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Impact of Doula sand Acupressure during laboron Labor Pain Intensity andInfant's Apgar Score

Maryam Mohamed Ali, **Inaam Hassan abd El-Ati,**SehamShehata Ibrahim, *** Ebtesam EL sayedShama&* ManalFarouk Mohamed**

* Department of Obstetric physiotherapy, Faculty of physiotherapy, Egypt
** Department of Maternity, Gynecology & Obstetric Nursing, Faculty of Nursing, Port Said University, Egypt
*** Department Family & Community Nursing, Faculty of Nursing, Port Said University, Egypt
****Department of Pediatric Nursing. Faculty of Nursing, Suez Canal University, Egypt

Abstract

Background and Objectives: Delivery is considered as one of the most painful experiences of women's life. There fore continuous labor support offers multiple benefits for mothers and infants. The present study aimed to compare the effects of maternal supportive care and acupressure (at LI4 a cupoint) during labor on labor pain intensity, and infant's Apgar score. Methods: Parturient women (n=150) with low-risk pregnancy (with singleton pregnancies in the active phase of spontaneous labor, without any medical or obstetric problems, were enrolled in this single-blinded, randomized, clinical trial)were randomly divided into supportive care(Doulas)group, LI4 acupressure group, and control group each containing 50 subjects in which no pharmacological or non-pharmacological methods of pain relief were used. Pain intensity was measured by visual analog scale before and after the intervention in the first stage of labor. Pressure or touch was applied for 30 minutes during uterine contractions. The data were collected using a questionnaire including demographic and pregnancy characteristics. Then, the data were analyzed using Chi-square test and one-way ANOVA. **Results:** The difference in the pain scores between Doulas, the acupressure and control group was statistically significant ($p<0.001$). Moreover, the frequency of Apgar score>8 in the first and 5^{th} minutes was higher in the supportive care and acupressure groups compared to the control group, and the difference was statistically significant ($P<0.001$). **Conclusion and recommendation:** Continuous support and acupressure are an effective, non-invasive, and easily applicable technique to reduce labor pain and could reduce the length of labor stages and. Therefore, these methods, as effective non-pharmacological strategies, can be introduced to the medical staff to improve the delivery outcomes.

Key words: impact, Doulas, acupressure, labor, labor pain, infant's Apgar score

Introduction

Labor is a standout amongst the most imperative phenomena of a woman's life that exists in numerous creatures and unlike other acute and chronic pain, the pain of labor does not correlate with any disease. It is a physiologic process of rhythmic uterine contractions (labor pain) of sufficient frequency, intensity, and duration as a result effacement and dilatation of the uterine cervix occur ***(Martin*, Elizabeth.2016*).***

Labor pain has been accounted for as the severest pain in humans. It is the result of a subjective and complex interaction of numerous physiological and psychosocial factors on a woman's individual translation and interpretation of labor stimuli ***(Harms, Rogert W., 2016).***

The main fundamental factors in pain during labor are cervical dilatation and uterine contractions,uterine contractions result in visceral pain, which is innervated by T10-L1. While in presenting part descent, the fetus' head exerts pressure on the mother's pelvic floor, vagina, and perineum, bringing on somatic pain transmitted by the pudendal nerve (innervated by S2-4).Therefore, optimal labor pain control during labor ought to alleviate both sources of pain. ***(Niven C., 2016)***

Severity of labor pain leads to the mother's disturbs her mental health and emotional turmoil. It also has several negative impacts on delivery progress as well as maternal and fetal physiological status , including increase of pulmonary ventilation, increase of oxygen consumption, increase of cardiac output, delayed gastric emptying, inefficiency of uterine contractions, prolonged labor, decrease in uterine perfusion, fetal hypoxia, and metabolic acidosis, prompting to obstetric interventions and its resultant difficulties and complications ***(Brownridge . P, 2016)***

A comprehension understanding of pain during labor a multidimensional framework gives the basis for a woman-centered focused way to deal with labor pain management that includes a broad range of nonpharmacological and pharmacologic intervention strategies and techniques***(Lowe NK., 2016)***. Labor pain relief is an important aspect of women's health that has historically been neglected. It has been demonstrated that birthing assistants and midwives sometimes underestimate the intensity of the pain experienced by women in labor and overestimate the efficacy of pharmacological pain relief **agents*(Baker A., et al, 2016).***

Many variables are included in choices about which method (s) of pain control may be appropriate for birth experience, including the severity of pain sensations, the progress of labor, the size of presenting part of the fetus , previous experience with pain, and other medical conditions. ***(Departments of Anesthesia, Obstetrics, and Obstetrical Nursing December 2008)***

In spite of the numerous techniques accessible for analgesia and anesthesia to manage labor pain, few women may not wish to use conventional pain medications during labor, opting instead for a natural childbirth. In spite of the fact that these ladies may utilize breathing and mental activities to help reduce labor pain, they ought to be guaranteed that pain alleviation can be managed any time during labor ***(Abdullah NR, 2016).***

Pain relief in labor is an essential issue in obstetric care, however, as yet, there is no standard and accepted technique and strategies for the relief of that pain without side effects***(Lee et al.2004, Enjezab,et al 2008&, Abbasi***,et **al. 2009)**. Generally, there are two choices for labor pain relief, these use either pharmacological agents or non-pharmacological methods. Pharmacologicstrategies and methods have antagonistic and adverse side effects for the mothers and fetus, whereas non-pharmacological methods are free from reactions and side effects **(*Simkin 2004)*.**

Additionally,non-pharmacologic methods of pain relief are used by all women in labor. A systematic review by ***Simkin and O'Hara*** of non-pharmacologic pain relief examined only five methods which are warm water baths, continuous labor support, intra-dermal water injections, maternal positioning, and movement and touch and massage. Pain-relief methods without prospective studies (e.g., acupuncture) and

self-help techniques such as breathing, relaxation, and visualization were not inspected ***(SimkinP&O'Hara M., 2016)***

Another nonpharmacological method for diminishing pain is accompaniment of a doula. Doula's supportive care and postpartum supporter ***(Brüggemann,2016),*** is a nonmedical person who assists a woman before, during, and/or after childbirth, as well as her spouse and/or family, by giving physical assistance and emotional support***(Balas, M. et al,2016).***The provision of continuous support during labor is associated with improved maternal and fetal health and a variety of other benefits, including lower risk of induction and interventions and less need for pharmacological pain relief. These benefits are particularly significant when continuous support is provided by someone who is not there as family/friend or as medical staff (i.e. a doula). Also, a, a doula is sometimes hired to work with families beyond the postpartum stages, providing continued physical and enthusiastic support, for as long as needed (sometimes, this support can be ongoing for several years) **(*Hodnett, E. et al, 2011).***

Modern hospital maternity care practices have diminished the availability of an attending nurse to remain with a mother during labor. A result of this has been the loss of having someone at the bedside to offer continuous support throughout the birthing process, as a result of this has been the loss of having someone at the bedside to offer continuous support throughout the birthing processBecause manywomen during labor are encouraged and comforted by having someone with her throughout delivery, support persons known as doulas havebecome increasingly present. **(Kenneth et al 2013).**

Doula's supportive care incorporates emotional support (continuous presence, encouragement and reassurance) and physical support (reduction of thirst, hunger, and pain, giving information about what is happening and how to deal with it, respecting the woman's decision, and helping her to create relationships with the caregivers) ***(Lundgren 2010)***. Supporting the mother has a considerable effect on reduction of labor pain. In this regard, **Hofmeyr et al, 1991**. Indicated that supporting the mother by the doula caused the mothers to report less pain. Also, ***Hodnett and Osborn1989*** stated that continuously supporting the mother by the doula during the labor significantly reduced utilization of analgesics. Doula calms the mother down during labor and suggests different positions to increase fetal descent. Besides, doula's support leads to less utilization of oxytocin for augmentation, lower rate of instrumental delivery, less utilization of epidural anesthesia and narcotics, and lower rate of cesarean delivery***(Gilliland, 2011)***.

An example of a non-pharmacological method is acupressure, which is a traditional Chinese medicine where acupuncture points are stimulated by hands, fingers, thumbs, or small beads.**(Coffoery & Beebe1994)**This method acts according to the gate control theory where burning, massaging, and scratching can stimulate the large fibers responsible for transmitting nerve impulses to the spinal cord. A sustained stimulation can keep the gates of pain transmission closed, which may result in decreased pain.6 On the other hand, the stimulation of acupressure points using heat, needles, or pressure causes the release of endorphins**(Borup et al 2009).**

An assortment of acupoints are valuable in labor to induce and manage labor, provide pain relief, It expands the intensity of uterine contractions (based on Montevideo unit) without affecting the duration and intervals of uterine contractions and, eventually, reduces the duration of delivery and shorten delivery time, including LI4. Hugo point (LI4), or Large Intestine, is one of the 14 main meridians on the body and studies have

shown that the stimulation of this point plays a key role in reduction of labor pain. Some studies have examined the effects of ice massage on LI4 and found that labor pain decreases**(Heydari ET al.2008 &Waters & Raisler 2003).**

Considering the harmful effects of severe delivery pain on mother, fetus, and delivery outcomes, safe and effective control of pain is of great importance. Nonetheless, there are limited studies of these methods, since non-pharmacological methods are not commonly used in Egypt on the impact of Doula's supportive care during labor and LI4 acupressure on labor pain intensity, duration and labor outcome. Thus, the present study aims to compare impact of Doula's supportive care during labor on the pregnant women's pain intensity and delivery outcome

Aim of the study

The aim of this study is to compare the effects of maternal supportive care and acupressure (at LI4 acupoint)during labor on labor pain intensity, and Apgar score.

Purpose of the Research

Objectives

1. Assess intensity of labor pain among intervention and control group.
2. Evaluate the Apgar score among intervention and control group.
3. To compare the effects of supportive care and routine care on the pregnant women's pain intensityand Apgar score.

Hypnosis

Laboring women receiving Doula's supportive care during labor was reduce intensity of labor pain and improve their delivery outcomes.

Methodology

Overview of the study

This randomized clinical trial was conducted in the delivery ward,since this study concerns the researcher to implement an intervention, the evaluation method of observation and assessment form was appropriate, Moreover, to make the study more rigorous, the control group was chosen firstly, the chosen design was enable the researcher to generalise the findings for all labouring women.

Study setting

The study was conducted in the delivery ward of Mansoura university Hospital in. This is a governmental health agency providing obstetrical, gynecological and child care services. It is chosen because it attracts women from all nearby areas and provides free cost health services for women during pregnancy time, natal, and postnatal.

Study Population and Sample:

This study wasemployinga probability sampling to choose participants from the selected sector according to their attendance within the research setting.

Sample criteria: any laboring woman was attending the mentioned study setting during the study period (6 months) was eligible for inclusion in the study sample if she fulfills the following eligibility criteria:

Inclusion Criteria:

- 18–35 years of age, term pregnancy,
- Singleton pregnancy and healthy fetal membranes.
- Primiparous at a gestational age of 37–42 weeks, cephalic presentation

- The participants' uterine contractions started spontaneously and,
- In active phase of labor (cervical dilatation 3-4 cm)
- Also, the study participants had no history of medical, surgical, cesarean section,cephalopelvic disproportion, or mental problems and had faced no special problems during pregnancy.
- **Researchers were excluded women who were decline participation,if they needed an emergency cesarean section, or who was not meet inclusion criteria.**

Sample size: This randomized controlled trail wasconducted in the delivery ward of the selected hospital of selected region (MansouraUniversity hospital) in 2016. Considering

$d = 5$, $\alpha = 0.05$, $1 - \beta = 0.90$, SD = 7, and the following Formula, 150-subject sample size (50 subjects in each group) was determined for the study.

$$N = \frac{2(z_{1-\alpha/2} + z_{1-\beta})^2 SD^2}{d^2}$$

The study population consists of 150 pregnant women were attending the study setting and fulfilling the inclusion criteria were recruited in the study sample. They wereselected through simple random sampling and assigned in an alternating way to one of the three following groups:

- ***Supportive care:*** those women who were receive the supportive care by; doula (the researcher) was constantly beside the mother from the beginning of the mother's maternity ward admission (beginning of the active phase of labor at 3-4 cm cervical dilatation) to the end of the second stage of labor. Supportive measures classified into psychological and emotional, educational, and physical categories were offered to the mother.

1-Psychological and emotional support includes touching, empathy, compassion, encouraging the mother to continue cooperation in the labor process, reassurance, taking mother's hands, maintaining eye contact, creating a sense of trust and confidence, continuous talking, and reduction of fear during labor.

2- Educational support includes informing the mother about the natural process of childbirth and answering her questions.

3- Finally, physical support includes cooling the mother, satisfying her hunger and thirst, and helping her change the positions in various stages of labor. These positions was as follows: the mothers followed activity positions, such as straddling a chair, leaning, tailor stretching, and lunging for 20 minutes at 3–8 cm dilatation. Then, they wererequiring following relaxing positions, such as semi-sitting and side-lying for 10 minutes. Since 8–10 cm dilatation, the mothers will follow fetal head descent positions, such as dangling, squatting, and hands and knees. 20 minutes will be considered for changing maternal positions during labor in order to avoid boredom and monotonous conditions for the mothers (n=50).

- **An acupressure group (acupressure on point L14),**a trained physiotherapist, certificated in the acupressure method, performed the treatment. Pressure was applied bilaterally within the contraction on Hugo point (LI4), which is located on the medial midpoint of the first metacarpal within the skin of the thumb and the index finger [Figure 1]. Prior to applying pressure the patient was asked to

take a deep breath then a rotational and vibration pressure was applied for 60 seconds, she then received a 60 second rest, and pressure was repeated. This cycle continued for 30 minutes. Accurate location of the acupoint was confirmed when the subjects felt heaviness, pressure, tingling, or numbness in the area or a pleasant feeling. the pressure was stopped temporarily and commenced after a few minutes if the participant reported feeling severe pain at the site of pressure,

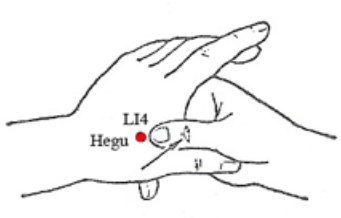

Figure 1**Acupressure was applied using fingers to hugo point LI4 located on the medial midpoint of the first metacarpal.**

- **C*ontrol Group***: those women who was only received the department's routine care and undergone no interventions (n=50).

Data Collection

Method for data collection (instrument)

Following three different tools was used to collect the necessary data to achieve the aim of the study, they was:

I- Interviewing questionnaire form.

The questionnaire was developed and constructed by the researcher after reviewing the literature and expertise' opinions. The sheet was designed in Arabic form to avoid misunderstanding, designed for the study's objectives and consisted of different questions /phrases in three parts including:

- **First part:** Woman's socio-demographic data such as age, level of education, job status, income and residence as was as the identification data as the address and telephone number. It consists of 7 questions covering the previous items.
- **Second part:** Included familial status
- **Third part**: Obstetrical history which include; gravidity, parity, weeks of gestation, and current pregnancy information.

II- Observation form including evaluation of:

- uterine contractions,
- fetal heart rate,
- labor progress,
- and delivery outcome(Apgar score)

III: Visual Analogue Scale (VAS)(Appendix III)

VAS is a scale numerated from 0 to 10 with 0, 1–3, 4–6, 7–9, and 10 representing no, mild, moderate, severe, and the worst possible pain, respectively where 0 indicated no pain and 10 indicated extreme and intolerable pain. ***(McCaffery1999).***At every stage of the trial, the participant ticked her pain level on a VAS. For each group the average pain intensity was calculated before and after the intervention, and then comparisons made between the groups.

Operational Design

The operational design was include preparatory phase, content validity, reliability, pilot study.

Preparatory phase

It includes reviewing of literature, different studies and theoretical knowledge of various aspects of the problems using books, articles, internet, periodicals and magazines.

Content validity

The researcher, after extensive review of the literature, prepared the tools for data collection. Then, the tools were tested for their content validity through the opinions of experts (a jury). These included 5 experts in the field of obstetrics and gynecology from medical and nursing faculty staff whose opinions. To make sure that the study tools looks though it measured what supposed to measure. Was think using an opinionare sheet. Thus sheet involved two parts: (1) the opinions of the expert for each item regarding its relevance and clarity; (2) general or overall opinion about the form. They was requested to express their opinions and comments on the tool and provide any suggestions for any additional or omissions of items.

Reliability

Cronbach alpha coefficient was calculated to assess the reliability of the developed tool through their internal consistency.

Pilot Study

A pilot study was carried out after the development of the study and before embarking on the actual study (data collection). It was conducted during 2016 on 10% of the study subjects. It was carried out on 15 women who match with eligibility criteria in order to test the applicability of the tools, clarity and simplicity of the included questions as was as to estimate the average time needed to complete the sheets. Those who shared in the pilot study were excluded from the main study sample. Necessary modifications were carried out based on the finding of the pilot study to develop the final form of the tools. Finally, making assurance that each tool as a whole achieved the aim of the study.

Procedures

Approval to approach the participants was sought through the formal channels of the University and the managers of the hospital. Following this pilot study, the process of data collection and implementation of the supportive care and acupressure, the sample was accessed during the period, March 2016 to Sept. 2016(duration of the six-month period.). We wereinviting the participants who fulfilling the eligibility criteria to contribute to the study during the morning shift at labor ward. Subsequently, the informed consent was obtained from all participants before employing using the three data collection forms. These forms were done for both study and control groups, but the supportive care by Doula (the researcher) and acupressure was administered to members of the study group only.

Implementation phase:

All of the education was conducted by the researcher (doula) who had adequate experience in the field of health education and full understanding of this care.

The supportive care by Doula (the researcher) was administered to members of the supportive care group only (n=50). Different and suitable teaching methods was used including; booklet, data shows (laptop), and real objects.

An acupressure group (acupressure on point L14),a trained physiotherapist, certificated in the acupressure method, performed the treatment. Pressure was applied bilaterally during the contraction on Hugo point (LI4), which is located on the medial midpoint of the first metacarpal within the skin of the thumb and the index

finger. Before applying pressure the patient was asked to breathe deeply then a vibration and rotational pressure was applied for about 60 seconds, she then received a one minute (60 second) rest, and pressure was repeated. This cycle continued for 30 minutes. Accurate location of the acupoint was confirmed when the subjects felt heaviness, pressure, numbness in the area or a pleasant feeling. If the participant reported feeling severe pain at the site of pressure, the pressure was stopped temporarily and commenced after a few minutes

Data Analysis

Statistical testing depends on the level of measurement and sample size. The data was collected by the researcher and entered via statistical program SPSS statistical software (v. 16) with the support of a statistical specialist. Then, the data was analyzed using descriptive and inferential statistics. Wilcoxon nonparametric test, Chi-square test, and one-way ANOVA. After all, it can be presented in tables.

Ethical Consideration

In this study, the researcher was first seek ethical approval from the university's then seek official permission from hospital director and participant it was through .

1-A letter was written and sent to the director of the hospital to provide anexplanationabout the aim of the study to take their permission.

2-Participation was voluntary and based on the women ability to provide informed consent and signed it after they have read all of the details. The consideration of ethical issues was including an explanation of the purpose of the study; a statement that the participants can withdraw at any time, assurance of the confidentiality of the information obtained, wasmaintaining their privacy. And a statement that there was no risks associated with participation in the study.

Timescale

A timescale reveals that the researcher aware about the need for planning the study and has considered how long the different tasks might take. This study was aim to be completed within one year and four months, during which the data collection and analysis were achieved. Table 4.8.1 presents the outlines of each task including estimates of the duration of each one.

N	Activity Task name	Start	Finish	Nov 2015	Dec 2015	Jan 2016	Fib 2016	Mar 2016	Sep 2016	Nov 2016	Dec 2016
1	**Research Proposal**	**2/11/2015**	**20/12/2015**								
2	**Literature review**	**20/12/2016**	**30/01/2016**								
3	**Ethical approval**	**1/2/2016**	**10/02/2016**								
4	**Negotiate sampling and access**	**10/02/2016**	**25/02/2016**								
5	**Pilot study**	**1/03/2016**	**10/03/2016**								
6	**Data collection**	**10/03/2016**	**10/09/2016**								
7	**Data analysis**	**10/09/2016**	**10/11/2016**								
8	**Revisit literature and writing**	**10/11/2016**	**10/12/2016**								
9	**Final draft &publication**	**1/1/2017**	**1/3/2017**								

Table (8-1): Gannat Chart

Results

Table 1&2:A total of 150 women were enrolled across three groups, 50 in the acupressure group, 50 in Doula supportive care group, and 50 in the control group. There were no significant differences in demographic characteristics [Table1] between the three groups (p=>0.05). All three groups were similar in terms of gestational age, gravidity, parity, and cervical dilatation before intervention [Table 2].

Table 3: Considering the intensity of pain, the results ofWilcoxon nonparametric test showed no significant difference among the supportive care (6.48+2.23), acupressure (6.54 ± 1.054), and control groups (6.20±1.088) before the intervention (P = 0.354). After the intervention, however, the intensity of pain reduced in the supportive care (3.54±1.328) and acupressure groups (3.44 ±0.908) compared to the control group (9.40 ± 1.010) and the difference was statistically significant (P <0.001). Nonetheless, no significant difference was observed between the two intervention groups concerning the intensity of pain (P > 0.05) **[Table 3].**

Table 4: illustrates the first- and fifth-minute Apgar scores the results revealed a significant difference among the three groups regarding the first- and fifth-minute Apgar scores (P<0.001). The frequency of first-minute Apgar scores<8 in the control group was higher compared to the supportive care and acupressure groups by 40% and 34%, respectively. Also, the frequency of fifth-minute Apgar scores<8 in the control group was higher compared to the supportive care and acupressure groups by 18%. The frequency of first-minute Apgar scores>8 was higher in the acupressure and supportive care groups (84% and 78%) compared to the control group (44%). The frequency of fifth-minute Apgar scores>8 was also higher in the acupressure and supportive care groups (98 %,) in comparison to the control group (80%)

Table 1: Comparison of demographic characteristics among the three groups.

Variables	Supportive care (n = 50)	Acupressure (n = 50)	Control (n = 50)	χ^2	P value
Age (years)*	27.22±4.40	26.46+4.48	26.24±3.84	0.664	>0.05
Education No. (%)					
Illiterate	3(6.1%)	3(6.1%)	4 (8%)	1.00	>0.05
Elementary	30(60%)	28(57.2%)	27(54%)		
Secondary	14(28.3)	16(32%)	15 (30%)		
Collage or above	3(6.1%)	3(6.1%)	4 (8%)		
Occupation No. (%)					
Employee	0	2(4%)	2(4%)	2.03	>0.05
Housewife	50(100%)	48(96%)	48(96%)		
Residence					
Rural	23(46.0%)	28(57.2%)	22(42.8)	1.20	>0.05
Urban	27 (54.05%)	22 (44.0%)	28(57.2%)		

*mean ± SD Significance level: P< 0.05.

Table 2: Comparison of obstetric characteristics among the three groups (n=150).

Variables	Supportive care (n = 50)	Acupressure (n = 50)	Control (n = 50)	P value
Gestational age(weeks)*	**38.86±1.07**	**38.58±.95**	**38.76±0.91**	**>0.05**
Parity				
Primiparous (n)	**50(100%)**	**50(100%)**	**50(100%)**	**>0.05**
Cervical dilatation at admission (cm)*	**3.47±0.87**	**4.23+0.79**	**4.56±1**	

*mean ± SDSignificance level: P< 0.05

Table 3: Comparison of the mean intensity of pain in the three groups before and after the intervention.

Pain assessment time	Supportive care (n = 50) M ± SD	Acupressure (n = 50) M ± SD	Control (n = 50) M ± SD	P value
Before the intervention	6.48+2.23	6.54± 1.054	6.23± 1.088	0.110
After the intervention	3.43± 1.328	3.44 ± 0.908	9.44± 1.010	0.000

Significance level: P< 0.05

Table4. Comparison of the first and fifth minute Apgar scores of the infants in the intervention and control groups

Apgar score after birth	Supportive care (n = 50)	Acupressure (n = 50)	Control (n = 50)	P value
First minute Apgar score				0.000
<8	8(16%)	11(22%)	28(56%)	
≥8	42(84%)	39(78%)	22(44%)	
Five minute Apgar score				
<8	1(2%)	1(2%)	10(20%)	
≥8	49(98%)	49(98%)	40(80%)	

Significance level: P< 0.05

Discussion

In this study every one of the members means all the participants' pain intensity increased by increase in dilatation of the cervix in the first stage of labor. However, the intensity of pain was lower in the two intervention groups compared to the control group and the difference was statistically significant (P< 0.001).

As indicated by ***Baker A., et al, (2016),*** the intensity of pain is to a great degree high in the first stage of labor, especially in the transition phase (8–10 cm dilatation).In light of Western medicine, the intensity of uterine contractions (labor pain) is closely related to delivery pain. However, pharmacological method and interventions prevent effective uterine contractions but some medications increase uterine contractions; they increase the delivery pain, as well. However, Traditional Chinese Medicine (TCM) has shown that acupressure can maintain balance during labor, reduce labor pain, and improve the delivery process by increasing the uterine contractions**(Borup 2009)**.

Chung et al. 2003additionally revealed that the members of the pressure point massage assemble experienced less pain during labor compared to those of the control group**.** Diminishment of pain by acupressure atLI14 acupoint can be legitimized by the gate control theory of pain. As indicated by this theory, acupoints are an areas of sensory receptors with thin afferent fibers (A-delta and C-fibers) set in the muscles. By incitement and stimulation of nerve at these points by pressure, needle, or trans-cutaneous electrical nerve stimulation (TENS), the sensory receptors are activated and send the stimulations to the spinal cord. In this way, the axis of the spinal cord, midbrain, and hypothalamic-pituitary are activated, initiated, and present their pain relieving impacts and analgesic effects through releasing enkephalin and endorphin **(Setax & Pomeranz, 2006).**

In this study discovering, we tried to decide the impact of pressure point massage on labor pain and labor outcome. Utilization of the pressure point massage procedure on Hugo (L14) point was fundamentally powerful and significantly effective in reducing pain intensity, Acupressure through the gate control theory of pain and the secretion of endorphins decreases and reduces the severity of labor pain. **(Enjezab, et al 2008&Borup et al 2009)**

The consequences of this study were steady with different reviews done in this field. **Chunget al2003** studied the effect of L14 and BL67 acupressure on labor pain and uterine contractions and found a critical significant difference in pain intensity after the intervention. However, in the transitional phase of labor no pain reduction was observed. Studies by **Waters & Raisler 2003,Enjezabet al.2008,Smith2011 And Fatemeh 2014**demonstrated that utilizing ice

rub on the Hugo point diminished pain intensity 30 minutes after intervention., In addition, **Qu,** concentrated the impact of electro-needle therapy on focuses L14 and SP6 on the intensity of labor and inferred that the intervention could cause reduction in pain during the active phase.

Conversely,, Lawrence specified that acupuncture had no effects on reduction of labor length **(Lawrence, et al 2009).**The distinction between that review and the present one may be because of various meanings of the first stage of labor. In the present study and other comparative studies, the first stage of labor began from 3cm dilation to complete dilation. Lawrence, however, considered this stage from the time the number, length, and intensity of contractions were sufficient for opening of the cervix. It is significant that in nothing from what was just mentioned specified, acupressure increased the first stage of labor. Moreover, not only these non-pharmacological methods did not inhibit the uterine contractions, but they also sedated the delivery pain and enhanced the delivery progress.

In the present study, doula's continuous support significantly reduced the intensity of labor pain contrasted with the control group, which is consistent and steady with the results of many studies and reviews directed on the issue. For instance, the study by **Grath and Kennell 2008 and Marzieh etal 2014**showed that continuous and persistent support during labor considerably diminished the need for analgesics Also, the consequences of the examination by **Pascali-Bonaro2004**demonstrated that supporting the woman during labor facilitated labor and decreased the intensity of delivery pain**.**

Reduction of pain by this strategy can be justified by Melzack's neuromatrix theory. This theory gives a novel concept of a widely distributed neural network in perception and reception of pain on one hand and individuals' responding method and physical as well as psychological behavior on the other hand. According to this theory, pain is a multifactorial experience. Besides, based on the brain's view towards the whole body, it not only responds to the sensory input, but it can also experience pain without any input or stimulation from the sensory neurons**(Trout, 2004,& Lundgren, 2010).**

Hence, presence of the doula, her psychological support, and suggestion of various positions during stages of labor led to a decrease of mother's pain by changing her physical and psychological behavior.

Regarding Apgar scores the findings of the our study showed a significant statistically difference among the three groups regarding the first- and fifth-minute Apgar scores ($P<0.001$). The frequency of Apgar scores<8 in the first and fifth minutes was higher in the control group compared to the supportive care and acupressure groups.

After 70 years, Apgar scoring system is still the best method for assessment of newly born prognosis. It describes the status of the newborn infant immediately post birth and, when properly applied, is a tool for standardized evaluation**(Kasdorf et al 2015).**The Apgar score provides an accepted and convenient method for reporting abstract the condition of the infant immediately after birth and the response to resuscitation if needed**(American Academy of Pediatrics and American Heart Association2011).**

First-minute Apgar score indicated the infants' need for resuscitation.A 5-minute Apgar score of 0 to 3 correlates with neonatal mortality in large populations but does not predict individual future neurologic dysfunction. However, a low 5-minute Apgar score clearly confers an increased relative risk of determines the probability of death or nervous complications as cerebral palsy, more precisely. Although individual risk varies, the population risk of poor neurologic outcomes also increases when the Apgar score is 3 or less at 10 minutes, 15 minutes,

and 20 minutes. When a newborn infant has an Apgar score of 5 or less at 5 minutes, umbilical arterial blood gas samples from a clamped section of the umbilical cord should be obtained, if possible. Submitting the placenta for pathologic examination may be valuable**(Malin 2010).Cunningham et al 2010** demonstrated that prolonged labor was accompanied by Apgar scores<7due to long labor stages and disruption of delivery phases

Besides, a few scientists have demonstrated that decreased labor pain and the length of labor stages through non pharmacological pain relief enhance and improve maternal and fetal outcomes. **Andrews & Chrzanowski, 1990**and **Ben et al. 2010** revealed that mother's activity during labor pain reduced labor pain and the length of labor stages, improved maternal and fetal outcomes, improved infants' first- and fifth-minute Apgar scores, and reduced the rate of transfer to the neonatal ward. These results were all in agreement with those of the present study. However, **Liu 1989**and **Akbarzadeh 2015**reported that mother's activity had no effects on infants' Apgar scores improvement.

The difference between these two studies and the current one might result from the fact that they only investigated physically supporting the mother. In the present study, however, the doula provided the mother with various physical support (suggestion of appropriate positions and activities) as well as emotional and mental support which reduced mothers' anxiety, improved her self-confidence, and decreased labor disorders and pain .

Conclusion

The findings of the present study showed that supportive care andL14 acupressure are a suitable non-pharmacological technique that is easy to perform and effective in elevating pain, without causing adverse side effects for the mother or baby and increased the infants' Apgar scores compared to the control group. Therefore, these two non-pharmacological methods which are easy to perform and are not accompanied by any side effects can be employed during labor to achieve better delivery outcomes.

Recommendation

- Due to the simplicity and safety of the acupressure technique, L14 acupressure is easy to perform and can be used to reduce pain during the active phase of labor rather than using pharmacological methods.
- It is necessary to make childbearing pleasant and reduce maternal fear of normal labor by using safe methods to reduce labor pain and increase the rate of vaginal delivery.
- Nurses at the delivery room need training in using non-pharmacological techniques and the attitudes and policies of the hospitals need to be altered toward it.
- Perinatal health care professionals should be consistent in assigning an Apgar score during resuscitation; therefore, the American Academy of Pediatrics and the American College of Obstetricians and Gynecologists encourage use of an expanded Apgar score reporting form that accounts for concurrent resuscitative interventions.
- The impact of supportive care by Doula in Mansoura region appears to be innovative. The findings provide knowledge that assist in the future implementation and evaluation of supportive care by doula for laboring women in different setting using a large sample size.

References

Abbasi Z, Abedian Z, Fadaei A. (2009): The Effect of Back Massage on Pain Intensity during First stage of labor in primiparous women. Iranian Journal of Obstetrics, Gynecology and Infertility. (4):39-47.

Akbarzadeh M, Masoudi Z, Zare N, Kasraeian M. (2015): Comparison of the Effects of Maternal Supportive Care and Acupressure (at BL32 Acupoint) on Labor Length and Infant's Apgar score. Glob J Health Sci. 19; 8(3):236-44.

American Academy of Pediatrics and American Heart Association. (2011) Textbook of Neonatal Resuscitation. 6th ed. Elk Grove Village, IL: American Academy of Pediatrics and American Heart Association

Andrews, C. M., & Chrzanowski, M. (1990). Maternal position, labor, and comfort. ApplKnurs Res., 3(1), 7-13.

Baker A., Ferguson S., Roach G., Dawson D. Perceptions of labor pain by mothers and their attending midwives. Journal of Advanced Nursing.2001;35:171-179. Retrieved 30 July 2016.

Balas, M. C.; Gale, M.; Kagan, S. H. (2004)."Delirium doulas: An innovative approach to enhance care for critically ill older adults". Critical care nurse. 24 (4): 36–46. PMID 15341233.Retrieved 30 July 2016.

Ben Regaya, L., Fatnassi, R., Khlifi, A., Fekih, M., Kebaili, S., Soltan, K., et al. (2010). Role of ambulation during labor: A prospective randomized study. J Gynecology Obstetric Biol Reprod (Paris), 39(8), 656-62.

Borup L, Wurlitzer W, Hedegaard M, Kesmodel US, Hvidman L. (2009) Acupuncture as pain relief during delivery: a randomized controlled trial. Birth Mar; 36(1):5-12.

Brownridge P., 2016. "The nature and consequences of childbirthpain," The European Journal of Obstetrics & Gynecology andReproductive Biology, 59(15) pp. S9–S15.

Brüggemann O. Evidence on support during labor and delivery: a literature review. In: Parpinelli MA, ed. Caderno deSaúde pública, Rio de Nov; 2016.

Chung, U. , Hung L. C., Kuo S. C., and Huan C. L. g,(2003) :Effects of LI4 and BL 67 acupressure on labor pain and uterine contractions in the first stage of labor, Journal of Nursing Research, 11 (4) pp. 251–260

Chor J, Goyal V, Roston A, Keith L, Patel A. (2012): Doulas as Facilitators: The Role of Doulas in Abortion Care. Journal of Family Planning and Reproductive Health Care. 38(2):123–4.

CoffoeryM , Beebe M(1994) .Pain Clinical manual for nursing practice. 1st edition. Mosby. London.

Cunningham, F. G., Leveno, K. J., Bloom, S. L., Hauth, J., Rouse, D., &Spong, C. (2010). Williams Obestrics. (23 Ed.)In T. Edition (Ed.). New York: McGraw Hill; 2010

Enjezab B, khoushbin A, Bokaei M, Naghshin N. (2008): Effect of ice massage on Hugo point for reduction of labor pain. Journal of Shahid Sadoughi University of Medical Science and Health services. 15(4):69-74.

Qu F, Zhou J. Electro-Acupuncture in Relieving labor pain.eCAM 2007;4(1)125-130

Fatemeh D. and Arefeh S. (2014): The Effect of LI4 Acupressure on Labor Pain

Intensity and Duration of Labor: A Randomized Controlled Trial Oman Medical Journal. 29(6): 425–429

Gilliland A. L., (2011) "After praise and encouragement: emotional support strategies used by birth doulas in theUSA and Canada," Midwifery, vol. 27, no. 4, pp. 525–531

Grath M. and Kennell and Marzieh A., ZahraM. Mohammad J. Hadianfard, Maryam K.,4 and Najaf Z. (2014) Comparison of the Effects of Maternal Supportive Care and Acupressure (BL32 Acupoint) on Pregnant Women's Pain Intensity and Delivery Outcome. Journal of Pregnancy 19; 8(1) P244.

Harms, Rogert W.Does back labor really happen?, mayoclinic.com, Retrieved 8 December 2016

Heydari P, Mozhdeh F, Mazloum SR, Tanbakouei K, Joudaki K. (2008) Effect of acupressure on labor pain intensity. Hakim 11(2):39-46

Hofmeyr G. J., Nikodem V. C., Wolman W., Chalmers B. E.,and Kramer T.,(1991) "Companionship to modify the clinical birth environment: effects on progress and perceptions of labor, and breastfeeding," British Journal of Obstetrics and Gynecology, vol. 98, no. 8, pp. 756–764.

Hodnett E. D. and Osborn R. W., (1989) "Effects of continuous intrapartum professional support on childbirth outcomes."Research in Nursing & Health.12 (5) pp. 289–297

Hodnett, E. D.; Gates, S.; Hofmeyr, G. J.; Sakala, C.; Weston, J. (2011). Hodnett, Ellen D, ed. "Continuous support for women during childbirth". The Cochrane Library (2): CD003766. doi:10.1002/14651858.CD003766.pub3. PMID 21328263.

Kasdorf E, Laptook A, Azzopardi D, Jacobs S, Perlman JM.(2015) Improving infant outcome with a 10 min Apgar of 0. Arch Dis Child Fetal Neonatal Ed.100(2):102–5.

Kenneth J. Gruber, PhD Susan H. Cupito, MA Christina F. Dobson, Med, (2013): Impact of Doulas on Healthy Birth Outcomes. The Journal of Perinatal Education, 22(1), 49–56, http://dx.doi.org/10.1891/1058-1243.22.1.49

Klaus, M., & Klaus, P. (2010). Academy of Breastfeeding Medicine Founder's Lecture: Maternity care re-evaluated. Breastfeeding Medicine, 5(1), 3–8.

Lawrence, A., Lewis, L., Hofmeyr, G. J., Dowswell, T., & Styles, C. (2009).Maternal positions and mobility during first stage labor.Cochrane Database Syst Rev., 15(2), CD003934.http://dx.doi.org/10.1002/14651858.cd003934.pub2

Lee M, Chang S., & Kang D. (2004): Effects of SP6 acupressure on labor pain and length of delivery time in women during labor. J Altern Complement Med Dec; 10(6):959- 965.

Liu, Y. C. (1989). The effects of the upright position during childbirth. Image J Nurs Sch., 21(1), 14-8.

Lowe NK.The pain and discomfort of labour and birth.J ObstetGynecol Neonatal Nurs. 1996;25(1):82-92.Retrieved 30 July 2016.

Lundgren I., (2010) "Swedish women's experiences of doula support during childbirth," Midwifery, vol. 26, no. 2, pp. 173–180.

Malin GL, Morris RK, and KhanKS (2010): Strength of association between umbilical cord pH and perinatal and long term outcomes: systematic review and meta-analysis. BMJ.; 340:c1471.

Martin, Elizabeth. Concise Colour Medical Dictionary.Oxford University Press.p. 375.ISBN 9780199687992.Retrieved 30 July 2016.

McCaffery M. and Pasero, C. (1999): Pain: Clinical Manual, Mosby, St. Louis, MO, USA,

Niven C. Coping with labour pain: the midwife's role In: Robinson S and Thomson A M (eds) Midwives, Research and Childbirth Vol3 London: Chapman and Hall,1994.Retrieved 30 July 2016.

Pascali-BonaroD.& Kroeger M., (2004): Continuous female companionship during childbirth: a crucial resource in times of stress or calm," Journal of Midwifery and Women's Health, vol. 49, supplement 1, no. 4, pp. 19–27.

Smith, C. CollinsC, Crowther C., and Levett K., (2011) Acupuncture or acupressure for pain management in labour,Cochrane Database of Systematic Reviews, 6, (7):6

Sauls, D. J. (2002). Effects of labor support on mothers, babies, and birth outcomes. Journal of Obstetric, Gynecologic, and Neonatal Nursing, 31(6), 733–741.

Simkin P, Bolding A. (2004): Update on nonpharmacological approaches to relieve labor pain and prevent suffering. J Midwifery Women'sHealth.Nov-Dec; 49(6):489-504.

Trout K., (2004): The neuromatrix theory of pain: implications for selected nonpharmacological methods of pain relief for labor," Journal of Midwifery & Women's Health, vol. 49, no. 6, pp. 482–488.

Waters BL, Raisler J. (2003): Ice massage for the reduction of labor pain. J Midwifery Women's Health. Sep- Oct; 48(5):317-321.