or overcome extraordinary physical difficulties so as to increase success in treatment (Khalifah, 2010). This fact can answer the question of why the pain level of adolescents who experience primary dysmenorrhea in the intervention group at the time of the post-test majority is in the moderate category (62.5%). However, in the control group, the majority is in the severe category (67.5%).

The diagnosis of dysmenorrhea in this study is a limitation of the study. In addition to anamnesis, the diagnosis of primary dysmenorrhea is based on physical and gynecological examinations and supporting examinations in order to examine anatomic abnormalities and pelvic area diseases. The process to determine the type of dysmenorrhea in this research is formulated using the Naïve Bayes method calculation from research data and based on expert knowledge. (no physical and gynecological examinations). Naïve Bayes method can make a diagnosis by entering at least two symptoms in the list of symptom choices on the consultation page (Nurfarianti et al., 2014). To minimize errors and find out the respondent's compliance with the Mindful-START practice procedure during dysmenorrhea, the subject's experience in undergoing a mindful-START exercise intervention was recorded using a form and then deepened with the interview method and 2x post-test. The way to control confounding variables is by including inclusion and exclusion criteria, selecting respondents with circumstances outside the confounding criteria, this is done by giving questionnaires to prospective respondents at the time of the preliminary study. For environmental variables and dysmenorrhea, treatments are controlled when conducting research data by using statistical tests. It is expected that the confounding variables can be controlled and do not disturb the course of the result.

#### 4. Conclusions

There is a significant effect of mindful-START training to reduce pain in adolescents who experience primary dysmenorrhea. Mindful-START is expected to be one of the treatments that does not provide side effects and can help reduce menstrual pain in adolescents with primary dysmenorrhea. The results of this study are expected to be used as a basis for compiling further research for primary dysmenorrhea therapy and providing input to changes in the behavior of women and health workers for not easy to give pain relievers to minimize the possible side effects of drugs. It is expected that with mindful-START training to overcome primary dysmenorrhea and can reduce the cost of administering drugs so that it can have an impact on cost savings and increase productivity. For further research, researchers can use a larger sample to know how far the influence of mindful-START training can do to improve the quality of life.

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