

Original Research Article

Effect of transcutaneous electrical Nerve stimulation on pain in subjects with primary dysmenorrhea

Vrunda Patel^{1*}, Megha Sheth², Neeta Vyas³

¹P.G. Student, ²Lecturer, ³Principal

SBB College of Physiotherapy, VS Hospital Campus, Ahmedabad, Gujarat, India

*Corresponding author email: vrundapatel892@gmail.com

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Abstract

Background: Low back pain and pelvic pain are most common symptoms of Primary dysmenorrhea. Most commonly used treatments are pharmacological drugs. TENS has been found to be effective for primary dysmenorrhea according to Parisa P. Transcutaneous Electrical Nerve Stimulation (TENS) can be given in pre-menstrual days or during menstrual cycle and in both phases TENS has been shown to be effective. So this study was done to see and compare the effect of TENS in primary dysmenorrhea in both phases.

Aim: The present study aimed at assessing effect of Transcutaneous Electrical Nerve Stimulation on Pain in Subjects with Primary Dysmenorrhea.

Materials and methods: A quasi-experimental study was conducted in community of Ahmadabad. Non athletic females between 18-25 years of age, diagnosed with primary dysmenorrhea with regular menstrual cycle and no other medical conditions were included in this study. 30 subjects included by convenience sampling were randomly divided in 2 groups. Both groups were given 20 minutes of TENS, to back over para spinal region (L₅-S₁) at 100 Hz frequency with 80 μs at comfortable intensity, once daily for 3 days. One of 2 groups was treated on three premenstrual days and other group was treated at same dose during initial three days of menstrual cycle. Outcome measure used was visual analogue scale. Level of significance was kept at 5%.

Results: Wilcoxon test was used to compare mean preVAS, 5.36±1.652 and postVAS, 2.85±1.711, in group A (W/z= -3.413, p= 0.001). Wilcoxon test was used to compare mean preVAS 4.61±1.187 and postVAS 2.77±1.102, in group B (W/z= -3.408, p= 0.001). Mean difference between group A and B was 2.17± 0.87. Applying Mann-Whitney U Test (U= 63.500, p=0.042) showed significant difference between groups.

Conclusion: Use of TENS for 3 days before or during menstrual cycle is effective in reducing pain. However use of TENS in premenstrual phase is more effective for reducing pain.

Key words

Primary Dysmenorrhea, Transcutaneous Electrical Nerve Stimulation, Visual Analogue Scale, Pelvic and Back pain.

Introduction

“Dysmenorrhea” is derived from a Greek root translating to difficult menstrual flow [1]. Dysmenorrhea is the most prevalent, periodical pelvic pain. Dysmenorrhea, or painful menstruation, affects 52.96% of post pubescent women with 10% of these women incapacitated for one to three days per month [1]. Primary dysmenorrhea is a common debilitating factor in most of the adolescent girls. It is a major cause of inability to concentrate on their work or studies, class or school absenteeism, inability to perform in their academic activities [2, 3]. Dysmenorrhea appears in two forms: primary and secondary [1].

Primary dysmenorrhea is defined as pain during menstruation that is not the result of a macroscopic pelvic pathological condition; i.e., the woman has had a normal pelvic examination [1]. Secondary dysmenorrhea is menstrual pain associated with underlying pelvic pathology such as endometriosis [2]. Primary dysmenorrhea starts some hours before menstruation and continues up to 12-72 hours and symptoms like occurrence of pains along with cramps in the lower abdomen radiating toward the inner side of the thighs [1, 2]. Half of such cases experience systemic symptoms, such as nausea, vomiting, diarrhea, fatigue, irritability, and dizziness. Low back pain and pelvic pain are most common symptoms of primary dysmenorrhea [2]. Most commonly used treatments for this are pharmacological drugs such as NSAIDs and oral contraceptive pills but there are several side effects which cannot be neglected so that now a day's non-pharmacological treatment is preferred for primary dysmenorrhea [3].

Transcutaneous electrical nerve stimulation (TENS) is an application of a pulsed rectangular wave current via surface electrodes on the patient's skin. This current is often generated by small battery operated machines in which circuits modify battery output in such a way that it will have a stimulatory effect. TENS' pulse width is from 50 μ s through 300 μ s and frequency can be as low as 2 Hz or as high as 600 Hz [4]. The wide range of variation in pulse width, frequency and intensity which is between 0 to 60 mA gives great flexibility in terms of treatments applied to patients with chronic pain syndromes [5].

TENS has been found to be highly effective for primary dysmenorrhea according to Manisha M (2015) [4], Parisa P (2013) [1] and others. TENS can be given in pre-menstrual days or during menstrual cycle and in both phases TENS has been shown to be effective [1-3]. Few studies have seen the difference in the effect of TENS, during or before menstruation. So the aim of this study was to compare the effect of TENS during pre-menstrual phase and in initial menstrual phase of menstruation in females with dysmenorrhea.

Materials and methods

A quasi-experimental study was conducted at the college of physiotherapy, Ahmedabad. Thirty subjects were included by convenience sampling who were randomly allocated in two groups using envelope method. The inclusion criteria were females aged between 18-30 years, having regular menstrual cycle but with primary dysmenorrhea, who were non athletic, taking or not taking specific drugs, not doing regular exercises. Females with irregular menstrual cycle, secondary dysmenorrhea, abnormal

vaginal bleeding or exercising regularly were excluded.

Both groups were given 20 minutes of TENS at 100 Hz frequency and 80 μ s pulse duration at comfortable intensity, once daily for 3 days. Group A was treated during 3 premenstrual days. Group B was treated during initial 3 days of menstrual cycle. Outcome measure used was visual analogue scale.

Subjects lay in prone position with a thin pillow placed under their abdomen. Two electrodes were placed on the proximal margin of low back area at L5, and two others were placed proximal to the gluteal region (S1) laterally. The intensity of stimulation was increased up to the tolerated

level without causing any contraction or discomfort [12, 13].

Results

Mean preVAS in group A was 5.36 ± 1.65 and postVAS for group A was 2.85 ± 1.71 . Applying Wilcoxon test ($W/z = -3.41$, $p = 0.001$) showed significant difference. Mean preVAS in group B was 4.61 ± 1.18 and postVAS for group B was 2.77 ± 1.10 . Applying Wilcoxon test ($W/z = -3.40$, $p = 0.001$) showed significant difference (**Table - 1**). Mean difference between groups A and B was 2.17 ± 0.87 . Applying Mann-Whitney U Test ($U = 63.50$, $p = 0.042$) showed significant difference between groups as per **Table - 2**.

Table - 1: Within group difference in Mean VAS scores in Groups A and B.

Groups	Mean PreVAS	Mean PostVAS	W/z value	P value
Group A	5.36 ± 1.65	2.85 ± 1.71	-3.413	0.001
Group B	4.61 ± 1.18	2.77 ± 1.10	-3.408	0.001

Table - 2: Between group analyses of difference in mean VAS scores.

Mean difference in VAS	U value	P value
2.17 ± 0.87	63.5	0.041

Discussion

Dysmenorrhea is a chronic, cyclic pelvic pain associated with menstruation. Medical therapy for dysmenorrhea commonly consists of non-steroidal anti-inflammatory drugs or the oral contraceptive pill both of which works by reducing myometrial (uterine muscle) activity [6]. TENS is the application of electrical stimulation to the skin for pain control and is a non-invasive, self-controlled, drug-free method of pain relief. The TENS also stimulates the body to produce higher levels of its own natural pain killing chemicals called endorphins and enkephalin. TENS appears to work by blocking efferent pain stimuli [7].

TENS is an appropriate method to control dysmenorrhea. The mechanism of the effect of TENS on primary dysmenorrhea is also based on

the pain gate theory [8]. In addition, skin stimulation causes local vasodilatation in the same dermatome area. Therefore, the pain-relieving effect of TENS on primary dysmenorrhea is also to reduce muscle ischemia of the uterus through increased blood flow to the corresponding skin area [9]. KaDlan B [10] in a study on sixty-one women who suffered from primary dysmenorrhea, who were treated with transcutaneous Nerve Stimulation (TENS) for two menstrual cycles, reported the effect of the treatment on their pain. Thirty percent of the patients reported marked pain relief and 60% reported moderate pain relief. They concluded that TENS is an effective and safe non-pharmacological means for the treatment of primary dysmenorrhea [10].

Tugay N (2007) [11] compared effectiveness of TENS and interferential current on primary dysmenorrhea. Their results support that using TENS and interferential current (IFC) both could be efficient in pain reduction among women with primary dysmenorrhea. There were no differences in the magnitude of analgesia between IFC and TENS [11].

The present study shows that use of TENS for 3 days before and during menstrual cycle is effective in reducing pain. The results of this study indicate that TENS is effective in reducing dysmenorrheal symptoms mainly lower back pain and pelvic pain. No adverse effects were observed. The finding of the present study of TENS on pain relief was supported by the previous studies [8-14]. The results showed immediate effect in pain relief after the use of TENS in initial 3 days of menstruation and also when given in pre-menstrual phase. However, the pain relief by TENS given in pre-menstrual days was more than when given in initial 3 days of menstruation.

A study by Jeffery SM [12], indicates that the TENS for premenstrual symptoms is also effective for relieving primary dysmenorrhea similar to present study. These findings are in agreement with Deborah L [13] who suggests that TENS given by placing electrodes on acupuncture points for bladder and uterus which are on lower back (L5-S1) decreases menstrual pain even given before menstrual cycle [13]. Dawood and Ramos J [14] have done a randomized four-way crossover study, 32 women with primary dysmenorrhea were treated with transcutaneous electrical nerve stimulation (TENS) for two cycles, TENS for one cycle, or ibuprofen 400 mg four times a day for one cycle. The TENS setting used was 100 pulses per second with 100-microsecond pulse widths and they demonstrated that TENS given during menstrual days provided good to excellent subjective pain relief and significantly reduced menstrual flow, diarrhea, clot formation, and fatigue [14].

Smith and Heltzel [15] also investigated the effect of TENS on dysmenorrhea and found it to be helpful in reducing the pain by altering the body's ability to receive or perceive the pain signal [15]. This is seen in the present study too. JOGC clinical practice guidelines, December 2005 also includes TENS as an effective tool for treating primary dysmenorrhea [16]. In clinical use, treatment choice depends on factors including practical use, expense, accessibility and efficacy. TENS machines are relatively inexpensive, portable, and easy to use safe devices [17]. Patients can be trained to use TENS themselves and they can self-administer TENS. The results of this trial indicated that TENS is a safe, effective, non-medication method for managing primary dysmenorrhea.

Conclusion

This study concludes that use of TENS for 3 days before and during menstrual cycle is effective in reducing pain. However use of TENS in premenstrual phase is more effective for reducing pain.

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