

## THE EFFECT OF GINGER AND TURMERIC ON PRIMARY DYSMENORRHEA

Masyithah Ridhati<sup>1</sup>, Mukhoirotin<sup>2\*</sup>

<sup>1,2</sup>University of Pesantren Tinggi Darul Ulum

---

### INFORMASI

Korespondensi:  
[mukhoirotin@fikunipdu.ac.id](mailto:mukhoirotin@fikunipdu.ac.id)

Keywords:  
 dysmenorrhea; ginger;  
 turmeric (*curcuma longa*)

### ABSTRACT

*Objective: To determine the difference in the effect of giving ginger and turmeric on dysmenorrhea in adolescents at the Hurun Inn Dormitory of Darul 'Ulum Jombang Islamic Boarding School that met the research criteria.*

*Methods: The research design used was Quasy Experiment with the two-group pre-posttest design approach. The population in this study were 70 respondents with a sample of 24 respondents obtained by purposive sampling technique. The instrument for measuring pain was using the Numeric Rating Scale (NRS), the data were analyzed using statistical test the Repeated Anova continued with post hoc paired wise comparison and Independent T-Test with a significant level of 5% ( $\alpha \leq 0.05$ ).*

*Results: The results showed that there was an effect of giving ginger and turmeric on dysmenorrhea with a significant value of  $p < 0.05$  ( $P < \alpha$ ), there was no significant difference in the two groups ( $2.583 \pm 1.93$  vs  $3.333 \pm 2.35$ ;  $p > 0.05$ ).*

*Conclusion: The administration of ginger and turmeric is effective in reducing dysmenorrhea so that it can be used as an alternative to overcome dysmenorrhea.*

---



## PENDAHULUAN

Dysmenorrhea is one of the gynecological problems that occurs at the reproductive age. Dysmenorrhea is classified as primary and secondary dysmenorrhea. Primary dysmenorrhea is started at or immediately after menarche without any gynecological abnormalities. Pain usually occurs just before or during the menstrual period, lasting for 3-4 days. Secondary dysmenorrhea is caused by certain pathological condition, such as adenomyosis and fibroids, endometriosis and pelvic inflammatory disease. The onset of secondary dysmenorrhea is started earlier than primary dysmenorrhea, usually more than 2 years after menarche. (Wong, 2018; Zhang et al., 2019).

The prevalence of dysmenorrhea in the world varies from 57,8 – 85,6%. It is 57,8% for women in reproductive age in Shanghai Cina (Zhang et al., 2019); 64,7% for university students in Gondar City, Northwest Ethiopia (Azagew et al., 2020); 70,7% for nurses in Taiwan hospital (Chiu et al., 2017); 83,6 % for university students in North Ghana (Ameade et al., 2018); 85,15 for university students in Palestine (Abu Helwa et al., 2018); 85,6% for secondary school students in Kuwait (Al-Matouq et al., 2019). Based on the previous study in Hurun Inn dormitory of Darul 'Ulum Islamic Boarding School Jombang on December 17, 2020, it was found that from 13 teenagers, 7 teenagers (54%) experienced menstrual pain (dysmenorrhea), with mild pain intensity as many as 3 teenagers (23%), moderate pain is as many as 2 teenagers (15%), and severe pain is as much as 2 teenagers (15%). The complaints experienced were pain such as being stabbed, local pain from abdomen to the pelvis, low back pain, dizziness, nausea, and the pain disturbed the daily activities. The efforts used usually done by having rest or sleeping and taking pain medication.

Prostaglandins play an important role in inducing uterine contraction that are released from the sloughing of endometrium at the beginning of menstruation. The overproduction

of uterine prostaglandins from the arachidonic acid through the cyclooxygenase (COX) has been generally accepted as the etiologic of dysmenorrhea. The intensity of painful cramps and associated symptoms of dysmenorrhea is proportional to the rate of prostaglandin release (Zhang et al., 2019). Contractions occur at the frequency of >4–5 per minute (high frequency) and are uncoordinated and unrhythmic. These contractions result in an increase of intrauterine pressure, which can even exceed 400 mmHg (ranging between 150 and 180 mmHg). There are uterine ischemia development and anaerobic metabolites accumulation as uterine pressure exceed arterial pressure which stimulates type C pain neurons causing dysmenorrhea (Najimudeen et al., 2020).

The risk factors that aggravate the occurrence of dysmenorrhea include stress, family history of dysmenorrhea, body mass index less than 20 or more than 30 kg/m<sup>2</sup>, depression, early menarche (before age 11), longer intermenstrual interval (>35 days) and duration of menstrual bleeding (>7 days), heavy bleeding, nulliparity, history of sexual violence, frequent alcohol consumption, smoking. Primary dysmenorrhea decreased as the age getting older (prevalence of dysmenorrhea decreased to 67% at the age 24), parity (but not in those who had miscarriage or abortion), exercise, stable relationship, and the use of oral contraceptives. Primary dysmenorrhea is characterized or described as a sharp pain or dull pain, intermittent cramping in the midline of suprapubic area that begins between a few hours before and a few hours after the onset of menstrual bleeding (Núñez-Troconis et al., 2021). The symptoms that accompany dysmenorrhea include tingling, lack of appetite, dizziness, nausea and vomiting, headache and depression. Dysmenorrhea has a negative impact on social life, academics, quality of life, work productivity and the absence at work or school (Chiu et al., 2017; Wong, 2018).

Non-steroidal anti-inflammatory drugs (NSAID) are usually prescribed as first-line

treatment for dysmenorrhea, because of the suppression of COX-2 activity. As many as 10% -20% of women with primary dysmenorrhea fail to respond or are intolerable of NSAIDs. Therefore, there are more women with dysmenorrhea that are using complementary medication. One of them is by drinking herbal ingredients such as ginger and turmeric. Research conducted by (Indrayani & Ningsih, 2018; Wulandari et al., 2018) stated that turmeric can reduce the intensity of menstrual pain (dysmenorrhea). Another study found that ginger was effective in reducing pain intensity of primary dysmenorrhea (Adib et al., 2018; Chen et al., 2016; Rondanelli et al., 2020). In the previous studies, giving ginger and turmeric were carried out in different studies and did not compare the effectiveness of giving ginger and turmeric in reducing the intensity of menstrual pain. Thus in this study, the researchers are interested in conducting research with the aim of knowing the difference in the effectiveness giving ginger and turmeric on the intensity of menstrual pain (dysmenorrhea).

## METODE

### Research design

This research is Quasy Experiment by using Two Group Pretest - Postests Design approach (Nursalam, 2016).

### Study Participants

The population in this study are 70 respondents of santriwati or the girl students of Hurun Inn Dormitory in Islamic Boarding School of Darul 'Ulum Jombang with the total sample of 24 who were tajen by purposive Sampling technique. There are two groups, the first group was given ginger drink as many as 12 respondents and the second group was given turmeric drink as many as 12 respondents, with the research criteria of regular menstruation every month, age of menarche  $\leq 12$  years and do not using analgesic medicine.

### Instrument and Data Collection

The instrument for measuring the intensity of

menstrual pain is using the Numeric Rating Scale (NRS) (Berman et al., 2015). The pain intensity was observed before and after the intervention. The first group was given a ginger drink made of 1000 mg of ginger powder dissolved in 100 ml of warm water and added with 7.5 g of granulated sugar. It is given on the first day of experiencing menstrual pain. The second group was given a turmeric drink made of 1000 mg of turmeric powder dissolved in 100 ml of warm water and added with 7.5 g of granulated sugar. It is given on the first day of experiencing menstrual pain. After the intervention, the pain intensity was observed with a span of 30 minutes, 1 hour, and 2 hours after the intervention.

### Data Analysis

The data was analyzed by using Repeated Anova test and continued by using post hoc paired wise comparison and Independent T-Test with significant level 5% ( $\alpha \leq 0,05$ ). The normality of the data was using Shapiro-Wilk (Nursalam, 2016).

## RESULTS

The characteristics of respondents in this study found that the age of respondents in the ginger group was 15-17 years old, namely entering middle adolescence, while half of the turmeric group entered early adolescence and half middle adolescence. Menstruation duration in both groups was mostly normal duration lasting 1-8 days. In the ginger group, if dysmenorrhea occurs, most of them are let them go, while in the turmeric group half are let them go and half of them are having rests. Half of the family history in the ginger group had a history of dysmenorrhea and half had no history of dysmenorrhea, while in the turmeric group, most of them had no history of dysmenorrhea. Most of the respondents in the two diet groups were high in caffeine and most of the respondents were in the healthy weight category (18.5 – 24.9). The results of the homogeneity test showed that the characteristics of the respondents based on age, duration of menstruation, ways of dealing with pain, family history and body mass index were homogeneous with a significance value of  $p > 0.05$  (table 1.1)

Tabel 1.1 The Characteristic of Research Subject and Homogeneity

Variabel	Ginger		Turmeric		P Value
	N	%	N	%	
Age					
a. Early Teenager (12-14 tahun)	5	42	6	50	0.581
b. Middle Teenager (15-17 tahun)	7	58	6	50	
Menstrual Duration					
a. Normal Periode (1-8 hari)	8	67	10	83	0.73
b. Long panjang (8-15 hari)	4	33	2	17	
Ways in overcoming the pain					
a. By let it go	7	58	6	50	0.581
b. By rest	5	42	6	50	
Family History					
a. Yes	6	50	5	42	1.00
b. No	6	50	7	58	
High Caffein Diet					
a. Yes	9	75	11	92	0.00
b. No	3	25	1	8	
BMI					
a. Underweight ( $\leq 18,5$ )	3	25	5	42	0.126
b. Healthy weight (18,5 – 24,9)	9	75	7	58	

Source: Primary Data, 2021

Before being given the intervention, the intensity of menstrual pain in both groups was measured. The intensity of menstrual pain in both groups was on average in the moderate intensity category, with an average of 6.083 in the first group who were given ginger intervention and an average of 5.75 in the second group who were given turmeric intervention

After being given the intervention, the intensity of pain in both groups was observed with a span of 30 minutes, 1 hour and 2 hours after the intervention. The highest decrease in pain

intensity was obtained after 2 hours of intervention and the lowest decrease in pain intensity was obtained after 30 minutes of intervention. The intensity of menstrual pain in both groups after 30 minutes and 1 hour after being given the intervention was on average in the moderate category and after 2 hours of intervention the average pain intensity was in the mild category (Figure 1.1)

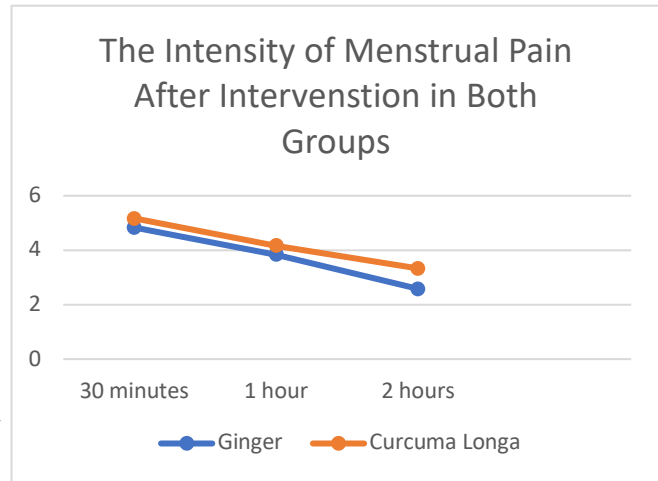


Figure 1.1 The Intensity of Menstrual Pain after Intervention of Both Groups

Before the Repeated Anova analysis test was carried out, followed by post hoc paired wise comparison and Independent T-Test, the data normality test was conducted using Shapiro-Wilk. The results of the normality test showed that before and after the treatment, the data for both groups were normally distributed. The results of the Repeated Anova test showed that there was a significant effect of ginger and turmeric on the intensity of menstrual pain after the intervention with a significance value of  $p < 0.05$  (Table 1.2). The results of the Post Hoc Paired Wise Comparison (Bonferroni) test showed that the highest mean decrease in pain intensity was post 2 hours (Table 1.3)

Tabel 1.2 The Effect of Ginger and Turmeric on the Intensity of Menstrual Pain

Variable	Intensity of Menstrual Pain (n-12)	Mean (SD)	P Value
Ginger	Pretest	6.083 (1.83)	0.000
	Post 30 minutes	4.833 (1.99)	
	Post 1 hour	3.833 (1.99)	



	Post 2 hours	2.583 (1.93)	
Turmeric	Pretest	5.750 (2.05)	0.000
	Post 30 minutes	5.167 (2.17)	
	Post 1 hour	4.417 (2.27)	
	Post 2 hours	3.333 (2.35)	

	minutes	(1.99)	(2.17)	2.096-1.429)
Post 1 hour	1	3.833 (1.99)	4.417 (2.27)	0.583 (- 0,511 2.394-1.429)
	2	2.583 (1.93)	3.33 (2.35)	0.75 (- 0,402 2.569-1.069)

Repeated Anova Test

Independent T-Test Test

Tabel 1.3 Analisis Post Hoc

Variable	Intensity of Menstrual Pain (n-12)	Different Mean	95% Confidence Interval		P
			Minimum	Maximum	
Ginger	Pretest vs 30 minutes	1,250	0.273	2.227	0.010
	Pretest vs 1 hour	2.250	1.124	3.376	0.000
	Pretest vs 2 hours	3.500	2.574	4.426	0.000
	30 minutes vs 1 hour	1.000	0.210	1.790	0.011
Turmeric	1 hour vs 2 hours	1.250	0.552	1.948	0.014
	Pretest vs 30 minutes	0.583	0.106	1.060	0.014
	Pretest vs 1 hour	1.333	0.877	1.789	0.000
	Pretest vs 2 hours	2.417	1.798	3.036	0.000
	30 minutes vs 1 hour	0.750	0.052	1.448	0.033
	1 hour vs 2 hours	1.833	1.060	2.606	0.000

DISCUSSION

Dysmenorrhea is pain that occurs during menstruation that comes from cramps in the uterus (Nugroho & Utama, 2014). Menstrual pain is usually centered in the lower abdomen (Sinaga et al., 2017). Dysmenorrhea is pain that occurs during or just before menstruation. This pain is felt in the lower abdomen and back, feels like cramps. It is colic or continuous and it is experienced by women of various ages, especially teenagers and young women (Mukhoirotin, 2018). Cramps come from very intense contractions of the uterine muscles during menstruation so that the muscles in the uterus tighten and cause cramping or pain. Muscle tension can also occur in supporting muscles such as muscles in the lower back, waist, pelvis, thighs to calves (Sinaga et al., 2017).

The results of the study showed that the average intensity of menstrual pain before being given ginger and turmeric drinks was in the moderate category. This happens because almost all respondents have normal menstrual duration and most respondents are in the ideal body weight (healthy weight), so that the average dysmenorrhea experienced by respondents is in the moderate category. Respondents with normal age of menarche, normal length of menstruation, regular menstrual cycle, and ideal body weight (healthy weight) experienced mild dysmenorrhea symptoms. Menstruation duration and length, menstruation that exceeds normal, causes uterine contractions more than usual and the greater the amount of prostaglandin released. The formation of prostaglandins that exceed normal can increase pain and prolonged uterine contractions so that the blood supply to the uterus decreases and

Paired Wise Comparison Test (Bonferroni)

The results of the Independent T-Test showed that there was a difference in the effect of ginger and turmeric on decreasing the intensity of menstrual pain after 30 minutes, 1 hour and 2 hours of intervention.

Tabel 1.3 The Difference in the Effect of Ginger and Turmeric Giving on Menstrual Pain Intensity

	Ginger Mean (SD)	Turmeric Mean (SD)	Different Mean (95% CI)	P Value
Post 30	4.833	5.167	0.333 (-	0,699

causes pain (Nurwana et al., 2017). The long menstrual period and the current of higher menstruation is determined by prostaglandin (Habibi et al., 2015; Ibrahim et al., 2015).

Respondents who had a family history of dysmenorrhea and a diet of high caffeine experienced severe pain symptoms. Family history is related to the presence of genetic factors, namely traits that can be passed on to their descendants. One of the characteristics is self-duplication so that the genetic traits from the mother can be passed on to their children. High consumption of caffeine causes vasoconstriction which exacerbates ischemic conditions in the uterus, that can cause pain (Wrisnijati, Wiboworini, & Sugiarta, 2019). Caffeine is an adenosine analogue that blocks adenosine receptors (a patented vasodilator) (Ribeiro & Sebastião, 2010). Blocking these receptors causes vasoconstriction, therefore it is decreasing blood flow to the uterus leading to a further increase in the degree of menstrual pain (Al-Matouq et al., 2019).

The results of the research showed that after being given ginger drink in the first group and turmeric drink in the second group, the intensity of menstrual pain decreased which was observed in the first 30 minutes, 1 hour and 2 hours post. The highest decrease was obtained after 2 hours of intervention, namely from moderate intensity to light intensity. The results of Repeated Anova followed by post hoc Paired Wise Comparison showed that there was a significant effect of giving ginger drink and turmeric drink on the intensity of menstrual pain.

Red ginger contains essential oils that have a strong taste (Andareto, 2015). The essential oil in ginger contains shogaol and gingerol substances. Both of these substances function to reduce pain and as anti-inflammatory substances that limit the release of prostaglandins that cause inflammation (Tandi, 2015 dalam Pratiwi et al. 2017). Gingerol and 6-shogaol are the active components of ginger. Gingerol works to inhibit the formation of the enzyme cyclooxygenase (COX) and the synthesis of prostaglandins. This mechanism is

similar to non-steroidal anti-inflammatory drugs (NSAIDs) such as ibuprofen and naproxen which also work by inhibiting the activity of COX-1 and COX-2 enzymes (Ozgoli et al., 2009). Ginger is as effective as mefenamic acid as a pain reliever in primary dysmenorrhea, ginger has no side effects and is an alternative treatment for primary dysmenorrhea (Shirvani et al., 2015). This research also stated that ginger was as effective as Novafen in relieving pain in women with primary dysmenorrhea (Adib et al., 2018).

Turmeric contains active ingredients which are not only used as analgesics, antipyretics, but can also be used as anti-inflammatory. Turmeric contains the active compound of curcumin which functions as an inhibitor of cyclooxygenase (COX-2) reaction so that it can suppress inflammation that can reduce uterine contractions. The compound of curcumenol as an analgesic substance will suppress the release of prostaglandins that are too large through the uterine epithelial tissue so that uterine contractions decrease and the complaints of dysmenorrhea are reduced (Suri & Nofitri, 2014).

At the measurement of 30 minutes after the intervention, the intensity of menstrual pain in both groups experienced a significant decrease. The decrease of pain intensity continued until the measurement of 2 hours after the intervention. The results of previous research conducted by Adib et al., (2018) dan (Faizah & Mukhoirotni, 2019) showed that giving ginger can reduce the intensity of menstrual pain (dysmenorrhea). Another results of the research done by Wulandari, Rodiyani and Sari (2018) also showed that turmeric can decrease the intensity of menstrual pain (dysmenorrhea).

The results of the research showed that there was no significant difference in the intensity of menstrual pain in the two groups after the intervention was given. It happens because ginger has two components namely, [6]-Gingerol and Gingerdiones, which are potential inhibitors of prostaglandins by blocking the cyclooxygenase (COX) pathway (Fauziyah Rahman et al., 2020). Several previous studies

have shown that ginger is effective in reducing pain intensity and duration in primary dysmenorrhea (Rahnama et al., 2012; Sugiharti, Rosi Kurnia; Sundari, 2018; Wrisnijati, Wiboworini, & Sugiarto, 2019). While turmeric contains curcumin as an anti-inflammatory mediated through its ability to inhibit cyclooxygenase-2 (COX-2), lipoxygenase (LOX), and inducible nitric oxide synthase (iNOS) (Menon & Sudheer, 2007), so that it is inhibiting the formation of prostaglandins and leukotrienes which has an impact on decreasing uterine contractions and vasodilation which can ultimately reduce the intensity of menstrual pain.

Curcumin is effective in reducing the symptoms in primary dysmenorrhea. This clinical evidence shows that curcumin has shown analgesic and anti-inflammatory effects (Pichardo et al., 2020). Other research has also shown that curcumin is effective in reducing the intensity and duration of menstrual pain (Tabari et al., 2020). Thus, ginger and turmeric are alternative therapies for pain relief in primary dysmenorrhea by blocking the cyclooxygenase (COX) pathway thereby it is inhibiting the formation of prostaglandins. The limitations of this study are the giving of ginger and turmeric which is only once on the first day of dysmenorrhea and the dose given is also the same and there is no comparison of doses in different groups. For further research, the dose should be given more than once and there is comparison of the doses in different groups so that it can determine the effectiveness of ginger and turmeric in reducing the intensity of menstrual pain. Therefore, the right dose is obtained for the treatment of dysmenorrhea.

## CONCLUSION

The giving of ginger and turmeric is effective in reducing the intensity of menstrual pain (dysmenorrhea) so that it can be used as an alternative to treat dysmenorrhea.

## DAFTAR PUSTAKA

Abu Helwa, H. A., Mitaeb, A. A., Al-Hamshri, S., & Sweileh, W. M. (2018). Prevalence of dysmenorrhea and predictors of its pain

intensity among Palestinian female university students. *BMC Women's Health*, 18(18), 1–11. <https://doi.org/10.1186/s12905-018-0516-1>

Adib, H., Basirat, Z., Bakouei, F., Akbar, A., Khafri, S., Farhadi, Z., Nikpour, M., & Kazemi, S. (2018). Effect of Ginger and Novafen on menstrual pain : A cross-over trial. *Taiwanese Journal of Obstetrics & Gynecology*, 57(6), 806–809.

<https://doi.org/10.1016/j.tjog.2018.10.006>

Al-Matouq, S., Al-Mutairi, H., Al-Mutairi, O., Abdulaziz, F., Al-Basri, D., Al-Enzi, M., & Al-Taiar, A. (2019). Dysmenorrhea among high-school students and its associated factors in Kuwait. *BMC Pediatrics*, 19(80), 1–12. <https://doi.org/10.1186/s12887-019-1442-6>

Ameade, E. P. K., Amalba, A., & Mohammed, B. S. (2018). Prevalence of dysmenorrhea among University students in Northern Ghana; its impact and management strategies. *BMC Women's Health*, 18(1). <https://doi.org/10.1186/s12905-018-0532-1>

Andareto, O. (2015). *Andareto, O. (2015). Apotik Herbal Di Sekitar Anda. Pustaka Ilmu Semesta*  
Azagew, A. W., Kassie, D. G., & Walle, T. A. (2020). Prevalence of primary dysmenorrhea, its intensity, impact and associated factors among female students' at Gondar town preparatory school, Northwest Ethiopia. *BMC Women's Health*, 20(1). <https://doi.org/10.1186/s12905-019-0873-4>

Abu Helwa, H. A., Mitaeb, A. A., Al-Hamshri, S., & Sweileh, W. M. (2018). Prevalence of dysmenorrhea and predictors of its pain intensity among Palestinian female university students. *BMC Women's Health*, 18(18), 1–11. <https://doi.org/10.1186/s12905-018-0516-1>

Adib, H., Basirat, Z., Bakouei, F., Akbar, A., Khafri, S., Farhadi, Z., Nikpour, M., & Kazemi, S. (2018). Effect of Ginger and Novafen on menstrual pain : A cross-over trial. *Taiwanese Journal of Obstetrics & Gynecology*, 57(6), 806–809. <https://doi.org/10.1016/j.tjog.2018.10.006>

Al-Matouq, S., Al-Mutairi, H., Al-Mutairi, O., Abdulaziz, F., Al-Basri, D., Al-Enzi, M., & Al-Taiar, A. (2019). Dysmenorrhea among high-school students and its

- associated factors in Kuwait. *BMC Pediatrics*, 19(80), 1–12. <https://doi.org/10.1186/s12887-019-1442-6>
- Ameade, E. P. K., Amalba, A., & Mohammed, B. S. (2018). Prevalence of dysmenorrhea among University students in Northern Ghana; its impact and management strategies. *BMC Women's Health*, 18(1). <https://doi.org/10.1186/s12905-018-0532-1>
- Andareto, O. (2015). *Andareto, O. (2015). Apotik Herbal Di Sekitar Anda. Pustaka Ilmu Semesta.*
- Azagew, A. W., Kassie, D. G., & Walle, T. A. (2020). Prevalence of primary dysmenorrhea, its intensity, impact and associated factors among female students' at Gondar town preparatory school, Northwest Ethiopia. *BMC Women's Health*, 20(1). <https://doi.org/10.1186/s12905-019-0873-4>
- Berman, A., Synder, S., & Frandsen, G. (2015). *Kozier & Erbs's Fundamental of Nursing: Concept, Process, and Practice (10th ed.)*. Pearson Education Inc.
- Chen, C. X., Barrett, B., & Kwekkeboom, K. L. (2016). Efficacy of Oral Ginger ( *Zingiber officinale* ) for Dysmenorrhea: A Systematic Review and Meta-Analysis. 2016. <https://doi.org/10.1155/2016/6295737>
- Chiu, M. H., Hsieh, H. F., Yang, Y. H., Chen, H. M., Hsu, S. C., & Wang, H. H. (2017). Influencing factors of dysmenorrhoea among hospital nurses: A questionnaire survey in Taiwan. *BMJ Open*, 7(12), 1–8. <https://doi.org/10.1136/bmjopen-2017-017615>
- Faizah, N., & Mukhoirotin. (2019). Pengaruh Pemberian Cokelat Hitam (Dark Chocolate) dan Jahe Terhadap Intensitas Nyeri Haid (Dysmenorrhea). 43–49.
- Fauziyah Rahman, S., Wisnu Hardi, G., Artha Jabatsudewa Maras, M., & Rachmia Riva, Y. (2020). Influence of Curcumin and Ginger in Primary Dysmenorrhea: A Review. *International Journal of Applied Engineering Research*, 15(7), 634–638. <http://www.ripublication.com>
- Habibi, N., Huang, M. S. L., Gan, W. Y., Zulida, R., & Safavi, S. M. (2015). Prevalence of Primary Dysmenorrhea and Factors Associated with Its Intensity Among Undergraduate Students: A Cross-Sectional Study. *Pain Manag Nurs*, 16(6), 855–861. <https://doi.org/10.1016/j.pmn.2015.07.001>
- Ibrahim, N. K., AlGhamdi, M. S., Al-Shaibani, A. N., AlAmri, F. A., Alharbi, H. A., Al-Jadani, A. K., & Alfaidi, R. A. (2015). Dysmenorrhea among female medical students in King Abdulaziz University: Prevalence, Predictors and outcome. *J Med Sci*, 31(6), 1312–1317. <https://doi.org/10.12669/pjms.316.8752>
- Indrayani, S., & Ningsih, I. S. (2018). Efektifitas Ekstrak Kunyit Dalam Mengurangi Nyeri Dismenore Pada Mahasiswi di asrama Akademi Kebidanan Salma Siak. XII(5).
- Menon, V. P., & Sudheer, A. R. (2007). Antioxidant and anti-inflammatory properties of curcumin. *Adv. Exp. Med. Biol.*, 595, 105–125.
- Mukhoirotin. (2018). DISMENOREA: Cara Mudah Mengatasi Nyeri Haid. *Dialektika*.
- Najimudeen, M., Myint, M. H., & Masharudi, A. (2020). Reappraisal on the Management of Primary Dysmenorrhoea in Adolescents. *Scholars International Journal of Obstetrics and Gynecology*, 3(9), 192–199. <https://doi.org/10.36348/sijog.2020.v03i09.001>
- Nugroho, T., & Utama, B. I. (2014). *Masalah Kesehatan Reproduksi Wanita. Nuha Medika.*
- Núñez-Troconis, J., Carvallo, D., & Martínez-Núñez, E. (2021). Primary Dysmenorrhea: pathophysiology. *Investigacion Clinica (Venezuela)*, 62(4), 378–406. <https://doi.org/10.22209/IC.v62n4a08>
- Nursalam. (2016). *Metodologi Penelitian Ilmu Keperawatan. Salemba Medika.*
- Nurwana, Sabilu, Y., & Fachlevy, A. F. (2017). Analisis Faktor Yang Berhubungan dengan Kejadian Dismenorea Pada



- Remaja Putri di SMA Negeri 8 Kendari Tahun 2016. *Jurnal Ilmiah Mahasiswa Kesehatan Masyarakat*, 2(6), 1–14.
- Ozgoi, G., Goli, M., & Moattar, F. (2009). Comparison of Effects of Ginger, Mefenamic Acid, and Ibuprofen on Pain in Women with Primary Dysmenorrhea. *The Journal of Alternative and Complementary Medicine*, 15(2), 129–132. <https://doi.org/https://doi.org/10.1089/acm.2008.0311>
- Pichardo, E., Liborio-Kimura, T., Caballero, M. E., Kandany, V. N., Mena, L., Ferreira-Filho, E., Almeida, E. D., Navia, S. B., Zelniker, M., Matsuura, D., Ying, C. T. Q., Calabria, B. S. R., Almeida, G. De, Mushtaq, K., Abdallah, A., Doomi, A., Antonio, E. P., & Tamayo, A. (2020). ESCAPE pain trial - The effects of Curcumin in pain relief in women diagnosed with primary dysmenorrhea: Principles and Practice of Clinical Research, 6(2), 25–32.
- Pratiwi, L. A., & Mutiara, H. (2017). Pengaruh Jahe terhadap Nyeri saat Menstruasi The Effect of Ginger in Menstrual Pain. 6, 51–54.
- Rahnama, P., Montazeri, A., Huseini, H. F., Kianbakht, S., & Naseri, M. (2012). Effect of *Zingiber officinale* R. Rhizomes (ginger) on pain relief in primary dysmenorrhea: A placebo randomized trial. *BMC Complementary and Alternative Medicine*, 12(1), 1. <https://doi.org/10.1186/1472-6882-12-92>
- Ribeiro, J. A., & Sebastião, A. M. (2010). Caffeine and adenosine. *J Alzheimers Dis*, 20(1), S3-15. <https://doi.org/10.3233/JAD-2010-1379>
- Rondanelli, M., Fossari, F., Vecchio, V., Gasparri, C., Peroni, G., Spadaccini, D., Riva, A., Nichetti, M., Petrangolini, G., Iannello, G., Infantino, V., & Perna, S. (2020). Clinical trials on pain lowering effect of ginger: A narrative review. *August 2019*, 2843–2856. <https://doi.org/10.1002/ptr.6730>
- Shirvani, M. A., Motahari-Tabari, N., & Alipour, A. (2015). The effect of mefenamic acid and ginger on pain relief in primary dysmenorrhea: a randomized clinical trial. *Archives of Gynecology and Obstetrics*, 291(6), 1277–1281. <https://doi.org/10.1007/s00404-014-3548-2>
- Sinaga, E., Saribanon, N., Sa'adah, S. N., Salamah, U., Murti, Y. A., Trisnamiati, A., & Lorita, S. (2017). Manajemen Kesehatan Menstruasi. Universitas Nasional, IWWASH, Global One.
- Sugiharti, Rosi Kurnia; Sundari, R. I. (2018). Efektivitas minuman kunyit asam dan rempah jahe asam terhadap penurunan skala nyeri haid primer [The effectiveness of curcumin and ginger tamarind in reducing primary menstrual pain]. *Medisains: Jurnal Ilmiah Ilmu-Ilmu Kesehatan*, 16(2), 55–59.
- Suri, S. I., & Nofitri, M. D. (2014). Pengaruh Minuman Kunyit Terhadap Penurunan Tingkat Nyeri Menstruasi Pada Remaja Putri Kelas 1 di Pondok Pesantren Nurul Yaqin Pakandangan Kecamatan 6 Lingkung Kabupaten Padang Pariaman Tahun 2014. 1–7.
- Tabari, N. S., Kheirkhah, M., Mojab, F., & Salehi, M. (2020). An Investigation of the Effect of Curcumin (Turmeric) Capsule on the Severity and Duration of Dysmenorrhea in Students of Iran University of Medical Sciences. *Journal of Evolution of Medical and Dental Sciences*, 9(46), 3444–3451. <https://doi.org/10.14260/jemds/2020/755>
- Wong, C. L. (2018). Health-related quality of life among Chinese adolescent girls with Dysmenorrhoea. *Reproductive Health*, 15(1). <https://doi.org/10.1186/s12978-018-0540-5>
- Wrisnijati, D., Wiboworini, B., & Sugiarta. (2019). Prevalensi Dan Faktor Yang Berhubungan Dengan Derajat Dismenore Pada Remaja Putri di Surakarta. *J Gipas*, 3(1).
- Wrisnijati, D., Wiboworini, B., & Sugiarto, S. (2019). Effects of Pineapple Juice and Ginger Drink for Relieving Primary Dysmenorrhea Pain among Adolescents. *Indonesian Journal of Medicine*, 4(2), 96–104.

<https://doi.org/10.26911/theijmed.2019.04.02.03>

- Wulandari, A., Rodiyani, & Sari, R. D. P. (2018). Pengaruh Pemberian Ekstrak Kunyit ( *Curcuma longa linn* ) dalam Mengatasi Dismenorea Effect of Tumeric Extract ( *Curcuma longa linn* ) for Overcoming Dysmenorrhoea. 7, 193–197.
- Zhang, X., Zhang, R., Chen, D., Huang, R., Tian, Y., Zhang, P., & Zhang, J. (2019). Association of tea drinking and dysmenorrhoea among reproductive-Age women in Shanghai, China (2013-2015): A cross-sectional study. *BMJ Open*, 9(4), 1–9. <https://doi.org/10.1136/bmjopen-2018-026643>