

The Effect of Pineapple Juice (*Ananas Comosus*) on Dysmenorrhea Pain

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Abstract: Menstrual pain, also known as dysmenorrhea, is one of the most common reproductive health problems experienced by adolescent girls. This condition often recurs every month and can interfere with school attendance, concentration, and participation in daily activities. Many individuals choose pharmacological treatments such as analgesics to relieve symptoms. However, excessive use of pain relievers can lead to side effects, prompting interest in non-pharmacological approaches. One such approach is the consumption of pineapple juice, which contains beneficial compounds such as pectin, vitamin C, and the enzyme bromelain. Bromelain has anti-inflammatory properties, aids in muscle relaxation, and improves blood circulation, potentially reducing uterine muscle contractions that cause pain. This study aimed to determine the effect of pineapple juice consumption on reducing menstrual pain among adolescent girls. The research design used was pre-experimental with a pretest–posttest approach. The population included 121 adolescent girls who experienced menstrual pain, and the sample was obtained through accidental sampling. Pain quality was evaluated using observation sheets, while pain intensity was measured with the Numeric Rating Scale (NRS), which has a validity coefficient of $r = 0.90$ and reliability above 0.95. Before the intervention, the majority of respondents reported a pain intensity score of 6 (46.7%), with a mean score of 5.86. Following the administration of pineapple juice, pain intensity predominantly decreased to a score of 4 (86.6%), with a mean score of 3.06. The Wilcoxon test produced a p-value of 0.000 (<0.05), indicating a statistically significant difference between pre- and post-intervention pain levels. In conclusion, pineapple juice is effective in significantly reducing menstrual pain in adolescent girls. This finding supports its potential as a simple, affordable, and natural alternative to pharmacological treatments. Further research with a control group and larger sample size is recommended to strengthen the evidence.

Keywords: adolescent health; bromelain; dysmenorrhea; non-pharmacological therapy; pineapple juice

Received: 17, May 2025

Revised: 31, May 2025

Accepted: 16, June 2025

Published: 30, June 2025

Curr. Ver.: 30, June 2025



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1. Introduction

Reproductive health in adolescents needs to be given attention because adolescents are the next generation to continue the nation. Adolescence is marked by rapid physical, cognitive, social, and emotional development. The earliest change that occurs during adolescence is physical or biological development, one of which is the onset of menstruation. Menstruation experienced by adolescent girls can cause problems, one of which is dysmenorrhea (Haryono, 2016:89).

Menstrual pain (dysmenorrhea) is a symptom, not a disease. Dysmenorrhea is spasmodic muscle pain in the lower abdomen that can spread to the inner thighs or lower back, occurring during or throughout menstruation as a result of uterine muscle contractions. Dysmenorrhea is caused by the endometrium in the secretory phase producing prostaglandin F₂, which causes contractions of the smooth muscles. If an excessive amount of prostaglandin is released into the bloodstream, it causes menstrual pain (Swanidari, 2022:18). According to the World Health Organization (WHO) in 2019, the prevalence of menstrual pain worldwide is quite high. The average occurrence of dysmenorrhea in women of reproductive age ranges from 16.8% to 81%. On average, more than 50% of women in each country experience menstrual pain. Meanwhile, in Indonesia, the prevalence of primary dysmenorrhea experienced by adolescents is 60-75%, with three-quarters of these adolescents experiencing mild to severe pain, and one-quarter experiencing dysmenorrhea that causes 7-15% to miss school (Ministry of Health RI, 2018).

Dysmenorrhea is divided into two types: primary and secondary dysmenorrhea. Primary dysmenorrhea is caused by high levels of prostaglandins and is not dangerous. Secondary

dysmenorrhea is caused by fibroid tumors, pelvic inflammatory disease, or ovarian cysts (Haryono, 2016:89).

Based on research conducted by Wullandarim (2019), it was found that symptoms frequently experienced by women with dysmenorrhea include abdominal pain (70.4%), fatigue (63.5%), and lower back pain (69.7%). Abdominal pain is the most characteristic symptom of primary dysmenorrhea. Dysmenorrhea usually occurs during or starting on the first day and can last up to the third day of menstruation, with the pain typically gradually decreasing. If untreated, dysmenorrhea can disrupt daily activities and reduce performance, causing nausea, vomiting, and diarrhea. Many women consider this pain normal and believe it will disappear after 1-2 days. However, it could be a sign of an illness such as endometritis, which can cause complications if untreated.

Efforts to manage or relieve typical dysmenorrhea in adolescents include pharmacological treatments (analgesics such as aspirin, phenacetin, hormonal therapy, and combined contraceptive pills) and non-pharmacological treatments such as a healthy diet, herbal or traditional plants (e.g., pineapple and honey juice), adequate rest, exercise, warm water compresses, relaxation techniques, and stretching (Juldha, 2016:93).

One herbal plant that can be used to treat dysmenorrhea is pineapple juice. Pineapple is a tropical fruit scientifically known as *Ananas Comosus*. Pineapple juice contains pectin, vitamin C, and the enzyme bromelain, which helps reduce pain and improve blood circulation. The bromelain and vitamin E in pineapple can reduce menstrual pain by inhibiting prostaglandin production, which acts as a pain stimulus receptor, thereby lowering pain levels (Setianingsih & Widyawati, 2018).

Honey is one of the non-pharmacological therapies included in herbal therapy, rich in nutrients. Research shows that honey has therapeutic effects due to its high viscosity, low pH, antioxidant properties, anti-inflammatory effects, healing stimulation, amino acids, enzymes, and minerals. Honey also contains vitamin E, which inhibits the activity of the enzyme phospholipase A and cyclooxygenase that produces prostaglandins. Vitamin E also increases the production of prostacyclin and PGE₂, which act as vasodilators and can relax the smooth muscles of the uterus (Sandiyati, 2015).

In research by Yanla and Nurin in 2018 on adolescent girls at SMPL Tri Tunggal II Surabaya, with a sample size of 32 divided into intervention and control groups, it was found that the administration of pineapple juice and honey influenced the reduction of dysmenorrhea pain in adolescent girls.

Based on research conducted by Harahap, Zuliawati, & Siregar (2020), there was a significant effect of pineapple juice administration on reducing the level of dysmenorrhea pain.

2. Research Methods

This study is a pre-experimental research with a pretest-posttest group design. The purpose of this study is to determine the effect of pineapple juice administration on the reduction of dysmenorrhea pain in adolescent girls. The population of this study includes all adolescent girls experiencing dysmenorrhea, totaling 121 individuals. The sample in this study consists of 30 adolescent girls with dysmenorrhea from SMK NL 1 Kota Jambi. The sampling technique used is accidental sampling. Data were collected using observation sheets to record the quality of pain. To measure the pain intensity, the Numeric Rating Scale (NRS) was used, which has a validity coefficient of $r = 0.90$ and reliability above 0.95. The statistical test used in this study is the Wilcoxon signed-rank test.

3. Result and Discussion

Description of Menstrual Pain in Adolescent Girls Before Pineapple Juice Administration

Based on the research results, it can be seen that menstrual pain in adolescent girls before being given pineapple juice is presented in Table 1 as follows

Table 1. Distribution of Respondents Based on Menstrual Pain in Adolescent Girls Before Being Given Pineapple Juice (n=30)

Pain Score	Distribution	
	f	%
5	8	26,6
6	14	46,7
7	8	26,6
Mean	5,86	

Based on Table 1, it is known that the majority of menstrual pain in adolescent girls before being given pineapple juice was a score of 6, with 14 respondents (46.7%). The average menstrual pain score in adolescent girls before being given pineapple juice was 5.86. Description of Menstrual Pain in Adolescent Girls After Being Given Pineapple Juice Based on the research results, it can be seen that menstrual pain in adolescent girls after being given pineapple juice can be seen in Table 2 as follows.

Tabel 2. Distribution of Respondents Based on Menstrual Pain in Adolescent Girls Before Being Given Pineapple Juice (n=30)

Pain Score	Distribution	
	f	%
3	2	6,7
4	26	86,6
5	2	13,3
Mean	3,06	

Based on Table 2, it is known that the majority of menstrual pain in adolescent girls after being given pineapple juice was a score of 4, experienced by 21 respondents (86.6%). The average menstrual pain score in adolescent girls after being given pineapple juice and honey was 3.06.

The Effect of Pineapple Juice Administration on the Reduction of Menstrual Pain in Adolescent Girls

Before conducting data analysis, the researcher performed a normality test using the Shapiro-Wilk test because the sample size was less than 50 to determine whether the data were normally distributed. For further details, see the table below:

Tabel 3. Normality Test of the Effect of Pineapple Juice Administration on the Reduction of Menstrual Pain in Adolescent Girls (n=30)

Normality Test	Shapiro wilk		
	Statistic	Df	Sig
Menstrual pain before pineapple juice administration	0,802	30	0,000
Menstrual pain after pineapple juice administration	0,729	30	0,000

Based on Table 3, the normality test results for menstrual pain before administering pineapple juice showed a value of 0.000 (<0.05). The normality test results for menstrual pain after administering pineapple juice and honey also showed a value of 0.000 (<0.05), indicating that the data are not normally distributed. This suggests that the appropriate test to analyze the effect is the Wilcoxon test.

Based on the Wilcoxon statistical test results, it was found that menstrual pain decreased after administering pineapple juice. Out of 30 respondents, all 30 experienced a decrease in menstrual pain; there were no respondents whose pain increased or remained the same. Furthermore, the results of the Wilcoxon test regarding the reduction of menstrual pain in adolescent girls before and after pineapple juice administration can be seen in the following table:

Tabel 4. The Effect of Pineapple Juice Administration on the Reduction of Menstrual Pain in Adolescent Girls (n=30)

Variabels	Median	Minimum-Maximum	P Value
Menstrual pain in adolescent girls before being given pineapple juice	7	7-8	
Menstrual pain in adolescent girls after being given pineapple juice	4	3-5	0,000*

Wilcoxon Test*

Based on the Wilcoxon test results in Table 4, the median value of menstrual pain in adolescent girls before being given pineapple juice was 7, which decreased to 4 after administration of the pineapple juice. The minimum pain score reduced from 7 to 3, and the maximum pain score decreased from 8 to 5 after the pineapple juice was given. Based on the analysis, the p-value obtained was 0.000 ($p < 0.05$), indicating that statistically there is a significant effect of pineapple juice administration on the reduction of menstrual pain in adolescent girls.

4. Discussion

Description of Menstrual Pain in Adolescent Girls Before Being Given Pineapple Juice

Based on the research results, the average menstrual pain score in adolescent girls before being given pineapple juice was 5.86. Dysmenorrhea is pain in the pelvic area caused by menstruation and the production of prostaglandin substances. It often begins immediately after experiencing menarche (the first menstruation). The pain decreases after menstruation, although some women may continue to experience it throughout the menstrual period. The cause of the pain originates from the uterine muscles. Like other muscles, the uterine muscles can contract and relax (Proverawati & Misaroh, 2017).

Menstrual pain is classified into two types: primary dysmenorrhea and secondary dysmenorrhea. Primary dysmenorrhea is caused by high levels of prostaglandins and is generally not dangerous. Secondary dysmenorrhea is caused by fibroid tumors, pelvic inflammatory disease, or the presence of cysts in the ovaries (Haryono, 2016:89).

Risk factors that influence the occurrence of dysmenorrhea include early menarche (first menstruation age < 12 years), lack or absence of physical exercise, prolonged menstrual cycles or longer than normal bleeding (more than 7 days), alcohol consumption, positive family history, and smoking (Harsinta, 2017).

This research aligns with the findings of Setianingsih & Widyawati (2018), which reported an average pain score of 2.62 in adolescent girls before consuming pineapple juice at SMP Tri Tunggal II Surabaya. Similarly, research by Simamora et al. (2022) found an average dysmenorrhea pain score of 5.01 among adolescent girls before pineapple juice consumption at SMP YP Singosari Deli Tua. Research by Gani (2023) reported an average pain intensity of 4.97 in adolescent girls before being given pineapple juice and honey. Before consuming pineapple juice and honey, most respondents experienced dysmenorrhea. This may be caused by the limited knowledge of adolescent girls about nutrition contained in fruits like pineapple juice and honey that can help reduce menstrual pain.

Description of Menstrual Pain in Adolescent Girls After Being Given Pineapple Juice

Based on the research results, the average menstrual pain score in adolescent girls after being given pineapple juice was 3.06. Menstruation is the process of blood discharge through the vagina due to the shedding of the endometrium (uterine lining). Menstruation is a normal process that occurs every month, typically with a cycle ranging from 21 to 35 days. During menstruation, the uterine lining is shed and replaced by a new layer about 14 days before the next menstrual cycle begins (Dartiwen & Aryanti, 2022:89).

The impact of menstrual pain can disrupt the comfort and daily activities of sufferers. This condition requires special attention because, if not addressed, it can affect a person's quality of life and ability to carry out normal daily activities. Menstrual pain (dysmenorrhea) can prevent a woman from functioning normally (Manulaba, 2016).

Management of menstrual pain is generally divided into two categories: pharmacological and non-pharmacological approaches. Pharmacologically, menstrual pain is usually treated with analgesic therapy, which is the most commonly used method to relieve pain (Potter & Perry, 2016). Non-pharmacological treatments include warm compresses, staying well hydrated, rest, regular exercise, eating nutritious food, engaging in pain-relieving activities such as yoga, and consuming herbal remedies — one of which is pineapple juice (Irianti, 2017).

Dysmenorrhea can be treated non-pharmacologically by consuming pineapple juice, which has been shown to reduce menstrual pain. This effect is due to the bromelain content in pineapple and the presence of vitamin E and flavonoids in honey. According to Rahayu (2015), pineapple juice contains pectin, vitamin C, and the enzyme bromelain, which help relieve pain, improve blood circulation, and aid in the healing process. Bromelain decreases bradykinin levels and reduces prekallikrein levels in the serum. The reduction of prekallikrein means reduced release of arachidonic acid and inhibition of prostaglandin PGE₂ production.

These findings are in line with previous studies. Setianingsih & Widyawati (2018) found the average menstrual pain score in adolescent girls after consuming pineapple juice at SMP Tri Tunggal II Surabaya was 3.75. Simamora et al. (2022) found the average score was 6.79 at SMP YP Singosari Deli Tua, and Gani (2023) reported an average menstrual pain score of 6.01 after pineapple juice consumption.

The reduction in menstrual pain in adolescent girls after consuming pineapple juice is attributed to the bromelain enzyme in pineapple and the additional nutrients in honey, which help slow uterine contractions and reduce excessive prostaglandin production, thus effectively relieving menstrual pain.

The Effect of Pineapple and Honey Juice Administration on the Reduction of Menstrual Pain in Adolescent Girls

Based on the research results, it was found that the administration of pineapple juice had a significant effect on reducing menstrual pain in adolescent girls, with a q -value = 0.000 ($q < 0.05$). Pineapple is a tropical fruit with high and complete nutritional value, containing protein, fat, carbohydrates, minerals, and vitamins. Additionally, pineapple is a plant that contains the enzyme bromelain. Bromelain is a proteolytic enzyme found in pineapples that can reduce the level of menstrual pain by inhibiting the production of prostaglandins, which are pain-stimulating receptors in the body (Amalia, 2017). Pineapple juice contains pectin, vitamin C, and bromelain, which help relieve pain and improve blood circulation. The bromelain and vitamin E content in pineapple can reduce menstrual pain by inhibiting prostaglandin production, which serves as a pain receptor.

This study is in line with the research conducted by Gani (2023), which found that there was an effect of pineapple juice (*Ananas comosus* L.) on the intensity of dysmenorrhea in adolescent girls. It can be concluded that there is a significant effect of pineapple juice (*Ananas comosus* L.) on the intensity of dysmenorrhea in adolescent girls, with a p -value of $0.000 < 0.05$. The study by Setianingsih & Widyawati (2018) showed that in the treatment group, the average pain level before consuming pineapple juice was 3.58 and after the intervention decreased to 2.12, with a p -value of $0.000 < 0.05$. Simamora et al. (2022) also found that there was a significant effect of pineapple juice administration on reducing menstrual pain in adolescent girls at SMP YP Singosari Deli Tua, with a p -value of $0.000 < 0.05$.

The administration of pineapple juice is quite effective in helping to reduce menstrual pain levels. The findings of this research indicate a measurable reduction in pain scores. This is due to the consumption of pineapple juice, which contains bromelain. Bromelain itself has analgesic and anti-inflammatory properties. The bromelain enzyme in pineapple slows down uterine contractions, thereby preventing excessive prostaglandin production that can cause menstrual pain.

5. Conclusions

The study revealed that the majority of menstrual pain experienced by adolescent girls before the administration of pineapple juice was at a pain score of 6 (46.7%), with an average pain score of 5.86. After the administration of pineapple juice, most adolescent girls reported a pain score of 4 (86.6%), with an average pain score of 3.06. The results of the Wilcoxon test showed a p -value of 0.000.

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