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• Research Article

Effectiveness of breathing exercises during the second stage of labor on labor pain and duration: a randomized controlled trial

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ABSTRACT

BACKGROUND: Some research exists on the effect of non-pharmacological approaches for labor pain relief. However, there is limited information about effectiveness of breathing exercises in pregnant women to reduce maternal pain during labor.

OBJECTIVE: To determine whether breathing exercises for pregnant women during the second stage of labor have beneficial effects on maternal pain, duration of labor, and the first-minute Appearance, Pulse, Grimace, Activity and Respiration (APGAR) scores.

DESIGN, SETTING, PARTICIPANTS AND INTERVENTIONS: This randomized clinical trial involved 250 pregnant women, who were randomly divided into two groups: intervention group (IG; n = 125) and control group (CG; n = 125). IG received one session breathing exercise training and performed breathing exercises during the second stage of labor versus the CG that did not receive any breathing exercise training.

MAIN OUTCOME MEASURES: The effects of breathing exercises on maternal pain were determined by Visual Analogue Scale (VAS), duration of the second stage of labor, and the first-minute APGAR scores.

RESULTS: The mean age of the participants was (23.2 ± 4.2) (range: 18 to 42) years. Both IG and CG had similar baseline characteristics in terms of age, education level, occupation, and smoking (P > 0.05). The mean VAS scores of IG and CG were (88.2 ± 6.3) and (90.5 ± 7.0), respectively (P < 0.001). The duration of the second stage of labor was (369.6 ± 92.0) s for IG and (440.7 ± 142.5) s for CG (P < 0.001). The mean first-minute APGAR scores were (8.84 ± 0.50) for IG and (8.73 ± 0.89) for CG (P > 0.05).

CONCLUSION: Based on this study, breathing exercises with deep inhalation and exhalation in pregnant women are effective in reducing the perception of labor pain and shortening the duration of the second stage of delivery. Therefore, we recommend breathing exercises as an effective modality for labor pain management and shortening the duration of labor.

TRIAL REGISTRATION: This study is registered on the website of ClinicalTrials.gov (www.clinicaltrials.gov) with the number of NCT03066973.

Keywords: breathing exercise; labor pain; labor time; labor pain management; visual analogue scale; randomized controlled trial

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1 Introduction

Normal, uncomplicated vaginal birth is a physiological process that is safer than cesarean section, and reduces the mother's length of hospital stay.[1] However, pain and anxiety during labor may negatively affect this physiologic process.[2,3] In cases of women who have fear regarding birthing pain and complications, cesarean delivery is preferred over vaginal delivery.[4] Maternal request is also an important factor which increases (elective) cesarean delivery rates.[5] According to the World Health Organization, the ideal cesarean rate is accepted as 10% to 15%,[6] but 45% of the babies in Turkey were born through cesarean delivery, according to community-based studies. Therefore, women in Turkey need appropriate education in order to select vaginal birth as the birth route of choice.

Labor pain management is important in reducing the rate of increased elective cesarean section. Cervical dilatation and intensive uterine contractions causes labor pain that is a progressive pain with gradually increasing severity. The pain in the first stage of labor is a visceral pain and cannot be localized well. However, in the second stage of labor, pain is more intense and well located in the lower part of the abdomen.[7] Several non-pharmacological methods can be performed to reduce labor pain. The methods of labor pain management should be simple and reliable, and should also maintain fetal hemostasis.[8] Studies have shown acupuncture and hypnosis to be beneficial for the management of pain during labor.[9] Also, usage of relaxation techniques like massage and breathing exercises can reduce stress and anxiety during labor.[10] Although some non-pharmacological methods are non-invasive, safe for both the mother and infant, and are supported by scientific evidence, other techniques lack such evidence of efficacy.[11] Studies with non-pharmacological methods mainly focused on their effects on maternal pain or anxiety management. However, there are limited numbers of studies investigating the effects of these methods on newborns. In addition, it has been shown that the respiratory pattern previously applied at the first stage of labor has no significant effect on pain, fatigue, and maternal satisfaction.[2]

The present study aimed to assess the efficacy of breathing exercises during the second stage of labor for maternal pain, duration of labor, and first-minute Appearance, Pulse, Grimace, Activity and Respiration (APGAR) scores of the newborn.

2 Methods and materials

2.1 Study design

This randomized controlled trial was designed to compare nulliparous pregnant women in the second stage of labor who performed breathing exercises as instructed, versus a control group who received standard care. The study was conducted at Nenehatun Obstetrics and Gynecology Hospital between May 2016 and June 2016, in Erzurum, Turkey. The study was conducted in accordance with the Consolidated Standards of Reporting Trials Statement.[12] This study is registered on the website of ClinicalTrials.gov (www.clinicaltrials.gov) with the number of NCT03066973.

2.2 Inclusion and exclusion criteria

Inclusion criteria were as follows: being a nulliparous pregnant woman with a gestational age ranging between 37 and 42 weeks. Those using analgesics or anesthetics, and those with clinical instability, psychiatric disorders and the inability to cooperate with breathing exercises were excluded. The sample size was calculated using data obtained in a pilot study conducted with 140 patients. A total of 112 patients in each group provided a statistical power of 80%. There was a difference of 30% reduction in pain with the use of breathing exercises in both groups with an α error of 5%. Considering a possible 10% loss rate, 250 women were selected for the study. The patients were either randomized to the intervention group (IG; n = 125) or control group (CG; n = 125) using computer-generated randomization lists (stratified randomization with random allocation sequences to ensure closely balanced groups).

The study protocol was approved by the Ethics Committee of Ataturk University, Faculty of Medicine (Number of the Ethic Committee Report: B.30.2.ATA. 0.01.00/69). An informed written consent was obtained from each participant. The study was conducted in accordance with the principles of the Declaration of Helsinki.[13]

2.3 Intervention

Pregnant women in the IG received one session breathing exercises in the first stage of labor. The training of breathing exercise was given by the principal investigator. Before the training, all women in the IG were given brochures with directions to be able to work on their own. During training, all participants were instructed to perform abdominal breathing during the second stage of birth.[14] The main components of breathing exercises during training were as follows: (A) First, fill your stomach and then your lungs with air while breathing in; (B) Feel the expansion in the stomach; (C) Make sure the muscles from your stomach to your knee are relaxed, as if you are urinating while breathing out; (D) When there is pain, perform deep abdominal breathing exercises, and take a deep breath in and hold as much as you can; (E) Try to push the baby downward; (F) You can do it by holding your breath or

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