Effectiveness of Combined Progressive Muscle Relaxation and Turmeric-Tamarind Herbal Drink in Reducing Primary Dysmenorrhea Among Adolescent Girls

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ABSTRACT

Background: Primary dysmenorrhea is usual menstrual health problems in adolescent girls and significantly affects level of comfort, regular school attendance, and daily activities. Non-pharmacological interventions are increasingly recommended due to their affordability and minimal side effects. Progressive Muscle Relaxation (PMR) and a turmeric-tamarind herbal drink are considered potential complementary approaches to reduce menstrual pain. Objective: This present study to assess effectiveness of the combination of Progressive Muscle Relaxation (PMR) and a turmeric-tamarind herbal for adolescent girl to reduce PD (Primary Dysmenorrhea). Methods: A quasi-experimental study with a pretest-posttest control group design was conducted on 60 adolescent girls experiencing primary dysmenorrhea. Purposive sampling was used to select participants, who were then divided into intervention and control groups. During their menstrual period, the intervention group received PMR sessions and a turmeric-tamarind herbal drink. Pain was measured using a Numeric Rating Scale (NRS). Data were analyzed using_paired t-tests and independent t-tests at a significance level of $p<0.05$. Results: The intervention group explained a significant minimize in pain intensity after receiving the combined PMR and turmeric-tamarind intervention collate to the control group ($p<0.001$). The average pain score decreased substantially after the intervention. Conclusion: The combination of Progressive Muscle Relaxation and a turmeric-tamarind herbal drink effectively reduced primary dysmenorrhea in adolescent girls and may serve complementary therapy.

Keywords: primary dysmenorrhea; adolescent girls; progressive muscle relaxation; turmeric-tamarind; complementary therapy.

INTRODUCTION

Menstruation is a natural cycle regulated by hormones in a woman's body. Women generally experience a menstrual cycle consisting of four stages: the menstrual phase, the follicular phase, the ovulation phase, and the luteal phase. If a mature ovum is released during ovulation without fertilization, estrogen and progesterone levels can drop to their lowest levels at the end of the luteal phase, allowing them to be released into the uterine lining. This also indicates an active opportunity for the release of prostaglandins and other hormones that can support blood flow to the uterus (1).

Primary dysmenorrhea occurs due to excessive uterine contractions due to increased levels of prostaglandins. Hormonal compounds produced by the body travel to the uterus to contract, expelling its lining. Smooth muscle in the surrounding tissues contracts due to the effects of prostaglandins. Colicky pain, cramps, and pain similar to childbirth in the lower abdomen and lower back caused by smooth muscle contractions within the uterus are indicative of dysmenorrhea (2).

In addition, the stomach and intestines experience contractions in the smooth muscle area due to the release of prostaglandins, which can cause discomfort due to nausea, progressing to vomiting and diarrhea. The shedding of the uterine endometrium due to the effects of prostaglandins reduces the flow of O2 or Oxygen to the cells of the uterine lining. These formed cells can be lost, and these are what are excreted during menstruation (3).

Menstrual trouble is dysmenorrhea are common complaints experienced by women. There are two types of dysmenorrhea: primary dysmenorrhea and secondary dysmenorrhea. Primary dysmenorrhea is menstrual pain with an idiopathic cause, or not related to a gynecological disorder (4). While the second type, called secondary dysmenorrhea, is relevant to gynecological disorders of the uterus, such as endometriosis, cervical stenosis, and chronic salpingitis (5).

Primary dysmenorrhea is a usual gynecological problem often described as uncomfortable menstrual cramps without identifiable pelvic pathology. Globally, it affects between rom 45% to 95%, with adolescent girls representing the most affected population.Menstrual pain negatively impacts concentration,emotional well-being, regular physical activity,and academic achievement (6).

This condition is characterized by lower abdominal pain that occurs before or during menstruation, with the pain typically continuing for several hours after the onset of menstruation and peaking early on the first day of the menstrual cycle. Associated symptoms may include nausea, vomiting, diarrhea, fatigue, headache, dizziness, anxiety, and sleep disturbances (7).

Primary dysmenorrhea related with high condition prostaglandin production, which causes uterine hypercontractility and ischemia (8). Pharmacological treatment often includes nonsteroidal anti-inflammatory drugs, which are of concern due to their possible side effects of long-term use. Therefore, non-pharmacological interventions to address menstrual disorders are increasingly being explored (9).

The Progressive Muscle Relaxation (PMR) method, created by Jacobson, with method that relaxes the body by systematically stretching and releasing muscle tension and release to reduce sympathetic nervous system activity. PMR stimulates the release of endorphins and reduces stress-related responses that can affect pain perception (10).

A turmeric-tamarind herbal drink is widely consumed in Indonesia and contains curcumin and anthocyanin compounds with anti-inflammatory and analgesic properties. Curcumin can inhibit the cyclooxygenase pathway and reduce prostaglandin synthesis (11).
The novelty of this study in the combination of Progressive Muscle Relaxation (PMR) plus turmeric-tamarind herbal drink as an integrated complementary intervention with different

but potentially synergistic mechanisms of action in as a step for cases of adolescent dysmenorrhea. Turmeric and tamarind are traditional Indonesian herbal drinks. This study presents an integration of modern relaxation therapy with Indonesian local wisdom based on evidence-based practice. From various previous studies, most of them examined Progressive Muscle Relaxation and turmeric-based herbal interventions separately in reducing menstrual pain. Existing evidence regarding the combined effect to the combination of these two interventions in adolescent girls is still limited. Furthermore, studies focusing on school-aged adolescents and culturally based complementary therapies are still rare. This Purpose study make to address this gap by investigating the effectiveness of the combination of Progressive Muscle Relaxation and a turmeric-tamarind herbal drink in a step for cases of adolescent dysmenorrhea.

METHODS

This study uses a quasi-experimental pre-test-post-test control group design. The location of this study with among female adolescent respondent in the Wirengan Sragen area of Central Java and respondent participants were recruited using appropriate sampling by means of screening and selection with two (2) criteria. Choice one is a Inclusion criteria are female adolescents aged 15–19 years, experiencing primary dysmenorrhea, regular menstrual cycles, willing to participate, while exclusion criteria as a choice second with distress reproductive disorders, swallowing analgesic drugs before the intervention, having a background of chronic diseases. The population of this study is all female adolescents who have experienced menstruation. By taking the sample size using a total sampling consisting of 60 participants who were divided equally into the intervention group and the control group. The intervention group received treatment where they were given Progressive Muscle Relaxation for approximately 15–20 minutes every day during menstruation and were given 200 ml of turmeric-tamarind herbal drink twice a day for three days. The control group only received standard menstrual health education, did not receive PMR and herbal drinks. The research instrument was carried out in Pain intensity was measured using a Numeric Rating Scale (NRS), rang ive statistics were used to summarize alyzed differences within groups, while independ een groups.

Research Flowchart of The Effectiveness of the Combination of Progressive Muscle Relaxation and Turmeric and Tamarind Herbal Drink in Reducing Primary Dysmenorrhea in Adolescent Girls

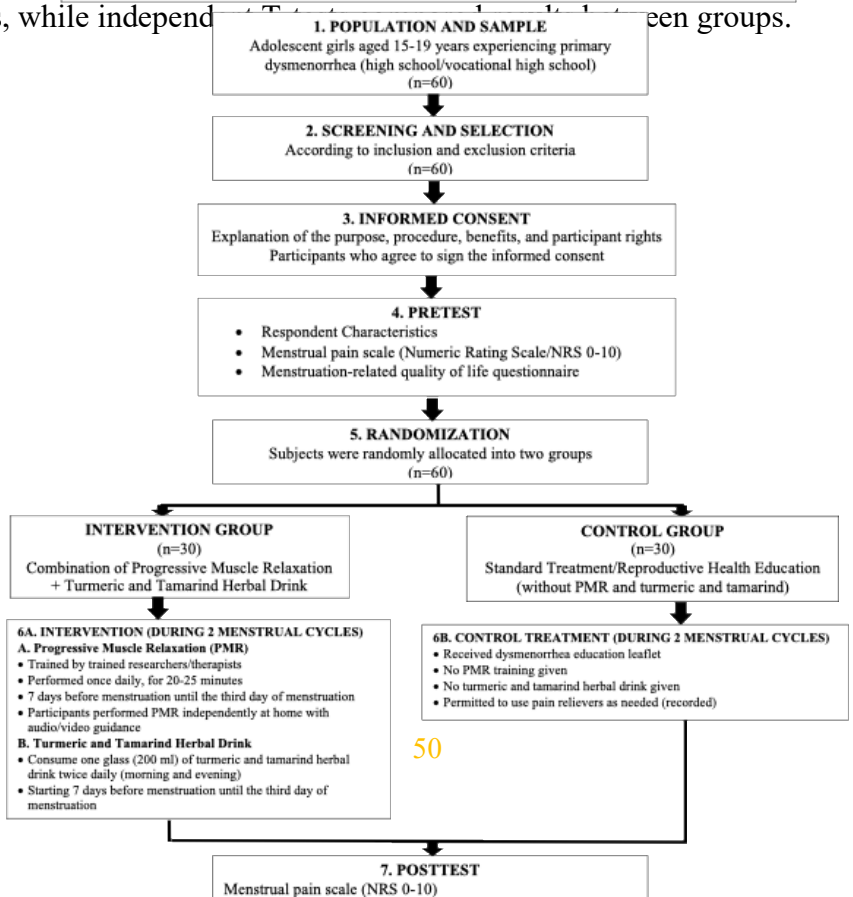

Figure 1. Research Stages Flowchart

RESULTS

The results with sixty respondent girls with primary dysmenorrhea or PD participated and were divided equally into the intervention group (n=30) and the control group (n=30). No participants dropped out during the study period.

Participant Characteristics

Table 1. Basic Characteristics of Participants with n=30 adolescent girls

Num.	Variable	Intervention		Control	
		Data	Mean	Data	Mean
1	Age (years)	16.5	1.2	16.7	1.1
2	Menarche age (years)	12.4	1.0	12.6	0.9
3	Menstrual duration (days)	6.2	1.1	6.4	1.0
4	Menstrual cycle length (days)	28.3	2.4	28.6	2.1

The mean age of participants in the intervention group was 16.5 years get a mean of ±1.2 years and 16.7 years with a mean of ±1.1 years in the contro group. Most participants experienced menarche at the age of 12–13 years. Menstrual duration was approximately 6–7 days, and the menstrual cycle of adolescent girls was approximately 28–29 days, categorized as a normal menstrual cycle**.**

Changes in Dysmenorrhea Intensity

Table 2. Comparison of Dysmenorrhea Scores Before and After Intervention

Group	Pre-test Mean ± SD	Post-test Mean ± SD	Mean Difference	p-value
Intervention	7.13 ±1.10	3.27 ±1.02	3.86	<0.001
Control	6.93 ±1.25	6.12 ±1.18	0.81	0.083

Pain intensity was measured using a Numeric Rating Scale (NRS) with a score poin of 0–10. Before the intervention, mean pain scores were similar between groups. After the intervention, the combination of Progressive Muscle Relaxation and the turmeric-tamarind significantly can decrease pain intensity.

The intervention with a statistically significant reduction in pain scores after give treatment ($p<0.001$), while no significant changes were observed in the control group.

Furthermore, a comparison of post-intervention pain scores between groups a significant difference.

Table 3. Comparison of Independent T-Test of Post-Test Pain Scores

Variable	Intervention	Control	t-value	p-value
Post-test NRS score	3.27±1.02	6.12±1.18	10.27	<0.001

The analysis in table Comparison of Independent T-Test can shows in table 3 is significant difference in post-test pain level between groups ($p<0.001$). This means that the respondents who received the combined PMR and turmeric-tamarind intervention stated that menstrual pain was slightly low than those in the control group. This finding suggests that integrating relaxation therapy with herbal medicine results in greater reduction in dysmenorrhea symptoms.

DISCUSSION

Research findings indicate that the combined intervention resulted in significant pain reduction among participants. PMR Methods can low muscle tension and stimulate endorphin production, while the turmeric-tamarind herbal drink can reduce prostaglandin synthesis through the anti-inflammatory effects of curcumin. The integration of these two interventions may produce a synergistic effect in minimizing the intensity of menstrual pain.

Factors influencing primary dysmenorrhea include early menarche, frequent consumption of cold foods, high serum PGF2α levels, and lack of physical activity, which is an independent risk factors for excessive menstrual pain in adolescent girls. The Interventions that achieve these factors may help reduce the incidence of severe dysmenorrhea (12).

PMR has the potential to reduce pain by reducing muscle tension and increasing parasympathetic activation. Relaxation techniques can stimulate endorphin secretion and modify pain perception (13).

Progressive muscle relaxation techniques are effective in reducing primary dysmenorrhea; however, their effectiveness depends on the environmental conditions and the individual's emotional state during the relaxation process. An unconducive environment and feelings of anxiety or stress can cause progressive muscle relaxation to fail to relieve dysmenorrhea. Various progressive muscle relaxation methods can be done to help overcome dysmenorrhea. This technique can also can be compared to other interventions, including music therapy or warm compresses, to increase its effectiveness (14).

Research data from Fernandez shows that approximately 88.9% of those who used relaxation techniques; 87.5% of those who used local heat; 77.6% of those who used massage; 76.9% of those who used antalgic positioning techniques; 73.3% of those who listened to music; and 60% of those who watched television as a way to break concentration. Approximately 85% of participants who used two way of pharmacological and non-pharmacological methods convey that this is effective (15).

Decreased pain intensity may be associated with relaxation-induced release of endorphins and the reduction of muscle tension from PMR, along with the anti-inflammatory properties of curcumin, found in turmeric. Previous studies have information is Progressive Muscle Relaxation significantly reduces dysmenorrhea symptoms and improves quality of life (16).

Turmeric contains curcumin, which has anti-inflammatory properties. Curcumin inhibits inflammatory mediators involved in prostaglandin synthesis, which contribute to menstrual pain (17).

Based on data from various studies related to natural ingredients used to relieve primary menstrual pain, curcumin extract, often mixed with tamarind and ginger, has been shown to be highly effective in relieving primary menstrual pain.Many studies have shown that menstrual pain is caused by prostaglandin levels. This is based from the literature research, curcumin has anti-inflammatory and antiprostaglandin effects in relieving primary menstrual pain (18).

From the a study involving 50 female adolescents, compared for consuming a turmeric-tamarind drink (kusuh) was effective and true can reduce dysmenorrhea. Group one experienced a lower increase in pain scores than group two. This study demonstrates that the use of turmeric and tamarind is effective in reducing dysmenorrhea. Most participants in the intervention group experienced a decrease in dysmenorrhea after treatment with turmeric and tamarind, and none experienced worsening symptoms. This confirms that this treatment is low-risk and effective (19).

Naturally dysmenorrhea young woman who was previously given turmeric tamarind drink included severe pain (69%), and action of intervention, moderate pain (57.1%). The Wilcoxon test can demonstrated the effectiveness of turmeric tamarind administration in reducing menstrual pain (dysmenorrhea) in Islamic junior high schools (20).

Primary dysmenorrhea (PD) was significantly compared with increased stress levels and poorer sleep quality among adolescent girls.Psychological stress management and sleep-related strategies into a holistic, methods use non-pharmacological approach to treating primary dysmenorrhea for teenage girls (21).

Combined interventions can provide a synergistic effect: PMR influences physiological and psychological responses, while turmeric and tamarind provide biochemical anti-inflammatory actions (22).Research has shown that consuming a turmeric drink can reduce the intensity of dysmenorrhea. Statistically, there was a significant difference before and after turmeric administration. Turmeric drinks contain compounds that can reduce menstrual pain, namely: curcumin, essential oils, anthocyanins, and tannins. Turmeric plays a role in reducing prostaglandin production, particularly F2a (PGF2a), which results in the amount of prostaglandin hormone can decrease so that pain is reduced experienced by young women during menstruation (23).

Other research has proven effective in using PMR in reducing symptoms of menstrual pain, intensity menstruation and anxiety, and improving quality of life, participation in social activities, and work/school performance in girls with Primary Dysmenorrhea. Based on these results, this easy-to-implement, inexpensive, and non-adverse-impaired method can be utilized to alternative complementer for primary dysmenorrhea (24).

This study have important implications for holistic nursing and midwifery, and the wider community. Specifically, in health intervention practice, abdominal stretching exercises and PMR methods can be used as a non-pharmacological approach to reduce menstrual pain, improve adolescents' quality of life, and reduce dependence on medication. Meanwhile, for the community, this intervention can be implemented in health education programs in schools and communities because it is easy to perform, requires minimal costs, and can increase awareness about menstrual pain management. Furthermore, the results can support evidence-based health policies aimed at improving the well-being of adolescent girls (25).Scientifically, these findings support an integrative approach to menstrual pain management among adolescents.

CONCLUSION

The combination of progressive muscle relaxation-PMR and a turmeric-tamarind herbal drink significantly reduces primary dysmenorrhea in teenage girls. This intervention can be recommended as a safe and affordable complementary therapy. Several limitations should be considered when interpreting the results. First, the sample size was very limited, involving only adolescent girls from a single location. Therefore, the results cannot be broadly generalized to adolescent populations with varying characteristics. Second, dysmenorrhea pain was measured using the Numeric Rating Scale (NRS), which is subjective and influenced by individual perceptions of pain.

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