

EFFECT OF VIBRATION AND HEAT COMBINATION ON PRIMARY DYSMENORRHEA

¹Mansoureh Hoseini, ²Sheida Rafieezadeh Gharah Tapeh, ³Azam Jahazi.

¹Master science of Nursing, A Faculty Member of Islamic Azad University, Gorgan Branch, Islamic Azad University, Gorgan Branch, Department of Nursing, Gorgan, Iran.

²Bachelor science of Nursing, A member of Young Researcher Club, Islamic Azad University, Gorgan Branch, Gorgan, Iran.

³Master science of Midwifery, A faculty member of Islamic Azad University, Gorgan Branch, Islamic Azad University, Gorgan Branch, Department of Midwifery, Gorgan, Iran.

Background: Primary dysmenorrhoea is a common, idiopathic, chronic pelvic pain syndrome, with unknown aetiology which about 50% of women with regular menstrual period suffer. This study was designed to determine the effect of vibration and heat on primary dysmenorrhea. **Materials and Methods:** In this clinical trial, 75 female students aged 18-22 years old were evaluated for two menstrual cycles. At the first cycle the participants received the routine pain-relief method (synthetic or herbal medicine and traditional remedies). At the second cycle for each participant combined vibration-heat device was applied for ten minutes during menstrual pain. The average of perceived leg pain, lumbar pain and abdominal pain scores at two cycles were determined. The data were analyzed based on Wilcoxon and T tests by using SPSS (v 16.0) for Windows. **Results:** The average of all perceived pain scores at two cycles were significantly different before pain relief and after both routine methods and using the device ($p < 0.001$). Those were more significantly reduced after using the device in comparison of using routine methods ($p < 0.001$). **Conclusion:** Since “vibration-heat” is an effective pain relief method, it can be used as a complementary alternative medicine in primary dysmenorrhea reduction.

Keywords: Vibration; Heat; Dysmenorrhea; vibration.

INTRODUCTION

Primary dysmenorrhoea is a common, idiopathic, chronic pelvic pain syndrome, with unknown aetiology.¹ It is a frequently occurring condition affecting a large proportion of young women. The highest prevalence has been reported in adolescent women, where as many as 50–75% suffer from dysmenorrhoea.²⁻⁷ Dysmenorrhea is one of the major factors that decreases young women's quality of life and social activities specially if such symptoms as headache, fatigue, nausea, vomiting, diarrhea, irritation, shivering and muscle cramps are involved.⁸ About 15% of

adolescent and young women describe their dysmenorrhoea as severe, causing regular absenteeism from school and work.⁸⁻¹¹ This monthly disability, which interferes with daily work several days each cycle, has been estimated to account for 600 million lost working hours and two billion dollars in lost productivity annually in the USA.¹² Effective management of dysmenorrhoea is beneficial for both the afflicted individual and society.

Systematic reviews and randomised controlled trials have shown that non steroidal anti-inflammatory drugs¹³⁻¹⁷ and hormonal regulation through oral contraception¹⁸ are significantly more effective for pain relief than placebo and are often used for symptom control.^{19,20} However, some women may not always find them effective or acceptable. For example, owing to side effects in the case of non-steroidal anti-inflammatory drugs.¹³ Non-drug treatments, including alternative and physical Therapies such as topical heat, herbal medicine, thiamine, vitamin E, fish oil, vegetarian diet, low fat diet, acupuncture, acupressure and

Address of Correspondence:

Azam Jahazi

Master science of Midwifery, A faculty member of Islamic Azad University, Gorgan Branch, Department of Midwifery, Gorgan, Iran.

Email: ajahazi@gmail.com

transcutaneous electrical nerve stimulation (TENS) are increasingly being used for dysmenorrhoea.²¹

In different studies the effect of TENS on primary dysmenorrhea,²² the effect of vibration on chronic backache,²³ and toothache were identified.²⁴ Vibration, moderate or fast percussions and also deep pressure on painful spots are pain relievers in dysmenorrhea.²⁵ A research on self-treatment patterns of young girls for dysmenorrhea management showed that they use heat to decrease their pain.²⁶ Another research study on the effect of physical activity on dysmenorrhea showed that dysmenorrhea prevalence in the athletic group was 3.2% less than non-athletic group.²⁷

The above mentioned problems of this disorder and calls for its treatment prompted the researcher and her colleagues to study the effect of vibration and heat combination on dysmenorrhea among the students of Islamic Azad University, Gorgan Branch.

MATERIALS AND METHODS

Study design, setting and subjects: This is a clinical trial conducted between Jun 2009 and March 2010 in the girls' dormitory of Islamic Azad University of Gorgan (a city located in the north of Iran). Seventy five 18-22 year-old girls with a mediocre dysmenorrhea not having any cardiovascular disease, severe anemia, chronic headache, precedent pelvic surgery, secondary dysmenorrhea and not being married were studied. The sampling was purposeful and voluntary.

Instruments

Demographic questionnaire, pain ruler and vibration-heat device were used. Demographic questionnaire consists of two-part: 1-demographic characteristics (age, field of study, menarch age, menstruation interval and the length of period) and 2- clinical characteristic of dysmenorrhea (leg pain, lumbar pain, abdominal pain). Vibration-heat device vibrates with a frequency of 50 (Hz) and heats up to 38 degrees in Celsius for ten minutes. It is a portable, light weight (w=424gr) and a safe device and is used as a belt on the abdomen. Anti-dysmenorrhea 08 device with registration no.58420 is from General Department for Registration of Companies and Industrial Ownership (General Department for Registration of Documents and Landed Properties).

Data collection

During dysmenorrhea, participants were asked to express their pain severity on a scale of 0-10 on the pain ruler, with 0 meaning no pain and 10 meaning the most severe pain that an individual might experience.

Each individual was studied for two continuous menstrual periods. In both periods participants filled out the checklists. On the first period, no intervention was made by researchers and participants were asked to fill out the questionnaire according to the severity of pain before and after using routine methods for relief (synthetic medicine (Ibuprofen, Mefenamic Acid, Hyoscine), herbals such as oxtongue boile, solution of rock candy in hot water and homemade treatments such as heating, massaging and holding legs into belly). On the second period, they were asked to use vibration-heat device for ten minutes each time when the menstrual pain began and they were told to use the device at a maximum of three times for each pain. They were told to avoid using other pain-relief methods as long as possible but, if necessary, they could use other methods. In the latter case they had to mention the type, the quantity and the length of that method.

Participants were referred to a gynecologist for a pelvic ultrasonography to make sure that there was not some pathologic factor in uterus and ovaries (i.e. myoma, ovarian cyst).

The study was approved by the Islamic Azad University, Gorgan branch, Medical Sciences Research committee. The record number of study in clinical trial site of IRAN is as IRCT: 201102195866N1. Written informed consent was obtained from the participants before enrollment. All ethics were observed in this study following Helisinki Ethics.

Data analysis

Data were analyzed based on Wilcoxon and T tests using SPSS (v 16.o) for Windows. The confidence level was rated 95%.

RESULTS

Seventy five students were studied in two cycles, 43% of whom were 20 years old, 82% were Fars natives and 18% were Torkman natives. All of participants were single. The subjects mostly studied basic science, humanities and medical science respectively. Menarche age of 42% of them was 13 years old. Minimum interval between two periods was 21 days and maximum interval was 40 days. Forty five percent of them had a 28 day interval.

The shortest menstrual duration was 5 days and the longest was 9 days and 53% of participants had a 7 days menstrual duration.

The average of perceived pain score at two cycles was significantly different before using pain relief and after using both routine methods and the device ($P<0.001$). It was more significantly reduced after using the device in

comparison of using routine methods ($P < 0.001$). Tables 1-3 show more details of the results.

While using the device, most of the sample (53%) mentioned no side effect. A slight redness of skin was reported in 8% of sample.

Table 1

Comparison of the average of pain severity before and after routine methods (control group)

| Variable | Before pain relief | After routine methods |
|----------------|--------------------|-----------------------|
| Leg pain | 4.52 | 3.45 |
| Lumbar pain | 5.25 | 4.08 |
| Abdominal pain | 6.26 | 4.75 |
| Total | 5.34 | 4.09 |

$p < 0.001$ (Wilcoxon test)

Table 2

Comparison of the average of pain severity before and after using the device (control group)

| Variable | Before pain relief | After using device |
|----------------|--------------------|--------------------|
| Leg pain | 2.93 | 4.52 |
| Lumbar pain | 3.34 | 5.25 |
| Abdominal pain | 4.05 | 6.26 |
| Total | 3.44 | 5.34 |

$p < 0.001$ (Wilcoxon test)

Table 3

Comparison of the average of pain severity between routine methods and using the device

| Variable | After routine methods | After using device |
|----------------|-----------------------|--------------------|
| Leg pain | 2.93 | 3.45 |
| Lumbar pain | 3.34 | 4.08 |
| Abdominal pain | 4.05 | 4.75 |
| Total | 3.44 | 4.09 |

$p < 0.001$ (T-test)

DISCUSSION

A study on the effects of TENS as a treatment for primary dysmenorrhea among students of Medical Science University of Tehran showed that using TENS alone in the case group had a remarkable decrease in pain in 65% of participants in comparison with control group (24%) and there was considerable decrease in dysmenorrhea symptoms. Due to the results of that study, TENS is a safe, effective and nonopioid treatment of primary dysmenorrhea.¹⁹ Studying the effect of acupressure on Saninjiao spot and Ibuprofen on primary dysmenorrhea on students showed that the severity of the pain after treatment in the first and second month hadn't a

significant difference, but the severity of pain before and after treatment by acupressure and Ibuprofen had a significant difference.²⁸ In this study the average severity of leg pain, lumbar pain and abdominal pain during the first time before using routine treatments and the device was 5.34, while the average after using routine treatments decreased to 4.09 and after using device to 3.44. Studying the effect of physical activity on dysmenorrhea comparing 250 students of Tarbiat Mo'alem and 250 students of Physical Education showed that dysmenorrhea prevalence was more than 75% in each group. Dysmenorrhea prevalence in the physical education group was 2.4% less than Tarbiat Mo'alem group. Prevalence of dysmenorrhea in athletic group was 3.2% less than non-athletic group. Prevalence and severity of dysmenorrhea in athletic individuals significantly decreased.²⁷ Study on backache reduction showed vibratory exercises in comparison with tensive exercises had a significant statistical relation to chronic backache relief.²⁰ Studying the effect of heat with Acetaminophen showed when heat was used with Acetaminophen, pain was decreased for a longer time and topical heat would decrease dysmenorrhea.²⁹ Data gathered in this study showed vibration with heat had results similar to physical exercise or other treatments such as using synthetic medicine, herbal medicine and that traditional remedies can be effective in decreasing dysmenorrhea. Results of this study showed vibration is a safe, non-invasive, non-drug way and also during this research no considerable side effects were observed or reported. Only a slight side effect, that is, a moderate topical redness of skin was observed in 8% of participants. In this study, also, on the phase using routine methods and on the second phase using the device, a significant decrease was observed, therefore, using the vibration-heat device was shown to be more effective in pain relieving in comparison with routine methods. A Study on the effect of topical pressure and vibration on muscular pain showed, when pressure is used with vibration, it would decrease the pain by 11%. Vibration can block the function of vast neurological fibers and sciatic nerve and relieve the pain.³⁰⁻³² The effect of vibration on the pain reduction in the mentioned study confirms vibratory effect of the vibration device on pain reduction in our research.

CONCLUSION

Because this method is safe, it may be used with common medicines or as an alternative treatment for dysmenorrhea. Since this is the first study on the relationship between vibration-heat and dysmenorrhea, it is recommended in future

studies should be done on different nationality groups, other age classes and married individuals.

ACKNOWLEDGEMENT

We wish to thank the Research deputy of Islamic Azad University, Gorgan Branch, Young Researchers Club of Islamic Azad University, Gorgan Branch, Students participating in this study and all those who helped us. We would also like to thank very much, Mr. shahin Hosseinian MA in English, Mr. Reza Mokaram Ms in Statistics and Dr. Zohre Montazeri, gynecologist .

References:

1. Khan KS, Champaneria R, Latthe PM. How effective are non-drug, non-surgical treatments for primary dysmenorrhoea? *BMJ* 2012;344:e3011 doi: 10.1136/bmj.e3011
2. Campell MA, McGrath PJ. Use of medication by adolescents for the management of menstrual discomfort. *Arch Pediatr Adolesc Med* 1997;151:905–913.
3. Andersch B, Milsom I. An epidemiologic study of young women with dysmenorrhea. *Am J Obstet Gynecol* 1982a;144:655–660.
4. Robinson JC, Plichta S, Weisman CS, Nathanson CA, Ensminger M. Dysmenorrhea and the use of oral contraceptives in adolescent women attending a family planning clinic. *Am J Obstet Gynecol* 1992;166:578–583.
5. Davis AR, Westhoff CL. Primary Dysmenorrhea in Adolescent Girls and Treatment with Oral Contraceptives. *J Pediatr Adolesc Gynecol* 2001;14:3–8.
6. Harlow SD, Campell OM. Epidemiology of menstrual disorders in developing countries: a systematic review. *BJOG* 2004;111:6–16.
7. Harlow SD, Park M. A longitudinal study of risk factors for the occurrence, duration and severity of menstrual cramps in a cohort of college women. *Br J Obstet Gynaecol* 1996;103:1134–1142.
8. Burnett MA, Antao V, Black A, Feldman K, Grenville A, Lea R, Lefebvre G, Pinsonneault O, Robert M. Prevalence of primary dysmenorrhea in Canada. *J Obstet Gynaecol Can* 2005;27:765–770.
9. Sundell G, Milsom I, Andersch B. Factors influencing the prevalence and severity of dysmenorrhea in young women. *Br J Obstet Gynaecol* 1990; 97:588–594.
10. Harlow SD, Ephross SA. Epidemiology of menstruation and its relevance to women's health. *Epidemiol Rev* 1995;17:265–286.
11. Dawood MY. Primary dysmenorrhea—advances in pathogenesis and management. *Obstet Gynecol* 2006;108:428–441.
12. Coco AS. Primary dysmenorrhea. *Am Fam Physician* 1999;60: 489–498.
13. Marjoribanks J, Proctor M, Farquhar C, Sangkomkarn US, Derks RS. Nonsteroidal anti-inflammatory drugs for primary dysmenorrhoea. *Cochrane Database Syst Rev* 2003;4: CD001751.
14. Nor Azlin MI, Maryasalwati I, Norzilawati MN, Mahdy ZA, Jamil MA, Zainul Rashid MR. The efficacy of etoricoxib vs mefenamic acid in the treatment of primary dysmenorrhoea: a randomised comparative trial. *J Obstet Gynaecol* 2008;28:424-6.
15. Barbosa ICF. Comparative study of the efficacy and safety of valdecoxib and piroxicam in the treatment of patients with primary dysmenorrhoea. *Revista Brasileira de Medicina* 2007;64:318-22.
16. Daniels S, Gitton X, Zhou W, Stricker K, Barton S. Efficacy and tolerability of lumiracoxib 200mg once daily for treatment of primary dysmenorrhoea: results from two randomized controlled trials. *J Women Health* 2008;17:423-37.
17. Daniels S, Robbins J, West CR, Nemeth MA. Celecoxib in the treatment of primary dysmenorrhoea: results from two randomized, double-blind, active- and placebo-controlled, crossover studies. *Clin Ther* 2009;31:1192-208.
18. Wong CL, Farquhar C, Roberts H, Proctor M. Oral contraceptive pill for primary dysmenorrhoea. *Cochrane Database Syst Rev* 2009;4:CD002120.
19. Daniels JP, Khan KS Chronic pelvic pain in women. *BMJ* 2010;341:c4834.
20. Vercellini P, Vigano P, Somigliana E. The role of the levonorgestrel-releasing intrauterine device in the management of symptomatic endometriosis. *Curr Opin Obstet Gynecol* 2005;17:359-65.
21. French L. Dysmenorrhea. *American Family Physician*. 2005; 71(2): 292.
22. Robotjazi M. Influence of skin electrical nerve stimulation on primary dysmenorrhea among Tehran University of Medical Sciences [MSD thesis]. Tehran: TUMS;1997.
23. Rittweger J, Just K, Kautzsch K, Reeg P, Felsenberg D. Treatment of chronic lower back pain with lumbar extension and whole body vibration exercise: a randomized controlled trial. *Spine* 2002; 27(17):1892-34.
24. Hutchins HS, Young FA, Lackland DT, Fishburn CP. The effectiveness of topical anesthesia and vibration in alleviating the pain of oral injections. *Anesthesia Progress* 1997 ;44(3):87-9.
25. Pursell C. *American Technology*. England:Wiley-Blackwell; 2001.
26. O'Connell K, Davis AR, Westhoff C. Self-treatment patterns among adolescent girls with

- dysmenorrhea. *J Pediatr Adolesc Gynecol* 2006; 19(4):285-9.
27. Tirgartabri S. The physical activities on dysmenorrhea of 250 sport students and 250 teacher students [MSD thesis]. Kerman: Kerman University of Medical Sciences; 1996.
28. Suhrabi Z, Tadayon M, Javadifar N. Comparison of pressure effect on Sanyinjiao point with that of Ibuprofen on primary dysmenorrhea. *J of IUMS* 2006; 2(14): 30-35. [In Persian, English abstract]
29. Akin M, Price W, Rodriguez GJr, Erasala G, Hurley G, Smith RP. Continuous, low-level, topical heat wrap therapy as compared to acetaminophen for primary dysmenorrhea. *J Reprod Med* 2004; 49(9):739-45.
30. Bakhtiary AH, Safavi-Farokhi Z, Aminian-far A. Influence of vibration on delayed onset of muscle soreness following eccentric exercise. *Br J Sports Med* 2007;41:145-8.
31. Weerakkody NS, Percival P, Hickey MW, Morgan DL, Gregory JE, Canny BJ, et al. Effects of local pressure and vibration on muscle pain from eccentric exercise and hypertonic saline. *Pain* 2003;105(3):425-35.
32. Kakigi R, Shibasaki H. Mechanisms of pain relief by vibration and movement. *J Neurol Neurosurg Psychiatry* 1992; 55(4):282-6.



This work is licensed under
a Creative Commons Attribution