Gac Sanit. 2021;35(S2):S145–S147

Effect of varash oil to decrease menstrual pain in primary dysmenorrhea of senior high school student at Palu City☆

Ni Wayan Wirayanti Putri Negara[a,*], Stang[a], Ansariad[b], A. Ummu Salamah[a], Arifin Seweng[a], Rosmala Nur[c], Aminuddin Syam[d]

[a] Department of Biostatistics, Faculty of Public Health, Hasanuddin University, Indonesia
[b] Department of Epidemiology, Faculty of Public Health, Hasanuddin University, Indonesia
[c] Department of Public Health, Faculty of Public Health, Tadulako University, Indonesia
[d] Department of Nutrition, Faculty of Public Health, Hasanuddin University, Indonesia

ARTICLE INFO

Article history:
Received 28 June 2021
Accepted 30 June 2021

Keywords:
Menstrual pain
Ginger oil

ABSTRACT

Objective: menstrual pain is a common gynecological symptom at women on or near their menstrual period. Two third of them experienced moderate to severe pain. However, just several seek for medical help. This research aims to know the effect of ginger oil used on decreasing menstrual pain scale.
Materials and methods: this cross over experimental study was held from February until May 2020 on 64 grade XI high school students at Palu city. Participants were grouping cluster randomly into group A which applied 5 ml ginger oil five days before until the second day of the first menstrual period, and group B that given the same treatment in the next period. A visual pain scale measured the pain scale on the second day of the menstrual period.
Result: most participants were in the age of 17 years old. The study found a lowering of pain scale significantly at both groups after treatment. The main menstrual pain scale were 6.87 ± 1.817 and 6.46 ± 1.362 decreased to 3.48 ± 1.928 and 4.24 ± 2.010 after treatment ($p = 0.0001$). Differences between the two groups were significant in the first period ($p = 0.0001$) but not significant in the second period ($p = 0.410$).
Conclusion: the use of ginger oil several days before menstruation can reduce menstrual pain scale on students with primary dysmenorrhea; therefore, its use can be recommended to prevent the pain.

Introduction

Menstrual pain is a common gynecological symptom affected by up to 90% women around the world.[1] pain is felt like a cramp in the lower abdomen, thighs, and waist[2] a few days before or in menstrual period. Most women who experienced menstrual pain have reported moderate to severe pain.[3] Other studies also showed the same result.[2] This is in line with our preliminary survey to determine the prevalence of menstrual pain among high school students in Palu city. Our finding showed 95% of students had experienced menstrual pain. 29.6% of students reported severe pain and 47.2% moderate pain, while mild pain was reported only by 18.2% of students. Menstrual pain on primary dysmenorrhea is due to the rise of prostaglandin leakage in endometrium.[4] Prostaglandin is inflammatory agent,[5] so it theoretically can be handled by the non-steroid anti-inflammatory drug. Treatment is aimed to relieve the pain.

Moderate and severe pain can disturb daily activity; however, most women prefer to self-treatment than seeking for health worker assistance to relieve pain.[6] Based on the clinical algorithm for the treatment of primary dysmenorrhea in the nurse practitioner journal, treatment can be carried out pharmacologically, and nonpharmacological.[7] Drugs that are often taken to relieve pain are ibuprofen,[8] paracetamol, buscopan,[9] syncopal and naproxen.[10] 63% women on a study reported no improvement after taking drugs.[8] That leads women to turn to nonpharmacological treatment. Two-third of women reduce their menstrual pain with herbal medicine.[11] Some herbal plants considered effective on relieving menstrual pain are ginger, parsley, mint, coriander, cinnamon, chamomile, turmeric, celery seeds, and fennel.[12,13] Ginger is one of the herbals that has been considered effective in relieving menstrual pain.[14] It has equal effectiveness as mefenamic acid and ibuprofen to reduce menstrual pain.[15]

Ginger also can be used topically to reduce pain.[16] Some studies found ginger compress is effective in relieving menstrual pain scale.[17] Our study is intended to determine the effect of ginger oil early on reducing menstrual pain scale at high school students. Ginger oil is made by the distillation process like other essential oil.[18] In this study, ginger oil was used at night, starting five days before the menstrual period until the second day of the period. The finding of this study may provide the nonpharmacological choice for menstrual pain treatment for students.

Material and methods

Study design and sample

This cross over experimental study was held in Palu city from February until May 2020. The population in this study was grade XI high school student and randomized sampling clustery from

☆ Peer-review under responsibility of the scientific committee of the 3rd International Nursing, Health Science Students & Health Care Professionals Conference. Full-text and the content of it is under responsibility of authors of the article.

* Corresponding author.
E-mail addresses: wirayanti.unhas@gmail.com, pmc@agri.unhas.ac.id (N.W.W.P. Negara).

https://doi.org/10.1016/j.gaceta.2021.06.010

SMAN1 Palu and SMAN 3 Palu. The inclusion criteria included age range 15–19 years old, had a regular menstrual cycle, and menstrual pain in the last three months, pain intensity was moderate to severe. They who had pelvic diseases, psychological problems, and refused given intervention were excluded from the study. The participants selected were assigned to two groups: group A ($n = 50$), intervention is given in the second menstrual period, and group B ($n = 50$), which is given intervention in the third menstrual period. They were evaluated at three menstrual periods; the first period in February was assigned as a pretest, the second and third period each were assigned as posttest one and posttest 2.

Intervention in this study was smearing 5 ml of ginger oil on both soles of the feet, along the backbone, lower abdomen, and waist. It was undertaken at night[13] for five days before the estimated first day until the second day of menstrual period[19,20] for ten minutes. A research assistant helped the participant applying the oil. The first day of the period was estimated from the last three months menstrual cycle that confirmed at pretest. Group A was given intervention before posttest one, while group B was given before posttest 2. The menstrual pain scale was evaluated on the second day of the menstrual period or after the intervention ended. We used a pain visual analog scale to evaluate the pain by comparing the facial expression with the scale of pain from 1 to 10. This instrument has been applied in some studies to estimate menstrual pain.[21,22] Review of three commonly used pain measures concluded pain visual analog scale as one of the valid and reliable instrument to use in clinical practice.[23]

Ginger oil used in this study was in commercial name varash, produced by PT Saddan Nusantara. The preparation is in the form of a 100 ml plastic bottle. 5 ml oil was equal with one bottle of cup preparation.

Ethical consideration

This study has been approved by the ethics committee of the public health faculty of Hasanuddin University. The Government National unity and politics department has also given permission for this study. The participant joined the study voluntarily after the procedure explanation was given. The informed consent form was signed before intervention knowing by proxy and teacher.

Data analysis

Data were computerized processing with the spss program. Wilcoxon signed-rank test was used to compare the menstrual pain scale before and after the intervention. Mann Whitney test was used to compare pain scale between two groups on posttest 1. Normally distributed data on group A was compared with paired *t*-test while independent *t*-test compared normally distributed posttest 2 data between both groups. A *p*-value of less than 0.05 considered significant statistically.

Result

Thirty-six participants were dropped out during the study, remaining 64 participants until the end of the study. They were distributed in group A ($n = 23$) and group B ($n = 41$). The age of participants was in the range of 15–19, the most at 17 years old. They got their menarche on 10–15, the most 12 years old.

Table 1 shows that in group A, pain scale decreased from 6.87 ± 1.817 before intervention to 3.48 ± 1.928 after intervention ($p = 0.0001$). It also decreased in group B from 6.46 ± 1.362 on posttest 1 to 4.24 ± 2.010 after intervention were given on posttest 2 ($p = 0.0001$).

Pain measured in the second period of menstruation (posttest 1) showed a significant difference between group A and group B ($p = 0.0001$), while no significant difference was showed in the posttest two measurements ($p = 0.410$). But from Table 2, we can see the change of pain scale in both groups showed different patterns.

Table 1
Bivariate analysis in pretest and posttest 1.

Group	Menstrual pain scale (mean ± SD)		*p*
	Pretest	Posttest 1	
A	6.87 ± 1.817	3.48 ± 1.928	0.0001
B	6.32 ± 1.507	6.46 ± 1.362	0.496

Note: $p = 0.0001$.

Table 2
Bivariate analysis in posttest 1 and posttest 2.

Group	Menstrual pain scale (mean ± SD)		*p*
	Pretest	Posttest 1	
A	3.48 ± 1.928	4.70 ± 2.225	0.017
B	6.46 ± 1.362	4.24 ± 2.010	0.0001

Note: $p = 0.410$.

Discussion

Our study result showed there is ginger oil effect on decreasing menstrual pain scale. The effectiveness of ginger on reducing menstrual pain intensity has been approved. A pretest–posttest control group design study among college students found significant pain scale differences between control and group have given ginger tea.[14,24] Another study among college students in pretest-posttest design also found the effect of red ginger stew on reducing menstrual pain intensity.[25] Compared with another herb, ginger has the same effect with Rocella tea and turmeric on decreasing menstrual pain intensity.[26]

Ginger also has the same effect of relieving menstrual pain compared with a pharmacological agent. Randomized trials compare the effect of ginger, zinc, and placebo by Farzaneh Kashefi, et al. found that ginger had the same effect with zinc sulfate capsule on the improvement of menstrual pain in young women.[27] On a randomized clinical trial by Marjan Ahmad Shirvani, they compared the effect of mefenamic acid and ginger to relieve pain in primary dysmenorrhea. The study concluded the same effect between both agent.[28] Comparison study on double-blind clinical trial design also showed the same effectiveness between ginger, mefenamic acid, and ibuprofen in relieving menstrual pain.[15,29] A cross over clinical trial also found that ginger is as effective as novafen in relieving menstrual pain.

Besides orally consumed, the topical use of ginger is also has a significant effect in reducing menstrual pain intensity. Topically, ginger can be used by compressing ginger extract on the site of pain. Ginger compresses were more effective than compresses of warm water to reduce the pain concluded in a study performed by Ati Karomika et al. Pre experimental study on one group pretest–posttest design by Harmawati also found significant menstrual pain difference before and after ginger compresses were given.[30] Another pretest–posttest experimental study also found the effect of ginger compresses to decrease menstrual pain in MTs Hurul Huda.

In the above studies, ginger is as effective with other herbs and pharmacological agents in relieving menstrual pain, both consumed or topically used. In our study, ginger oil used is in preparation for oil. The distillation method used to produce ginger oil is the extracting technique using the vapor of boiled water.[18] A study found the use of ginger oil was more effective to relieve pain than raw ginger.[31]

The main mechanism of menstrual pain in primary dysmenorrhea is myometrium hypercontractility and vasoconstriction triggered by the accumulation of prostaglandin, chemokines, cytokines, growth factors, and oxytocin.[32] prostaglandin is inflammation substance which is synthesized from cyclooxygenase (COX).[5] Non-steroid anti-inflammatory drugs (NSAID) prevent inflammation by inhibiting enzymes COX-1 and COX-2 that produce prostaglandin. It can explain how NSAID is used as the first-line treatment of menstrual pain. Gingerols and gingerdiones are two components of ginger that has an anti-inflammatory and anticarcinogenic role. They are COX inhibitor which inhibits leukotriene and prostaglandin synthesis.[13] These COX inhibitor role of ginger components explain how ginger has effectiveness as NSAID drugs in relieving menstrual pain.

This study did not control other variables, which are risk factors of menstrual pain, such as dietary intake, daily activity, and psychological status, that can bias data collected. Another bias that can be occurred because the sample dropped out was more in group A. Limitation in this study is the absence of washout time in group A after the intervention that can affect comparison with group B in posttest 2. Subjectively evaluation of a facial expression in pain visual analog is another difficulty in this study. The strength of our study is intervention held starting before period comes to see prevention effect.

Conclusion

There was an effect of ginger oil in decreasing menstrual pain in primary dysmenorrhea of senior high school students when it used topically before the period comes. It can be an herbal treatment option for young women in relieving their menstrual pain. As this study did not evaluate the effect of long uses of ginger oil, we recommended the next research to examine it.

Funding

The material used in this study was 50 bottles of patent ginger oil, with commercial name varash, sponsored by PT Saddan Nusantara.

Conflict of interest

The author declares no conflict of interest.

References

1. Ju H, Jones M, Mishra G. The prevalence and risk factors of dysmenorrhea. Epidemiol Rev. 2014;36:104–13.
2. Joshi T, Patil A, Kural M, et al. Menstrual characteristics and prevalence of dysmenorrhea in college going girls. J Fam Med Prim Care. 2015;4:426.
3. Shah M, Monga A, Patel S, et al. A study of prevalence of primary dysmenorrhea in young students—a cross-sectional study. Health J Indian Assoc Prev Soc Med. 2013;4:30–4.
4. Ryan SA. The treatment of dysmenorrhea. Pediatr Clin North Am. 2017;64:331–42.
5. Ricciotti E, Fitzgerald GA. Prostaglandins and inflammation. Arterioscler Thromb Vasc Biol. 2011;31:986–1000.
6. Mohamed EM. Epidemiology of dysmenorrhea among adolescent students in assiut City. Egypt. life Sci J. 2012;66:37–9.
7. Roberts S, Hodgkiss C, DiBenedetto A, et al. Dysmenorrhea in young women. Nurse Pract. 2012:47–52.
8. Söderman L, Edlund M, Marions L. Prevalence and impact of dysmenorrhea in Swedish adolescents. Acta Obstet Gynecol Scand. 2019;98:215–21.
9. Zafar M, Sadeeqa S, Latif S, et al. Pattern and prevalance of menstrual disoreders in adolescents. Int J Pharm Sci Res. 2018;9:2088–99.
10. Ortiz MI. Primary dysmenorrhea among Mexican university students: prevalence, impact and treatment. Eur J Obstet Gynecol Reprod Biol. 2010;152:73–7.
11. Abdel-Salam DM, Alnuman RW, Alrwuaili RM, et al. Epidemiological aspects of dysmenorrhea among female students at Jouf University, Saudi Arabia. Middle East Fertil Soc J. 2018;23:435–9.
12. Kashani L, Mohammadi M, Heidari M, et al. Herbal medicine in the treatment of primary dysmenorrhea. J Med Plants. 2015;14:1–5.
13. Yu A. Complementary and alternative treatments for primary dysmenorrhea in adolescents Abstract: Primary dysmenorrhea is the most common gynecologic complaint among. Nurse Pract. 2014.
14. Shanthi L, Venketesan L. Effectiveness of Ginger tea on dysmenorrhea among college students. Int J Appl Res. 2016;2:669–71.
15. Ozgoli G, Goli M, Moattar F. Comparison of effects of ginger, mefenamic acid, and ibuprofen on pain in women with primary dysmenorrhea. J Altern Complement Med. 2009;15:129–32.
16. Lem H, Lee A. The effectiveness of ginger compress on non-specific low back pain. J Fundam Appl Sci. 2017;9:1173–86.
17. Karomika A, Yuniastuti A, Rahayu RSR. The comparison in the effectiveness of warm and ginger compresses to the menstruation pain toward the students of Smk 2 Al-Hikmah 1 Sirampog. Public Heal Perspect J. 2019;4:179–87.
18. Tritanti A, Pranita I. The making of red ginger (*Zingiber officinale* rovb. var. rubra) natural essential oil. J Phys Conf Ser. 2019;1273.
19. De Sanctis V, Soliman A, Bernasconi S, et al. Primary dysmenorrhea in adolescents: Prevalence, impact and recent knowledge. Pediatr Endocrinol Rev. 2015;13:512–20.
20. Petraglia F, Bernardi M, Lazzeri L, et al. Dysmenorrhea and related disorders. F1000Research. 2017;6:1–7.
21. Bani S, Hasanpour S, Mousavi Z, et al. The effect of rosa damascena extract on primary dysmenorrhea: a double-blind cross-over clinical trial. Iran Red Crescent Med J. 2014;16:1–6.
22. Adib Rad H, Basirat Z, Bakouei F, et al. Effect of Ginger and Novafen on menstrual pain: a cross-over trial. Taiwan J Obstet Gynecol. 2018;57:806–9.
23. Williamson A, Hoggart B. Pain: a review of three commonly used pain rating scales. J Clin Nurs. 2005;14:798–804.
24. Nur R, Demak IPK, Radhiah S, et al. The effect of moringa leaf extracton increasing hemoglobin and bodyweight in post-disaster pregnant women. Enfermería Clínica. 2020;30:79–82.
25. Nur R, Fitrasyah SI, Mallongi A. Women's reactions and health disorders caused by abuse during the pregnancy-postpartum period. Med Leg Updat. 2020;20:1329–34.
26. Astari RY. Effect of warm compress, ginger drink and turmeric drink on the decrease in the degree of menstrual pain. J KEBIDANAN. 2020;10:67–73.
27. Kashefi F, Khajehei M, Tabatabaeichehr M, et al. Comparison of the effect of ginger and zinc sulfate on primary dysmenorrhea: a placebo-controlled randomized trial. Pain Manag Nurs. 2014;15:826–33.
28. Shirvani MA, Motahari-Tabari N, Alipour A. The effect of mefenamic acid and ginger on pain relief in primary dysmenorrhea: a randomized clinical trial. Arch Gynecol Obstet. 2015;291:1277–81.
29. Nur R, Sese RGC, Patui NS, et al. Detection mapping of women with high-risk pregnancy in antenatal care in Kamonji public health center, Palu City, Indonesia. Syst Rev Pharm. 2020;11:642–7.
30. Rosmala NA, Indah KD, Fadliah, et al. Early age married and impact of healt reproduction women. J Eng Appl Sci. 2019;14:981–6.
31. Pradeep R, Devi RG, Jyothipriya A. Effect of raw ginger and ginger oil on pain. J Pharm Res. 2019;12:743–5.
32. Berkley K. Primary dysmenorrhea: an urgent mandate. Pain Clin Updat. 2013;1(1.).