

## TRANSCUTANEOUS ELECTRICAL NERVE STIMULATION: AN EFFECTIVE THERAPY TO WOMEN FOR PAIN MANAGEMENT AFTER VAGINAL DELIVERY

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### ABSTRACT

**Objective:** To determine the effectiveness of Transcutaneous Electrical Nerve Stimulation for pain control after vaginal delivery.

**Material & Methods:** It was a single blind experimental design carried out at different hospitals of Gujarat city including from February to April 2017. A total of sixty healthy females who delivered via vaginal route were randomly assigned with the help of coin tossing to the placebo group (sham intervention) and the experimental group (TENS group). To compare both the groups at the end of treatment, independent t-test was applied.

**Results** The mean age of females in experimental and sham therapy groups were  $31.54 \pm 3.74$  years and  $33.42 \pm 3.52$  years, respectively. There was no differences when patients in both groups were compared. However, significant differences were observed when both the groups were compared on frequency of taking analgesics. In experimental group, there was no need of taking analgesics by 19 females, 5 females needed single dose and only 2 females needed double dose of analgesics. In control group 3 females needed no analgesics, 12 females needed single dose and 9 females needed double dosage of analgesics.

**Conclusion:** The effects of TENS on pain reduction following vaginal delivery are promising and it can decrease the frequency of taking analgesics.

**Key Words:** Analgesics, Electrotherapy, Pain, Pregnant, Physiotherapy.

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### INTRODUCTION

Intense pains always have daunting challenges to medicine specially when there is a need of prescribing medication to pregnant or lactating mothers. Most of the time pain resolves if the noxious stimulus is removed or medication for its management is applied.<sup>1,2</sup> However, sometimes it may take long despite of the removal of the stimulus.

Though postpartum pain is normal response, yet it can be unpleasant for most of the women.<sup>3</sup> However, relief and control of labor pain is the basic need of the clients and clinicians as it can significantly contribute to the well-being of

mother and fetus. Drugs, epidural analgesia, localized anesthesia, invasive methods and non-invasive as transcutaneous and complementary therapies e.g. aromatherapy and water immersion which are used during or after labor to reduce pain.<sup>4-6</sup>

Birth pain is a set of uterine contraction and its severity and duration is the result of natural delivery process.<sup>7</sup> Uterine contractions remain constant within few hours after child birth and it has been reported that post child delivery contraction of uterine wall is almost the same as giving birth to a child.<sup>8</sup> Pain is transmitted through visceral afferent stretching in spinal cord which might be managed by applying some

of the modalities used in physical therapy. In obstetric the use of TENS was reported in Scandinavia in 1970s and was used as non-invasive intervention to reduce pain.<sup>9</sup> Literature provides evidence that most of the researchers used TENS during labor to save the energy of delivering woman for pushing the fetus during second stage of the labor.<sup>8, 10</sup>

Usually TENS is applied by means of electrodes placing over appropriate points in the skin, that transmit electrical current through the skin.<sup>11</sup> This may cause the recruitment of afferent fibers in posterior horn of spinal cord which prevent the activation of pain conducting fibers and nerve impulse and therefore stimulating the release of opioids that are responsible for pain reduction.<sup>12, 13</sup> TENS is now on the agenda for postoperative pain management and its method is based on the application of superficial skin electrodes that emit an electric current that attenuates the perception of pain. Because TENS can relieve pain, it can help prevent the side effects associated with pharmacological analgesia.<sup>14</sup> TENS is preferably used because analgesics can cause or be transmitted to maternal side effects including vomiting, nausea, sedation, constipation, respiratory depression, and lactation problems.<sup>15</sup>

The use of TENS for treatment of pain during labor has been reported, however, little work has been done on its effectiveness in managing pain following vaginal delivery. Therefore, this study was conducted to evaluate the effectiveness of TENS by comparing two selected groups of women who had vaginal delivery and reduction in the need of analgesics.

### **MATERIAL AND METHODS**

This was a single blind randomized controlled trial carried out from February 2014 to April 2014. All women who had normal vaginal delivery and aged 20 to 40 were invited to participate in this trial. Women who have diabetes mellitus, hypertension, malignancies and with any skin disease were excluded. All willing participants were recruited and were randomly allocated into experimental and sham therapy groups on the basis of randomization i.e. coin tossing and each group contains 30 subjects.

The study was approved by research/ethical committee of Riphah International University and further approval was taken from hospitals of Gujrat city including Aziz Bhatti Shaheed Hospital (DHQ), Al-Shifa Hospital and City Hospital. Afterwards objective of the research was explained to the patients and their caregivers and written consent was taken from the patients to show their willingness for voluntarily participating in the present study. However, participants were unaware with the purpose of the TENS and therefore they were blinded to the treatment. They were informed as it was the part of the treatment related to child birth. Small TENS unit connected with two pairs of electrodes was chosen for the study purpose. The electrodes were placed transcutaneous in symmetry to the position of uterine fundus. The position for placement of electrodes was chosen by electrode placement guide. TENS was applied as the patients were shifted into ward immediately after vaginal delivery; it was applied at 100 Hz frequency and maintained at a point at which patients felt maximum ease without any irritation. The women in sham therapy group, were applied TENS electrodes, however, no stimulation was given to them. Pain intensity was measured with the help of VAS before and after the electrode's placement. The study was limited to those females who were between 25-40 years with having no history of hypertension and diabetes mellitus. Data analysis was analyzed by SPSS version 18.0. Frequencies were reported for categorical variable, while to see pre and post differences paired t-test was applied. To evaluate the difference between the two treatments at the end of therapy session, t-test was used. P-value is less than 0.5 was considered significant.

### **RESULTS**

A total of 60 females were randomly allocated into two groups. The mean age of females in experimental and sham therapy groups were  $31.54 \pm 3.74$  years and  $33.42 \pm 3.52$  years, respectively. There were no significant differences between the two groups at baseline on age, indicating that both the groups were similar. To see the effects of TENS and sham therapy both groups, paired t-test was applied to see the pre- and post-treatment differences. Both

the groups showed significant improvement ( $p < 0.00$ ) on VAS scale. To compare both the groups at the end of treatment, independent t-test was applied. It is interesting to report that no differences were observed when patients in both groups were compared at the end of treatment sessions. One of the other outcomes measure of this trial was frequency of using analgesics in the patients of both groups. In experimental group, there was no need of taking analgesics by 19 females, 5 females needed single dose and only 2 females needed double dose of analgesics. In control group 3 females needed no analgesics, 12 females needed single dose and 9 females needed double dosage of analgesics. When independent t-test was applied to see the differences between the two groups on the frequency of taking analgesics for relieving pain, significant differences were observed. The patients in TENS group showed superior results by showing less frequent use of analgesics.

## DISCUSSION

Present study was aimed to evaluate pain reduction in females who had vaginal delivery. TENS is commonly used device in physical therapy for reduction of pain and therefore, one of the groups received this therapy for reducing pain. Following vaginal births, analgesics are commonly prescribed and taken by the patients. We aimed to find out whether application of TENS following vaginal deliveries can reduce pain or frequency of taking analgesics. One of findings of this trial showed that TENS has no effects on reducing pain following vaginal deliveries. Following a recent delivery, women are in stress and may not be able to respond properly to subjectively use measuring tools.<sup>16</sup> This might be one of the reasons that patients in both groups showed similar outcomes when compared on VAS for pain assessment following vaginal deliveries.

It is interesting to report that despite that fact that patients in both groups showed similar outcomes on pain measuring scale, patients in both groups showed significant difference when assessed on frequency of taking analgesics. The patient in experimental group achieved superior outcomes by showing reduced number of taking analgesics. Similar conclusion was developed by Maktabi et al, 2016 that female in experimental

group required less dose of painkiller compared to the patients in control group.<sup>17</sup> Moreover, in the latter comparative study, effects of promethazine and Pethidine with TENS in reducing child birth pain were evaluated and it was observed that patients in the experimental group showed improved outcomes.<sup>17</sup> In addition, the frequency of use of analgesics for relieving pain was decreased.

Although, results of the present study indicate that application of TENS in actual and sham therapy produce similar results in reducing pain when assessed on VAS, still it is debatable that the use of VAS for assessing pain at early stage may not be appropriate. It is reported for other conditions that the detection of VAS to assess pain at early stage of medical condition is less sensitive.<sup>18</sup> This might be one of the other reasons that patients in both groups in our trial showed similar results. Still the use of TENS seems to be effective as a pain reliever as the frequency of taking analgesics decreased many folds in those patients who received TENS therapy for decreasing pain. In general it is believed that the use of TENS is beneficial for decreasing pain.<sup>19</sup>

## CONCLUSION

Finding of the present study documented that TENS is a better option for relieving pain especially in women with vaginal deliveries as compared to use of analgesic. However, further research in this area is needed where women from different ethnic groups might be included.

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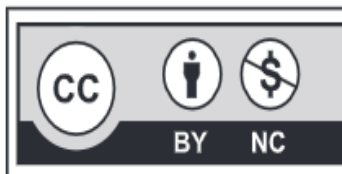
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