

Kinesio Taping for Labor Pain Control : A Randomized Controlled Trial

Original
Article

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ABSTRACT

Aim: This study aimed to assess the efficacy of Kinesio tape on relief of pain associated with labor.

Materials and Methods: We included 100 women (50 in each group). Each participant was subjected to assessment of Visual analogue scale, Present Pain Intensity (PPI) and Cardiotocography (CTG).

Results: Our study showed that there was no significant difference between women of both groups regarding VAS pain scores which were documented hourly. Also there was no significant difference between both groups in PPI except in hour3 in which PPI was significantly lower in Kinesio Taping than in control group (2.8 ± 0.8 and 2.5 ± 0.9 respectively). The overall need for analgesic was comparable in kinesio and control group (54.0% versus 52.0%, respectively). 58.0% of cases group required uterotonic versus 64.0% in control group without significant difference between both groups. Patient satisfaction was significantly higher in Kinesio Taping than control group. The majority in cases group (46.0%) was satisfied, while 34.0%, 16.0% and 4.0% was either Quite satisfied, Neutral or Dissatisfied. On the other hands, the majority of control group (44.0%) was neutral and 42.0%, 8.0% and 6.0% were satisfied, dissatisfied and quite satisfied, respectively.

Conclusion: Kinesiology taping was not shown to be effective for labor pain control. The remaining outcomes assessed (i.e., labor duration, uterotonic and anesthetic requirements, type of delivery, pathological CTG rates) showed no differences between the two groups. Maternal satisfaction with the childbirth experience and tape use was more with Kinesio tape group.

Key Words: Cardiotocography, labor pain, kinesio taping

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INTRODUCTION

One aspect of childbirth is the association of this physiologic process with pain and discomfort. Having a fear of pain leads to increase in catecholamine release; adrenaline promotes vasoconstriction and stops oxytocin production decreasing effective uterine contractions and placental blood flow, which can lead to exhaustion, dystocia, fetal suffering, and postpartum post-traumatic stress disorder Leading also to negative birth experiences^[1-4].

Many studies tested drug interventions during labor such as Inhaled nitrous oxide and oxygen (Entonox®), Non-opioid drugs (e.g. sedatives), epidurals and combined spinal-epidurals. Local anesthetic nerve blocks and parenteral opioids (pethidine and related drugs). Although being effective, pharmacological pain relief has many side effects varying from drowsiness with nitrous oxide

to increased forceps or ventouse use, low blood pressure, fever and urine retention with epidurals.

Consequently there is a growing interest in simple, non-invasive, and low-cost techniques for pain control, especially at sites with limited resources^[5].

Among alternative techniques for pain control during labor; massage, hot and cold compresses, baths^[5], sterile water injections^[6], hypnosis, acupuncture, acupressure, relaxation, and yoga have been shown to be helpful for pain management and patient satisfaction^[4,7]. A meta-analysis conducted by Chaillet *et al.*^[5] found an association between the use of non-pharmacological pain strategies with less epidural analgesia, and better experience of childbirth. Among these techniques Kinesio Tape which was developed by Kenzo Kase, a Japanese chiropractor, in 1970. It is manufactured pre-stretched by 15-25%. It mimics the physical qualities of the skin with same

thickness as the epidermis and can be stretched between 30% and 40% of its resting length longitudinally and following application, recoils back towards its unstretched length^[8]. Kinesio taping implementation has not been well studied during labor therefore in this study we will assess its effectiveness in reducing labor pain.

AIM OF THE WORK

The purpose of this study is to assess the efficacy of Kinesio tape on relief of pain associated with labor.

PATIENTS AND METHODS

This study was carried out on 100 women during normal labor, they were recruited from Ain-Shams University Maternity Hospital during the period between 1/2/2019 and 1/10/2019. Their age ranged between 17 and 40 and their BMI was from 19 kg/m² to 35 kg/m².

Study Design: This is a randomized controlled single blind trial. The purpose and nature of the study was explained to all participants and an informed consent form was signed from each woman participating in this study. The participants were randomly divided into two equal groups; group A consisted of fifty women who received kinesio tape at lumbar region (cases) and group B consisted of fifty women who received kinesio tape at upper back region (control).

Sample Size Justification: The sample size was calculated using G* power 3.0.10, Setting alpha at 5% and power at 80%. Assuming an effect size of 0.6 (medium effect size) of the Kinesio tape on pain Visual Analogue Scale score, the needed sample was calculated to be 50 cases per group (total 100).

Inclusion criteria comprised: Low-risk Primigravida women with a spontaneous onset of labor, single viable fetus in cephalic presentation, gestational age between 37 and 42 weeks (calculated from sure and reliable menstrual dates and confirmed by late first or early second trimester ultrasound), cervical dilation between 3 and 5 cm and a minimum of two uterine contractions at 10-min intervals

Exclusion Criteria: women with pre-eclampsia, diabetes mellitus, cardiopathy, hypertension and nephropathy, epilepsy, psychiatric dysfunction and drug use, elective Cesarean section, uterine scarring, dermatitis or skin infection at the site of bandage application, allergies related to Kinesio tape and fetal death or malformation.

Equipment: Evaluation Equipment: Visual analogue scale: Pain during contractions was assessed by the visual analogue scale. It is a 10 cm horizontal line with one end described as (no pain=0) and the other end (worst pain=10). Visual analog scale is considered a valid

way of assessing pain, it allows graphic representation and numerical analysis of collected data.

Present Pain Intensity scale (PPI): Pain in between contractions was assessed using the Present Pain Intensity scale; it is a portion of the McGill questionnaire, the Present Pain Intensity scale is a measure of the magnitude of pain experienced by an individual, it is a numeric-verbal combination that indicates overall pain intensity and includes 6 levels: none 0, mild 1, discomforting 2, distressing 3, horrible 4 and excruciating 5.

Likert scale: Patient satisfaction with birth experience and Kinesio bandage usage is measured using Likert scale; It is a five (or seven) point scale which is used to allow the individual to express how much they agree or disagree with a particular statement

Cardiotocography (CTG): Fetal heart rates and uterine contractions were continuously monitored by CTG in both groups.

Stopwatch: was used to record length of active phase of labor in both groups which is defined as the time between cervical dilatation from 3 cm until the cervix is fully dilated.

Treatment Equipment: The treatment protocol was achieved by using the following equipment Kinesio tape. The kinesio tape is comprised of a ureter polymer elastic strand wrapped by 100% cotton fibers. The cotton fibers allow for evaporation of the body moisture and following application of water allows for quick drying. There is no latex in the tape. The adhesive is 100% acrylic and is heat activated. The KT used is provided by INTERMED Company, it is 5ms length and 5cms width, we used the Pre-cut type. It is used at the lumbar region for group A and the upper thoracic region for group B.

Methods:

This study was conducted on 100 normal full-term Primigravida women presenting in the first stage of labor with regular painful, palpable uterine contraction, and cervical dilatation between 3 and 5cm. a total number of 117 women were approached from whom 100 were eligible. They were randomly assigned into two equal groups; group A (the study group) which consisted of 50 women, and group B (the control group) which consisted of 50 women.

Prior to data collection, the purposes and procedures were fully explained to each participant. Each participant was evaluated and treated individually following a standard protocol. They passed through the following steps of evaluation:

History taking which included patient's name, age, occupation, residential info, blood type (confirmed by

official documentation), gestational age (between 37 and 42 weeks). Current pregnancy history: first and second trimester screening tests, fetal anomaly screening, oral glucose tolerance test, vaccination records, history of any systemic diseases, past surgical history, drug history (regular medications, allergies), alcohol, and smoking. Family history: consanguinity, inherited genetic diseases.

General physical examination which included weight and height of the patient; body mass index (BMI), blood pressure, pulse rate, urinary protein check by dipsticks, skeletal anomalies: scoliosis, kyphosis and skin diseases at the site of application of the tape.

Local abdominal examination which included inspection, palpation for the measure of symphysial fundal height, fetal lie and presentation, amniotic fluid volume, uterine contractions frequency and duration (minimum of two uterine contractions at 10-min intervals). Auscultation of fetal heart beats using Doppler Fetal Sonicaid.

Local vaginal examination: we assessed the following components on manual vaginal examination: Cervical dilation in centimeters (between 3 and 5 cm), cervical effacement as a percentage, cervical consistency, cervical position, fetal station, status of membranes and pelvic capacity. Obstetric ultrasound to detect fetal viability, lie, weight, placental location, liquor assessment, fetal anomalies.

Baseline non-stress test: Patients underwent explanation of the process and after that, they signed an informed consent. Patients were blinded to the difference between both sites of application in relation to the efficacy of the tape.

Participants in group (A); the participants in group A received the kinesio taping at lumbosacral region, the skin was made free of oils and lotions and cleaned prior to the application. Anything that limits the acrylic adhesive ability to adhere to the skin limits both effectiveness and length of application. Taping was done using H technique; Application of bilateral kinesio strip with space correction for bilateral erector spinae muscle. The participant was placed in supine position and the base of kinesio H strip was applied at T11 and T12 to S1 and S2. The third strip is a space correction technique. 20-25% tension was applied in the vertical tape and 100% tension in the horizontal tape. This zone of tension was placed directly over the region of greatest pain (Figure 1).

Participants in group (B); a single, vertical I strip was applied on the thoracic region from T1 to T4. This location was chosen arbitrarily, as it is out of the uterine dermatomal region. The application site was cleaned, Patients were placed in supine position and the base of the strip was placed at T4 with the apex at T1 20-25% tension was applied to the strip (Figure 2).

Fig. 1: The site of application of KT in group A (cases)



Fig. 2: The site of application of KT in group B (control)



No form of non-pharmacological analgesia was used other than Kinesio tape in this study. Women were offered Pharmacological methods of analgesia in the form of Nalufin (Nalbuphine 20mg/1ml) or Pethidine (100mg/2ml) when needed. Fetal heart rates were monitored by continuous electric monitors. Artificial ruptures of fetal membranes were done when needed for delayed progress of labor. Uterotonics were used when needed in the form of Syntocinon (Oxytocin 5 UI/1 mL). Oxytocin administration is initiated at a dose of 2 mIU per minute, without contraindication the dose was increased by 2 mIU per minute every 30 minutes.

Study Outcomes: Our Primary Outcome was: pain sensation during labor. Secondary Outcome included: mode of delivery, length of active phase, rate of uterotonics, and maternal satisfaction with birth experience and Kinesio bandage usage.

Risk and Complications: None were reported with use of Kinesio tape in our study; (skin irritation, pain, or allergic reactions).

STATISTICAL ANALYSIS:

Data were analyzed using IBM© SPSS© Statistics version 23 (IBM© Corp., Armonk, NY). Continuous numerical variables were presented as mean and SD and inter-group differences were compared using the unpaired t-test. Categorical variables were presented as number and percentage and differences were compared using the Pearson chi-squared test or Fisher's exact test. Ordinal data were compared using the chi-squared test

for trend. Linear mixed model was used to examine the effect of intervention on the change in VAS, PPI or fetal heart rate. Two-sided *P-values* <0.05 were considered statistically significant.

RESULTS

The current study was conducted at Ain-Shams University Maternity Hospital during the period between 1/2/2019 and 1/10/2019. A total of 100 women were recruited in the current study (Figure 3 shows a flow-diagram of the study course).

We conducted this randomized controlled single-blind trial to assess the efficacy of Kinesio tape in reducing labor pain in 100 women (50 in each group). Each participant was subjected to assessment with Visual analogue scale, Present Pain Intensity (PPI) and Cardiotocography (CTG).

Both groups were comparable in age, BMI and GA. The mean age of cases group was 22.2±4.0 years versus 23.6±4.9 in control group. BMI was 25.9±4.3 and 25.8±3.5 and GA was 39.3±1.2 and 39.2± 1.2 in cases and control groups, respectively (Table1).

There was no significant difference between women of both groups in cervical dilatation and effacement at recruitment. Also there was no significant difference was found between both groups in frequency and Duration of uterine contractions. And both groups were comparable regarding duration of active phase (Table 2).

There was no significant difference between women of both groups regarding VAS pain scores which were documented hourly (Table 3).

No significant difference between both groups was observed in PPI pain scores except for (hour 3) as PPI score was significantly lower in cases than in control group (2.8±0.8 and 2. 5±0.9 respectively, *p=0.046*) (Table 4).

Pathological CTG rates were comparable between women of both groups (Table 5). The need for Pethidine and Nalbuphine was comparable in both groups, as well as the overall need for analgesia (Table 6). 58.0% of cases group required Uterotonics versus 64.0% in control group without significant difference between both groups (Table 7). The rate of cesarean delivery due to fetal distress was not significantly different between both groups as well as the rate of cesarean delivery due to failed labor progress.

The overall rate of Cesarean delivery was also comparable in both study groups (20.0% in cases versus 24.0% in control group) (Table 8).

Patient satisfaction was significantly higher in Cases group than in control group as *p<0.001*, accordingly the proportion of patients rating intervention as satisfactory or very satisfactory was higher in cases group than in control group (80.0% versus 48.0% respectively and *p=0.001*) (Table 9).

Table 1: Characteristics of patients in both groups

Variable	Kinesio Taping (n=50)		Control (n=50)		Mean Difference	95% CI		<i>P-value*</i>
	Mean	SD	Mean	SD		Lower	Upper	
Age (years)	22.2	4.0	23.6	4.9	-1.5	-3.3	0.3	0.101
BMI/kg/m2	25.9	4.3	25.8	3.5	0.1	-1.5	1.6	0.919
GA (weeks)	39.3	1.2	39.2	1.2	0.04	-0.4	0.5	0.865

Data are mean and standard deviation (SD).
*Unpaired t-test.

Table 2: Progress of labor in both study groups

Variable	Kinesio Taping (n=50)		Control (n=50)		Mean Difference	95% CI		P-value*
	Mean	SD	Mean	SD		Lower	Upper	
Cervical dilatation (cm)(at recruitment)	4.0	0.9	4.1	0.9	-0.2	-0.5	0.2	0.303
Cervical effacement (%) (at recruitment)	52.8	22.2	55.6	20.2	-2.8	-11.2	5.6	0.511
Frequency of uterine contractions (per 10 min)	3.6	1.1	3.6	0.9	0.00	-0.4	0.4	1.000
Duration of uterine contractions (s)	44.7	10.3	42.2	9.3	2.5	-1.4	6.4	0.207
Duration of active phase (min)	314.4	96.6	321.6	86.4	-7.2	-43.6	29.2	0.695

Data are mean and standard deviation (SD).

*Unpaired t-test.

Table 3: Pain scores in both study groups

Variable	Time	Kinesio Taping (n=50)			Control (n=50)			Mean Difference	95% CI		P-value*
		n	Mean	SD	n	Mean	SD		Lower	Upper	
VAS	1 h	50	4.7	1.0	50	4.7	0.9	-0.02	-0.4	0.4	0.915
	2 h	50	5.5	0.9	50	5.5	1.0	0.02	-0.4	0.4	0.918
	3 h	50	6.4	1.0	50	6.4	1.1	0.02	-0.4	0.5	0.928
	4 h	38	7.0	1.0	47	7.3	1.1	-0.3	-0.7	0.2	0.269
	5 h	20	7.6	0.5	35	7.7	1.0	-0.1	-0.5	0.3	0.479
	6 h	9	7.9	0.6	20	7.7	0.7	0.2	-0.3	0.8	0.369
	7 h	6	7.8	1.0	10	8.1	0.6	-0.3	-1.1	0.6	0.499
	8 h	4	8.3	0.5	4	8.5	0.6	-0.3	-1.2	0.7	0.537
	9 h	1	8.0	0.0	2	8.5	0.7	0.5	-10.5	11.5	0.667

Data are number (n), mean and standard deviation (SD).

*Unpaired t-test.

Table 4: PPI scores in both study groups

Variable	Time	Kinesio Taping (n=50)			Control (n=50)			Mean Difference	95% CI		P-value*
		n	Mean	SD	n	Mean	SD		Lower	Upper	
	1 h	50	1.9	0.7	50	1.7	0.7	0.2	-0.1	0.5	0.135
	2 h	50	2.1	0.9	50	2.2	0.8	-0.1	-0.5	0.2	0.487
	3 h	50	2.8	0.8	50	2.5	0.9	0.3	0.0	0.7	0.046
	4 h	38	3.5	0.7	47	3.2	1.1	0.3	-0.1	0.6	0.169
PPI	5 h	20	3.7	0.9	35	3.6	0.9	0.1	-0.4	0.6	0.685
	6 h	9	4.0	0.7	20	4.1	0.8	-0.05	-0.7	0.6	0.868
	7 h	6	4.2	0.4	10	4.4	0.5	-0.2	-0.8	0.3	0.363
	8 h	4	4.8	0.5	4	4.8	0.5	0.00	-0.9	0.9	1.000
	9 h	1	5.0		2	5.0	0.0	0.00	0.00	0.00	

Data are number (n), mean and standard deviation (SD).

*Unpaired t-test.

Table 5: Pathological CTG rates in study groups

Variable	Kinesio Taping (n=50)		Control (n=50)		P-value*
	n	%	n	%	
Fetal distress	4	8.0%	5	10.0%	1.000

Data are number (n) and percentage (%).

*Fisher's exact test.

Table 6: Need for analgesics in both study groups

Variable	Kinesio Taping (n=50)		Control (n=50)		P-value*
	n	%	n	%	
Need for Pethidine	10	20.0%	12	24.0%	0.629
Need for Nalbuphine	17	34.0%	15	30.0%	0.664
Overall need for analgesic	27	54.0%	26	52.0%	1.000

Data are number (n) and percentage (%).

*Pearson chi-squared test.

Table 7: Need for Uterotonics in both study groups

Variable	Kinesio Taping (n=50)		Control (n=50)		<i>P-value*</i>
	n	%	n	%	
Need for Uterotonics	29	58.0%	32	64.0%	0.539

Data are number (n) and percentage (%).

*Pearson chi-squared test.

Table 8: Need for Uterotonics in both study groups

Variable	Kinesio Taping (n=50)		Control (n=50)		<i>P-value*</i>
	n	%	n	%	
Cesarean delivery due to fetal distress	4	8.0%	5	10.0%	0.487*
Cesarean delivery due to failed labor progress	6	12.0%	7	14.0%	0.766§
Total Cesarean delivery	10	20.0%	12	24.0%	0.629*

Data are number (n) and percentage (%).

*Fisher's exact test.

§Pearson chi-squared test.

Table 9: Patient satisfaction in both study groups

Variable	Kinesio Taping (n=50)		Control (n=50)		<i>P-value*</i>	
	n	%	n	%		
Patient satisfaction	Dissatisfied	2	4.0%	4	8.0%	<0.001*
	Neutral	8	16.0%	22	44.0%	
	Satisfied	23	46.0%	21	42.0%	
	Very satisfied	17	34.0%	3	6.0%	
Patient satisfaction	Dissatisfied or Neutral	10	20.0%	26	52.0%	0.001§
	Satisfied or Very satisfied	40	80.0%	24	48.0%	

Data are number (n) and percentage (%).

*Chi-squared test for trend.

§Pearson chi-squared test.

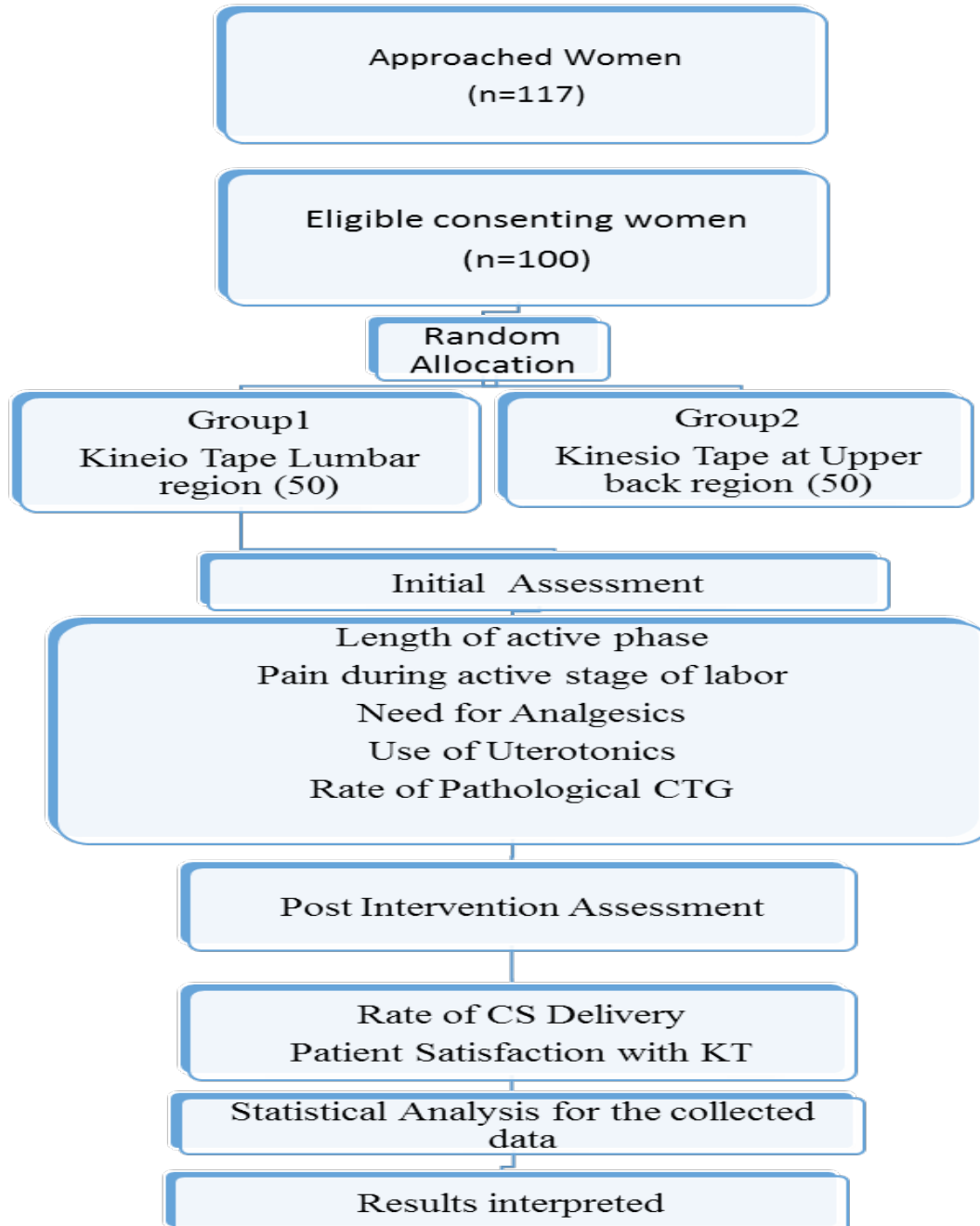


Fig. 3: Flow-Diagram showing Study Course

DISCUSSION

There is growing interest in simple, non-invasive, and low-cost techniques for pain control, especially at sites with limited resources^[5].

Having a fear of pain leads to a pain fear cascade, a reaction that increases catecholamine release. Among the catecholamines, adrenaline has a particular ability of promoting vasoconstriction and stopping oxytocin production. High levels of catecholamine decrease effective uterine contractions and placental blood flow, which can lead to exhaustion, dystocia, fetal suffering, and postpartum post-traumatic stress disorder^[9].

Studies have shown that the maintenance of pain during labor is fundamental to a positive birthing experience, whereas excessive pain sensation and loss of self-control are associated with negative experiences^[10].

Labor pain may be effectively controlled by analgesic procedures and modern anesthetics, although some users report finding these inconvenient. The current trend to decrease the amount of medication and number of procedures used during childbirth has increased demand for scientific, evidence-based information about less invasive and safer methods of labor pain control with also an attempt to supplement rather than replace traditional care^[10].

The Kinesio Taping (KT) technique was developed by Kenzo Kase, a Japanese chiropractor, in 1970. Although its implementation has not been fully studied during labor, its supposed mechanism of action is similar to other techniques that are based on the gate control theory of pain, such as massage, hot and cold compresses, baths, and sterile water injections^[5].

There is very little clinical experience and only limited documentation for effectiveness of kinesio taping on labor pain and childbirth duration. To the best of our knowledge this is the second study to evaluate the isolated effect of Kinesio tape on labor pain preceded only by Miquelutti *et al.*^[11]. There are three other studies evaluating the effect of kinesio taping on labor pain^[12-14]. But all were associated with the use of other non-pharmacological methods. Other studies evaluated kinesiology taping to relieve menstrual pain^[15,16] and although this pain is of uterine origin, methodological differences may explain the divergence between results found. In these studies, the tape was applied to the lower pelvic region, but it was applied days before the menstrual period. Furthermore, the multifaceted components of labor may add to the pain's physiological origin, intensifying the pain and making it more difficult to control.

We conducted this randomized controlled and single-blind trial to assess the efficacy of Kinesio tape in terms

of labor pain sensation, maternal satisfaction, and obstetric outcomes. 100 women (50 in each group) were recruited from Ain Shams University Maternity Hospital during the period from 1/2/2019 to 1/10/2019. Their age ranged between 17 and 40 and their BMI was from 19 kg/m² to 35 kg/m². The women were divided into two groups Group A received the tape in the lumbar region and Group B received the tape in the upper back. One strength of this study is that in the CG tape was applied to sites other than dermatomes corresponding to uterine innervation to control for possible biases or a placebo effect in pain. Similarly, participants were blinded to which group received the tape in the region of uterine dermatomes, allowing an impartial assessment. Each participant was subjected to assessment of Visual analogue scale, Present Pain Intensity (PPI) and Cardiotocography (CTG). Using two methods of pain scoring allowed for a better pain assessment.

Regarding patients' demographic data such as Age, Gestational age, BMI there was no statistically significant difference between both groups.

The choice of primigravida as an inclusion criteria is because this population group reportedly had a higher score of pain during labor compared to multigravida women partly due to less experience of previous pregnancies, inadequate preparation for delivery and low knowledge regarding labor process as a result of lack of antenatal education as reported by Melzack *et al.*, 1984^[17] and supported by other studies.

There was no significant difference between the groups in cervical dilatation at time of admission, cervical effacement at time of admission, frequency and duration of uterine contractions. The non-significant difference in sociodemographic and obstetric characteristics at baseline evaluation was important to insure that variable outcomes were not related to such confounding factors and to strengthen the results of this trial.

A prolonged active phase of the first stage labor was mostly reported due to pain intolerant leading to exhaustion. Research has linked prolonged labor or failure to progress to psychological factors, such as worry, stress, or fear^[18].

There was no significant difference between the groups in duration of active phase as mean duration was (314.4 min) in group A versus (321.6 min) in group B. This is in accordance with Miquelutti, study which was conducted on a total number of 60 women (30 allocated to Kinesio group A who used kinesiology taping during labor at Lumbar region and 30 were allocated to control group B who used non-kinesiology taping at upper back region. no significant difference in duration of active phase were observed between group A (312.2min) and group B (330min)^[11]. These results are also accordance with Shivanjani, study which was conducted on a total number of 40 primigravidas which were assigned as

Group A who received kinesio-taping and Group B who received Acu-TENS. There is no significant change in duration of the active phase of first stage labor between group A (317.25min) and group B (257.00min)^[12]. But different results were reported among total of 40 primigravida women included in El-Refaye *et al.*, study which was conducted on 40 primigravida women that were randomly assigned into two equal groups; group A (the study group) consisted of 20 women, and group B (the control group) consisted of 20 women. All participants in both groups performed breathing exercises. However, group A patients received kinesio taping at the lumbar region and anterior lower abdomen during the first stage of normal labor. There was a highly statistically significant difference in the duration of the first stage of labor in preference to Kinesio group^[14].

In current study, there was no significant difference between both groups in VAS. These results in accordance with Miquelutti *et al.*, as no significant differences were observed between the groups, pain in the KTG was observed to be non-significantly higher than in the CG after the second hour of follow-up. However pain evaluation in the first hour revealed that the CG had a significant increase in pain during contractions, with no increase in the KT group^[11]. This result may be biased by including both primigravida and multigravida women in this study. Also the use of non Kinesio tape in the control group may have biased the results.

In harmony with our results, El-Refaye *et al.*, found that There was a non-significant difference between group A and group B in the pain intensity using VAS in the first stage of labor at the first reading (cervical dilatation: 3-4 cm). However, there was a significant difference in the second reading at 6 hrs. with cervical dilatation: 7-8 cm; favoring group A^[14]. This may be biased by not assessing Kinesio tape affect separately as it used breathing exercise. Also changing the site of the tape in study group only (from lumbar region to lower abdomen with cervical dilatation: 7-8 cm) may have biased the result.

In contrast, to our study, Munayarokh, study which is a quantitative study conducted on 44 primigravida women utilizing quasi experiment with pre- and post-test two group design; Group A with effleurage massage and experimental group B with KT application. The mean score of KT application was higher (28.25) than the effleurage massage (16.75) meaning that the KT application was more effective than the effleurage massage on reducing pain among women during active phase of the first labor stage^[19]. Also different results were reported among total of 40 primigravida women included in Shivaranjani, study as there was a significant decrease in the VAS scores both in subjects who received kinesiotaping and in Acu-TENS group. With group A showing more significant reduction in VAS score during the first stage of labor^[12].

The heterogeneity observed in the previous results may be due to the use other non-pharmacological techniques in parallel with Kinesio tape which makes it difficult to isolate the Kinesio effect.

In current study, no significant difference between both groups in PPI except in hour3 in which PPI was significantly lower in Kinesio Taping than in control group (2.8±0.8 and 2.5±0.9 respectively). This sporadic result may be biased by the relatively small number of study groups which may be corrected in further studies by larger sample sizes. Similarly, Pain unrelated to uterine contractions, assessed by Miquelutti *et al.*, using the PPI showed no significant difference between the two groups^[11]. No other studies assessed the KT effect on labor pain using PPI.

In current study, there was no significant difference between both groups in Pathological CTG rates as (8.0% in cases versus 10.0% in control group). This results in accordance with El-Refaye *et al.*, study as there was a non-significant statistical difference between group A and group B in the fetal heart rate every 10 min in the first stage of labor^[14]. No other studies assessed the effect of kinesio taping on fetal heart rates during labor.

Pregnant women who received good analgesia having greater self-control, using non-pharmacological techniques more effectively, and feeling more satisfaction with the childbirth experience^[4, 19, 20].

In current study, the overall need for analgesic was comparable in kinesio and control group (54.0% versus 52.0%, respectively). Also the need for Pethidine (20.0% versus 24.0%) and Nalbuphine (34.0% versus 30.0%) were comparable in both groups, respectively. In harmony with our results the overall use of labor analgesia assessed by Miquelutti *et al.*, showed no significant differences between the groups (63.3% in cases versus 70.4% in controls)^[11]. No other studies assessed the effect of kinesio taping on the use of labor analgesia.

In current study, 58.0% of cases group required uterotonic versus 64.0% in control group without significant difference between both groups This was supported by Miquelutti *et al.*, observation that showed no differences between the two groups regarding the use of uterotonics (36.7% in cases versus 29.6 in controls)^[11]. No other studies assessed the effect of kinesio taping on the use of uterotonics during labor

In current study, the overall rate of Cesarean delivery was comparable in both study groups (20.0% in cases versus 24.0% in control group). Also the rate of cesarean delivery due to fetal distress was not significantly different between both groups (8.0% in cases versus 10.0% in control group). And cesarean delivery due to failed labor progress was also comparable between both groups (12.0% in cases versus 14.0% in control group) In accordance with

current results, Miquelutti *et al.* found that the obstetric outcomes after applying KT showed no differences between the two groups as regarding to type of delivery as vaginal delivery rate was (80.0%in cases versus 81.5% in controls)^[11]. But in contrary to our finding, Shivaranjani found that Caesarean section rate was increased in group A (35 %) when compared to group B (25%). The reasons for emergency CS's in both groups were non-progression of labor, fetal distress, dilatation arrest with non-assuring FHR and prolonged 2nd stage of labor^[12]. This finding may be biased by the small sample size and the co-use of Acu-TENS in his study.

In current study, patient satisfaction was significantly higher in Kinesio Taping than control group. The majority in cases group (46.0%) was satisfied, while 34.0%, 16.0% and 4.0% was either quite satisfied, neutral or dissatisfied. On the other hands, the majority of control group (44.0%) was neutral and 42.0%, 8.0% and 6.0% were Satisfied, Dissatisfied and Quite satisfied, respectively. The Proportion of patients rating intervention as satisfactory or very satisfactory was higher in Kinesio group than in control group (80.0% versus 48.0% respectively). This result may be due to investigator's bias which may be corrected in further studies by conducting double blinded studies in which the investigator is also blinded to the groups. In harmony with our results, Miquelutti *et al.*, found that more women were satisfied with the childbirth experience and the use of kinesiology taping^[11], despite the absence of statistical significance (unlike our study), this may be explained by the different sample size.

There were no observed adverse effects associated with tape use, such as skin irritation, pain, or allergic reactions.

One of the drawbacks in our study is the lack of labor preparation. Pregnant women who participate in labor preparation programs report having greater self-control, using non-pharmacological techniques more effectively, and feeling more satisfaction with the childbirth experience^[19, 20].

CONCLUSION

Kinesiology taping was not shown to be effective for labor pain control. The remaining outcomes assessed (i.e., labor duration, uterotonic and anesthetic requirements, type of delivery, pathological CTG rates) showed no differences between the two groups. Maternal satisfaction with the childbirth experience and tape use was more with Kinesio tape group. Being noninvasive, cheap, and safe method of relieving pain during labor and well-accepted by study participants we suggest further studies with larger sample sizes in an attempt to supplement rather than replace traditional pharmacological pain relief.

CONFLICT OF INTEREST

There are no conflicts of interests.

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