The Effectiveness of PAHE patch (Ginger Pandanus Amaryllifolius Extract Compress) on the Level of Menstrual Pain in Adolescent Girls

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ABSTRACT

Background: Adolescence is a period where sexual maturity occurs in adolescent girls, which is characterized by menstruation. Data shows that most adolescent girls in Indonesia experience menstrual pain. If left untreated, menstrual pain will cause interference in activities, especially learning activities. Therefore, therapy is needed that can help reduce menstrual pain. Pandanus amaryllifolius and ginger are Indonesian herbal plants that have analgesic effects.

Purpose: The purpose of this study was to determine the effectiveness of PaHe Patch (Pandanus amaryllifolius and ginger extract) on the level of menstrual pain in adolescents.

Methods: The design of this research is Quasy Experiment using Non randomized Pretest-Postest with Control Group design. The sample in this study amounted to 30 intervention groups and 30 control groups with Proportional stratified sampling technique. The implementation of the study was carried out with a pre-test to measure the level of pain before being given intervention in the 2 groups, then given Pahe Patch twice a day for 1-3 days in the experimental group, while the control group to reduce pain researchers taught distraction techniques. Furthermore, a post-test was conducted to measure the pain level of respondents in both groups

Results: Data analysis will be carried out using paired sample T test and Independent sample T test. The results obtained Pvalue: 0.000 which is smaller than the alpha value (0.05. Conclusions)

Conclusion: it can be concluded that PaHe Patch is effective in reducing menstrual pain in adolescent girls

INTRODUCTION

Adolescence is the stage of life where a person reaches the process of emotional, psychosocial, and sexual maturity, which is characterised by the functioning of the reproductive organs and all its consequences. The sexual development of adolescent girls is characterised by menstruation (Gustina & Djannah, 2015). Data shows that the incidence of menstrual pain in adolescent girls in Indonesia reaches 64.25% (Miraturrofi'ah, 2020). Menstrual pain is pain in the lower abdomen that occurs before or during menstruation. Menstrual pain can be mild, but can also be severe enough to interfere with daily activities (Pittara, 2022).

According to data from the American Congress Of Obstetricians And Gynaecologists (2016), more than 50% of women experience menstrual pain every month. Worldwide, more than 50% of women in every country experience pain during menstruation. In Indonesia, the incidence of women of productive age who experience menstrual pain is around 55. According to data from the American Congress Of Obstetricians And Gynecologist (2016), more than 50% of women experience menstrual pain every month (misrotun, 2018 in (Marques & Suwanti, 2022).

Based on the results of the study, it was found that the majority of adolescent girls in Pekanbaru city experienced menstrual pain with moderate pain intensity (71.7%), where most of them (58.5%) experienced the impact of disruption of learning activities (Karlinda et al., 2022). In addition, a study showed that the intensity of menstrual pain can disrupt the learning activities of adolescent girls, so interventions are needed to reduce the impact of menstrual pain (Rahma, 2023). The discomfort caused by menstrual pain makes adolescent girls try to protect themselves from the pain felt by doing therapy, both pharmacological and non-pharmacological. Many adolescent girls try to do rational treatment such as using pain medication with the right dose, frequency, and method of use (Haditya et al., 2022). However, it is hoped that young women can carry out non-pharmacological therapies in reducing the intensity of menstrual pain, given the adverse effects of consuming too much chemical drugs. The level of pain experienced by an average person is the same level, not influenced by the age and gender of the person (Fitri et al., 2013).

Indonesia is very rich in medicinal plants, one of the plants that can be used for traditional medicine is pandan leaves. It is easy to find pandan leaves in our country, often planted in the yard or in the garden. In some literature, it is mentioned that fragrant pandan leaves are rich in alkaloids, terpenoids, steroids, flavanoids and saponins. These compounds have potential as natural antioxidants, anti-inflammatory and analgesic properties. The oil obtained from pandan wangi leaves is referred to as a stimulant and antispasmodic that is effective against headaches, rheumatic pain and epilepsy and other diseases (Reza Suherry, Ah Yusuf, 2014).

Research conducted by Mantiri, et al (2013) on the comparison of the analgesic effect of ginger rhizome juice with therapeutic doses of aspirin in mice (Mus musculusi). The results of statistical analysis showed that there were significant differences between treatment groups (Dewi & Salim, 2018). Fresh ginger has a main component in the form of gingerol, where this gingerol at high temperatures will turn into shogaol which will give a hot and spicy effect. This effect is what makes ginger can reduce pain. Based on research, it was found that warm ginger compress was effective in reducing back pain in pregnant women in the third trimester (Inayah, 2020). The mode of drug administration can be an important consideration in optimising drug therapy, as it can affect compliance and treatment outcomes. It is important to develop optimal drug formulations for routine diseases or disorders such as menstrual pain. The patch form of treatment provides benefits for patients compared to the oral form, this is because the patch form is simply attached to the required area. Using the patch method can also avoid the first cross-effect, and avoid high maximum plasma concentrations with rapid changes in drug levels if given intravenously (Farlow & Somogyi, 2011).

Menstrual pain is not something that can be left alone because it will come every month, especially in adolescent girls, menstrual pain can reduce the activity of adolescent girls so that achievement can decrease. Moreover, currently there are many young women who immediately consume painkillers, which we fear will have a negative effect if consumed for a long time. Many studies have been conducted to see the analgesic effects of pandan leaves and ginger on several diseases, but no one has examined it to reduce menstrual pain. Among them are research from Sowwam, et al. which states that Ginger Compress is effective in reducing Uric Acid Pain in the Elderly (Sowwam et

al., 2022), and research from Sugiarto which states that Pandan Leaf Extract Oles Therapy (Pandanus Amaryllifolius Roxb) with a Mixture of Vco (Virgin Coconut Oil) is effective in reducing the Intensity of Joint Pain in the Elderly (Sugiarto, 2016) and research from Desy Rahma Firiyanti which concludes that there is a relationship between menstrual pain (dysmenorrhea) and learning activities in madrasah aliyah patra mandiri plaju Palembang students (Rahma, 2023).

Based on the above background, researchers are interested in developing nursing measures to reduce pain derived from a combination of pandanus and ginger leaf extracts and formed in a patch model so that it can be attached to the abdominal area to reduce menstrual pain which will be called Pahe Patch. This research will be conducted at SMA Negeri 14 Pekanbaru, where this school has a large number of students so it will be easy to find young women who are experiencing menstrual pain later. From the initial survey, it was found that out of 5 teenage girls, 5 of them stated that they took painkillers during menstrual pain. Therefore, this study will see how the effectiveness of Pahe Patch (ginger pandanus leaf extract compress) on the level of menstrual pain in adolescent girls at SMA Negeri 14 Pekanbaru City.

METHODS
1.1 Research design

This research uses a quantitative problem-solving approach using the Quasy Experiment research method using a Non-randomised Pretest-Postest with Control Group design approach. Quasi-experiment studies include a variety of non-randomised intervention studies. This design is often used when it is logistically unfeasible or unethical to conduct randomised controlled trials. . The selected control group is the comparison group. Obtaining pretest measurements in the intervention and control groups allows researchers to assess the initial comparability of the groups (13)..

1.2 Setting and samples

This research was conducted at public high school 14 Pekanbaru city. this place was chosen as the research location because the number of students at SMA 14 is very large, so that when the research is carried out it will be easy for researchers to find respondents who are in accordance with the inclusion criteria, namely adolescent girls who are menstruating day 1 or day 2, adolescent girls with moderate to severe pain scales, and adolescent girls who are not taking pain relievers. The sampling technique in this study was to use Proportional stratified sampling technique with a large sample in each group in this study of 30, because in this study there were two groups, namely the experimental group and the comparison group, so the total number of samples was 60 (14).

1.3 Intervention (applies to experimental studies)
Research Process:
a. Before the study was conducted, the researcher obtained ethical clearance from the ethics committee of PMC Hospital.
b. Explanation of research objectives, research procedures and asking for approval of willingness to be a respondent
c. Respondents who are willing to take part in the study and in accordance with the inclusion criteria, fill out the consent sheet to become a respondent.
d. The researcher conducted a general physical examination of the patient, then reminded the patient not to take pain medication at least 6 hours before the pre-test was carried out.

e. Researchers gave pain level questionnaires to respondents

f. For the intervention group, researchers gave Pahe Patches twice a day on days 1 - 3 of menstruation. For the control group, researchers taught distraction techniques to reduce pain levels.

g. Researchers explained to respondents, if there was a worsening of health conditions, please respondents immediately contact the researcher.

h. After the treatment was completed, the researcher gave a post-test questionnaire measuring the respondent's pain level. *Measurement and data collection below:*

Phases of Research
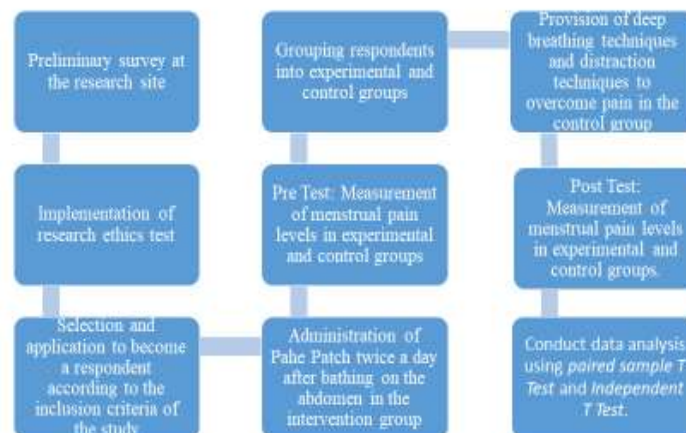
1.4 *Data analysis;*

For data analysis, the researchers first conducted a normality test on the data, where it was found that the data was normal. then the researchers used a 2 mean difference test, namely the paired sample T test to see the difference in menstrual pain before and after treatment in one group and the independent T test to see the comparison of menstrual pain after intervention between the control group and the experimental group.

1.5 *Ethical considerations.*

Before the research was conducted, the researcher had conducted ethical clearance at the PMC Hospital ethics commission, with the results of the study having passed the ethical test based on letter No. 023/RS.PMC/Kom-Etik/VIII/2024.

RESULTS
Phytochemical Test Results
Phytochemical tests that have been carried out are qualitative phytochemical tests for all test materials, for this phytochemical test carried out at the Chemistry Laboratory, Faculty of Health and Mathematics, University of Muhammadiyah Riau (UMRI), the test results can be seen from the table below:

:

Table 1.1 PaHe Patch Qualitative Phytochemical Profile

No	Test material	Alkaloid	Flavonoid	Saponin	Steroid dan Terpenoid	Tannin
				Class of Compound		
1	Pahe Patch	-	+	+	+	+

Description: (+): has a compound content, (-): has no compound content

Table 1.1 illustrates the qualitative phytochemical profile of the test material used for this study. Based on the phytochemical profile, it is known that the compound groups possessed by the PaHe Patch test material are flavonoids, steroids and terpenoids, saponins and tannins.

RESULTS

The implementation of this research was carried out on 60 respondents with the following stages:

1. Respondents were divided into 2 groups, namely 30 people in the experimental group, and 30 people in the control group.
2. Day 1: The researcher provides an explanation of the research to be carried out and asks for the respondent's consent. Then the researcher conducted a pre-test to assess the pain level of the control and experimental group respondents.
3. Day 2: Researchers gave the 1st PaHe patch (experimental) and Researchers teach deep breathing techniques (control)
4. Day 3: Researchers gave the 2nd PaHe patch (experimental) and Researcher teaches imagery guidance technique (control)
5. Day 4: Researcher applied the 3rd PaHe patch (experimental) and Researcher repeats teaching deep breath technique and imagery guidance
6. Day 5: Researchers conducted a post-test to assess the pain level of experimental and control group respondents.
7. The researcher entered the patient's pre and post test pain level data into the master table.

Based on the research that has been done, the following research results are obtained:

Characteristics of respondents

The characteristics of respondents in this study include age and age of menarche. Details can be seen in table 1.1 below:

Table 1 Results of Analysis of Respondents' Characteristics at SMAN 14 Pekanbaru

No	Characteristic	Frekuensi	Presentase (%)
1.	Age:		
	Eksperimen:		
	a. Early Teens (10 – 13 year)	0	0
	b. Middle Teens (14–17 year)	29	96,7
	c. Late Teens (18–24 year)	1	3,3
	Control:		
	a. Early Teens (10 – 13 year)	0	0
	b. Middle Teens (14–17 year)	30	100
	c. Late Teens (18–24 year)	0	0

Based on table 1.1 above, it can be concluded that most of the respondents in the experimental group were in their middle teens, namely 29 people (96.7%) and in the control group most of them were in their middle teens, namely 30 people (100%).

The Effect of PAHE Patch on Adolescent Girls' Menstrual Pain Levels
After obtaining pain level data from the control group of 30 people and the experimental group given PaHe Patch totaling 30 people, the data was tested for data normality, the results of the Shapiro-Wilk normality test showed that the control group data and the experimental group were different from the normal data distribution, because the value obtained was> 0.05. Therefore, the analysis test for the comparison of the average pain level uses the paired sample T test. The results of the average pain level for each group can be observed in the table below.

Table 2. Level of Menstrual Pain Scale for each Group

No	Group	n	Mean ± SD	p-value
	Control			
1	Pre	30	6,97 ± 0,81	0,000
2	Post		6,33 ± 0,80	
	Eksperiment PaHe Patch			
3	Pre	30	6,27 ± 0,87	0,000
4	Post		3,50 ± 0,63	

Based on Table 3, it is known that the average menstrual pain level of adolescent girls before being given PaHe Patch in the control group was 6.97 and the experimental group was 6.27. After being given PaHe Patch in the experimental group there was a decrease in pain levels with a statistically significant different analysis (p=0.000) between the pain levels before and after treatment. While in the control group there was also a change in the level of menstrual pain of adolescent girls (p=0.000). Furthermore, a comparison of the average pain level between the control group and the experimental group was carried out, the data from the comparison can be seen in the table below:

Table 3. Effect of PaHe Patch on Menstrual Pain Level

No	Group	n	Mean ± SD	p-value
1	Control	30	6,33 ± 0,80	<0,000
2	Eksperiment	30	3,50 ± 0,63	

Description: * Significantly different

Table 4 shows a comparison of the average pain levels of the control and experimental groups, where there was a decrease in pain levels by 39%, and after conducting an independent T statistical test to see the effect of PaHe Patch on pain levels, the p value was found to be <0,000. This shows that the average pain level between the control group and the experimental group is statistically significantly different, this result also shows that there is an effect of PaHe Patch on the menstrual pain level of adolescent girls.

DISCUSSION

Pandan leaves and ginger are two herbs that are often used in traditional medicine to treat various conditions, including pain. Pandan leaves (Pandanus amaryllifolius) and ginger (Zingiber officinale) contain compounds shown to have anti-inflammatory and analgesic properties, which contribute to pain reduction through different mechanisms. Pandan leaves are known to contain compounds such as alkaloids, flavonoids, and saponins, which generally have anti-inflammatory properties and can help relieve mild to moderate pain (Mardiyanto, D., et al, 2019). The anti-inflammatory mechanism of pandan leaves works through inhibiting the production of prostaglandins, which are inflammatory mediators that play a role in the occurrence of pain and inflammation. Research by Setyawati, N., et al. (2020) showed that pandan leaf extract was able to reduce the inflammatory response in a rat pain model, indicating its potential use as a natural ingredient for joint and muscle pain.

Ginger is known to be a more powerful herb in managing pain than pandan. This is due to the content of gingerol and shogaol, two bioactive compounds that have strong anti-inflammatory and analgesic effects. Gingerol inhibits the COX-2 enzyme that triggers inflammation, while shogaol suppresses the production of proinflammatory cytokines, which reduces pain and inflammation in the body (Tjandrawinata, R. R., et al. 2018). Another study by Black et al. mentioned that ginger can be used to reduce muscle pain and menstrual pain, and even has comparable effectiveness to NSAIDs (nonsteroidal anti-inflammatory drugs) in relieving mild to moderate pain (Black, C. D., et al. 2021).

The combination of pandan leaves and ginger can have a synergistic effect in relieving pain. Pandan leaves, which have a relaxing effect through their aromatic compounds, such as phytosterols, can be used to reduce muscle tension and mild pain. While ginger, with gingerol and shogaol, targets more severe inflammation. A clinical study by Zhang et al. (2020) revealed that a combination of ginger extract and other herbs (including pandanus in trial form) increased the effectiveness of pain reduction by up to 20% greater than the use of either ingredient separately . In general, pandan leaves and ginger are relatively safe when used in reasonable doses. However, ginger, especially in high doses, may cause gastrointestinal distress such as heartburn in some people, especially those who are sensitive to spices or have gastric disorders (Rifai, A., et al. 2017). In addition, ginger has mild anticoagulant properties that could interact with blood-thinning medications. Therefore, its use should be as recommended, especially for those on certain drug therapies.

The use of pain relief patches or plasters has evolved in the medical world as one of the effective methods for managing various types of pain, including acute, chronic, and neuropathic pain. These pain relief patches are designed to provide a gradual release of the drug or active compound directly into the painful area or through the skin into the bloodstream, allowing for more consistent and focused treatment on a specific area. The following is an explanation of the effectiveness of the patch form in pain reduction along with scientific references.

Patches provide several advantages over other methods, such as: 1. Constant Release: Patches provide a gradual release of the active substance thus keeping drug levels stable in the body, which is important for managing chronic pain (Chou, R., et al. 2009), 2.reduced Systemic Side Effects: Since the drug is delivered directly to the site of

pain or through the skin in controlled doses, side effects such as nausea or indigestion common with oral medications can be minimized. 3. ease of Use: The patch can be applied at home and does not require repeated doses like tablets, making it more convenient for patients who need long-term pain management.Menstrual pain relief patches, or warm plasters, have become a popular method of reducing discomfort during menstruation. These patches work by delivering heat directly to the abdominal area, helping to relieve menstrual cramps and pain.

Research shows that the use of warm patches is effective in reducing menstrual pain. A study published in the Journal of Physiotherapy found that heat therapy, including the use of warm patches, significantly reduced pain intensity in women with primary dysmenorrhea. Another study in the Archives of Gynecology and Obstetrics reported that localized heat is effective in relieving menstrual pain and can be an alternative or complement to pharmacological therapy.In the implementation of this study, researchers found several things that need to be improved to make the PaHe Patch more effective, the first is that the installation is done 2x a day, it is better if it is increased to 3x a day, the second is that the PaHe Patch material should be smoother so that the respondent is more comfortable in wearing it, the third is that the use of 30 minutes should be increased to 45 minutes because the respondent can still feel warm.

Implication and limitations

In the implementation of this study, researchers did not experience significant difficulties, only in the licensing process to the research location which took a little longer. this research can be taught by nurses in the community or nurses in schools to adolescent girls as a menstrual pain reliever that is

free from chemicals. There are limitations that researchers experience, namely the PaHe Patch material which is still not durable, so further research needs to be done to make the PaHe Patch form more patent and durable.

CONCLUSION

Based on the research that has been done, it is found that PaHe Patch (ginger paandan compress) is effective in reducing menstrual pain in adolescent piuteri at SMA Negeri 14 Pekanbaru. Recommendation for further research is to make PaHe Patch in the form of a patent that can be durable

Author contribution

In this study, Dwi Elka Fitri as author 1 was very instrumental in developing research ideas, processing research data and making research reports. While Sri Agnes Lexi and Nova Nopita Sari as authors 2 and 3 were very instrumental in implementing research interventions and processing research data. the three authors

contributed greatly to the implementation of this study.

Conflict of interest

In this research, there is no conflict of interest

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