

# Comparison of the Effects of Maternal Supportive Care and Acupressure on Labor Pain Intensity and Apgar Score

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**Abstract:** Supportive care, and acupressure are measures used during labor process to achieve better outcome, and provide the mother with a sense of confidence and control. The aim of this study was to compare the effects of maternal supportive care and acupressure on labor pain intensity and Apgar score. A quasi-experimental design was adopted in the delivery wards in the Suez Canal University and General hospitals. The study comprised a purposive sample of 126 parturient women that divided equally into supportive care, acupressure, and control groups. The tools of data collection were; a structured interviewing questionnaire, visual analogue scale, and Apgar score record. The results of the present study showed that, there was a statistical significant difference between supportive care, acupressure, and control groups regarding the mean first minute Apgar score. Also, there was a reduction of labor pain intensity post intervention at cervical dilatation (7-8) cm for acupressure, supportive care groups. It can be concluded that supportive care and acupressure during labor reduce labor pain intensity and elevate Apgar score. The study recommended that, providing a support person with a mother during labor to improve the outcome, and training all the maternity staff on supportive care measures and acupressure.

**Keywords:** Supportive care, Acupressure, Labor pain intensity, Apgar score.

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## 1. INTRODUCTION

Birth experience is the physiological, psychological, and emotional changes that take place during pregnancy which help to prepare the woman for labor and birth. Normal labor is the process whereby painful, regular uterine contraction with progressive cervical dilatation and effacement accompanied by descent of the presenting part leads to spontaneous expulsion of a single, mature (37-42) completed weeks of pregnancy, alive fetus, through the natural passages, presenting by vertex, within a reasonable time, without fetal or maternal complications [17].

Excessive pain during labor intensifies woman's fear and anxiety during labor and stimulates the sympathetic nervous system. These enhance secretion of some substances such as epinephrine and norepinephrine, thus leading to more pain, decrease uterine contractility, prolong labor stages, and lead to dissatisfaction with the woman's delivery experience [8, 20].

Acupressure is a technique which activates specific energy points on the body. It based on the concept that there are numerous channels of energy throughout the body called meridians. These meridians may become either blocked or over-stimulated. Maternity acupressure is used mainly to induce and ease the effects of labor by applying pressure on these energy channels, the blood flow is stimulated the baby to descend into the pelvis and get into the normal position for delivery, thus it stimulates the dilatation of the cervix, initiation of contractions, and reduction of labor pain [1].

Moreover, labor support is a term used by intra-partum nurses to describe the supportive care provided to women during labor, which may be emotional support alone, or conceptualized as having various categories such as emotional support, physical comfort, informational, and advocacy. Emotional support can include nursing presence, effective caring attitude, distraction and partner care. Physical support and comfort measures enhance labor progress and increase satisfaction with the birth experience [19].

Non-pharmacologic measures which include labor support and acupressure are based on the gate control theory of pain. These measures are usually safe, inexpensive, and woman should be encouraged to practice them in childbirth classes prior to real birth for best results in improving labor outcome [21].

Nurses play a key role in educating women and their support persons acupressure and supportive care measures to make sure that couples understand them according to their benefits and risks. Couples need support for their choices so that, they can feel confident in the method chosen. The nurse supports and assists the woman as she uses non-pharmacologic interventions for achieving better labor outcome [16].

### **Significance of the study**

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 [6].

Meanwhile, the use of pharmacological measures to improve labor outcome proved to have side effects on both mother and the fetus. Therefore, it is recommended to use effective and low-cost non-pharmacological method to improve labor progress [12]. Despite this evidences, huge paucity of data on the magnitude of this problem was present in Ismailia. Therefore, the study was conducted to compare between the effective uses of these methods to provide woman centered care during delivery.

### **Aim of the Study**

This present study aimed to compare the effects of maternal supportive care and acupressure on labor pain intensity and Apgar score.

### **Research objectives:**

- 1- Compare the effects of maternal supportive care versus acupressure (at BL32 acupoint) on labor pain intensity.
- 2- Compare the effects of maternal supportive care versus acupressure (at BL32 acupoint) on Apgar score.

### **Research Hypotheses:**

Parturient woman who will receive maternal supportive care or acupressure during their active phase of labor will exhibit reduction in labor pain intensity and elevating Apgar score than those who received routine intervention.

## **2. SUBJECTS AND METHODS**

### **Study Design**

A quasi-experimental design was utilized in this study to compare between the effect of two intervention groups (supportive care, acupressure), and control group during the first, and the second stage of labor on labor length, and cervical dilatation.

### **Study Sample**

Purposive sampling technique was used in recruiting subjects in the three groups according to the inclusion and exclusion criteria. The investigator determined three days to collect data from intervention group from Suez Canal University Hospitals, and other three days to collect data from control group from the General Hospital.

Nulliparous women were selected based on inclusion criteria which were: age is ranged between 18 and 35 years; women who were free from medical, obstetric, and fetal complications, which would affect the labor progress; singleton and live fetus with vertex presentation; cervical dilatation from 3-4cm; gestational age between 37 and 42 weeks; the woman did not receive epidural analgesia. Exclusion criteria were: woman who had induction of labor; those who had a cesarean delivery.

**Sample Size**

The sample size was calculated according to the following equation :

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

Considering,  $d=5$ ,  $\alpha=0.05$ ,  $1-\beta=0.90$ ,  $SD=7$ ,

$n= 42$  subjects per group.

the total number = 126 women (*Charan and Biswas, 2013*).

**Setting**

Two settings were selected in this study; delivery wards at the Suez Canal University Hospital in which care provided for about 1726 women annually for 40 Egyptian pounds. The General Hospital provided care for about 1516 women annually for 5 Egyptian pounds (*Statistical Department, 2017*).

Labor and delivery unit in Suez Canal University Hospitals consist of two parts for normal labor: one for the first stage of labor, which includes 3 beds, and the other part for delivery that includes 2 rooms for vaginal deliveries. In addition, 3 rooms; 2 for critical cases (one for pre-eclampsia and another for recovery after operation), and one for postpartum care. Care is provided by baccalaureate, diploma nurses, and nursing students.

Labor and delivery unit in the General Hospital consists of two parts: one for first stage of labor which includes 7 beds and the other part for delivery which includes 2 rooms for vaginal deliveries. Care is provided by diploma nurses and nursing students for laboring women.

**Tools of Data Collection**

Two tools were used achieve the study aims as the following:

**I - Apgar score record:**

Is a method for rapid evaluation of the infant's cardiorespiratory adaptation after birth. The nurse scores the infant at 1 minute and 5 minutes in each of five areas. The assessments include activity, breathing, grimace, appearance, respiration. The infant is assigned a score of 0 to 2 in each of the five areas. General guidelines for the infant's care are based on three ranges of 1-minute scores: 0 to 2; 3 to 6; 7 to 10.

**II- Visual Analogue Scale:**

This aimed to assess pain intensity. VAS is a 10-centimeter horizontal line with defined boundaries which ranging from no pain to the worst possible pain. The intensity of pain was calculated from point zero to the point where the nulliparous women had marked in centimeters.

**Content validity**

Tools were submitted to a panel of 5 experts; two experts in the field of Maternity, Obstetrics and Gynecology Nursing and three experts in the field of Obstetrics and Gynecology Medicine to test the content validity. Modifications were carried out according to the panel judgment on clarity of sentences and appropriateness of content.

**Ethical considerations**

Oral approval was obtained from the nulliparous women. All of them were informed about the nature, process, and expected outcomes of the study. They were reassured that the study was safe, the information obtained was confidential and was used only for the purpose of the study and informed about their rights to withdraw at any time they wanted throughout the study.

**Pilot study**

Pilot study was carried out on 10 % of the sample (13 of nulliparous women) who were selected to assess the feasibility and clarity of the tools and determine the needed time to answer the questions. This sample was excluded from the study sample. The pilot study lasted for one month.

## *Procedures*

### *Preparatory phase:*

The investigator undertook a review of past and current available literature relevant to the study topics in order to acquire in-depth theoretical knowledge of the various aspects of the problem. This was done using textbooks, articles in scientific periodicals and magazines, and internet search. This helped in the selection of the pertinent and validated data collection tools.

**In acupressure group:** The investigator trained on how to apply acupressure on the (BL 32) acupoint under the supervision of physiotherapist at the Suez Canal University Hospitals in Ismailia and the document was obtained.

**Permission:** An official letter was issued from the Faculty of Nursing, Suez Canal University to the directors and heads of delivery wards of the Suez Canal University and the General Hospital in Ismailia city to obtain their permission to conduct the study.

After the preparatory phase had been finished, data was collected. Data collected through four phases: interviewing; assessment; implementation and evaluation phase.

**1-Interviewing Phase:** Nulliparous women who fulfilled the criteria for selection, and gave their verbal informed consent to participate were interviewed using the interview questionnaire. This was done individually and ensuring total privacy. The interview took from 5 to 10 minutes for each nulliparous women.

**2-Assessment Phase:** In this phase, immediately after admission to labor and delivery unit, the investigator together with the on-duty physician started regular assessment of the mothers in all groups and her fetus to obtain base line information about progress of labor and fetal condition and exclude any abnormal condition that deviate from normal pattern of labor and monitor progress of labor. Intensity of labor pain was measured through visual analogue scale at cervical dilatation (3-4) cm, and (7-8) cm.

**3-Implementation Phase:** All women in the two study groups “supportive care group and acupressure group” received the theoretical and clinical training during their active stage of labor in the labor ward. Individual contact was essential to obtain the maximum benefit of the used method.

**For the supportive care group:** The investigator accompanied the mother from the beginning of her admission to the labor ward until the end of the second stage of labor and never left her alone. Supportive care activities were classified into: physical, emotional, informational support, and advocacy.

**Physical support include:** environmental control, changing woman position and encouraging ambulation during the first stage of labor, provide hygienic practice, bladder and bowel care, and hydration. **Informational Support include:** practicing the various type of breathing technique, encouraging spontaneous pushing, providing information about labor progress and procedures. **Emotional support include:** continuous presence, touching, reassurance, taking mother’s hands, maintaining eye contact, creating a sense of trust and confidence, continuous talking, and reduction of fear during labor. **Advocacy include:** respect the mother, keep privacy, encouraging the woman or their partner to ask questions and verbalize their preferences, asking her about what they want, supporting her decision, Amplifying the mother’s voice if she is being dismissed, or not heard.

**For the acupressure group:** it was comprised of 42 women upon whom acupressure was applied on the Ciliao point (BL32) by the investigator. Parturient woman was assisted by the investigator to assume comfort and proper position (sitting position) and the position of the investigator was behind the mother back to allow proper application of the procedure then the acupoint was determined.

This acupoint is located in the second hole of sacral bone, which lies approximately one index finger length above the top of the buttock crease and one thumb width either side of the spine. The pressure was continuously and gently applied by the right and the left thumbs from the beginning of uterine contraction to the end of it. The woman should take rest between contractions and then repeated pressure was done with each contraction through the 30 minutes. The pressure was applied for the first time when the cervix was 3-4cm then repeated when the cervix was 7-8cm dilatation.

**For the control group (n=42)** was left to the routine care of the hospital which include maternal and fetal assessment, hydration, bladder care and reassurance. Maternal and neonatal condition was also noticed and recorded.

**4-Evaluation Phase:** The investigator will measure the labor pain intensity through the visual analogue scale, and Apgar score at the 1<sup>st</sup> minute, and 5<sup>th</sup> minutes after the neonatal delivery.

**Statistical analysis:** Collected data was arranged, and analyzed by using Statistical Package of Social Science (SPSS) program. Chi-square test ,one-way ANOVA and Post-hoc test were used to identify the groups with significant differences.

### 3. RESULTS

The results of the present study are presented in the following sequence:

- Comparison between the Nulliparous Women in the Intervention and Control Groups regarding the Mean Apgar Score of the First Minute of Birth.
- Comparison between the Nulliparous Women in the Intervention and Control Groups regarding the Mean Apgar Score of the Fifth Minute of Birth.
- Comparison between the Nulliparous Women in the Intervention and Control Groups regarding the Visual Analogue Scale for pre and post intervention at Cervical Dilatation (3-4) cm .
- Comparison between the Nulliparous Women in the Intervention and Control Groups regarding the Visual Analogue Scale for pre and post intervention at Cervical Dilatation (7-8) cm.

Table (1) shows that, the mean Apgar score regarding the first minute of birth was high in the supportive care and acupressure group compared to the control group ( $9.00 \pm .88$ ,  $9.2 \pm .857$ , and  $7.9 \pm 1.46$ ) respectively . There was a statistical significant difference between supportive care, acupressure, and control groups regarding the mean first minute Apgar score.

As shown in table (2), there was a slight variation of the mean Apgar score regarding the fifth minute of birth between the control, supportive care , and acupressure groups . The upper limit of the fifth minute Apgar score was(10.00) for the supportive care group in which the lower limit was (9.44 ) for the control group. There were no statistical significant differences found between three groups.

In which table (3) reveals that, there was a slight variation of the mean score regarding the visual analogue scale for pre intervention at cervical dilatation (3-4) cm between the supportive care, acupressure, and control groups. There was a significant reduction in the visual analogue scale for the supportive care, and acupressure group for post intervention. There was no statistical significant difference between supportive care, acupressure, and control groups for post intervention at cervical dilatation (3-4) cm.

Table (4) shows that, there was a statistical significant difference between the supportive care, acupressure, and control groups regarding the mean score of the visual analogue scale for pre intervention at cervical dilatation (7-8) cm. There was a statistical significant difference between supportive care and control group (.000\* ) , also between acupressure and control group (.000\*) for post intervention at cervical dilatation (7-8) cm.

**Table (1): Comparison between the Nulliparous Women in the Intervention and Control Groups regarding the Mean Apgar Score of the First Minute of Birth.**

Apgar score	Parameters	Control (n=42)	Supportive care (n=42)	Acupressure (n=42)	F (anova)	P value
First minute Apgar score	M±SD	7.95 ± 1.465	9.00 ± .883	9.26 ± .857	16.396	.000*
	Maximum	10	10	10		
	Minimum	4	7	7		
	Upper limit	8.41	9.28	9.53		
	Lower limit	7.49	8.72	8.99		

**Table (2): Comparison between the Nulliparous Women in the Intervention and Control Groups regarding the Mean Apgar Score of the Fifth Minute of Birth.**

Apgar score	Parameters	Control (n=42)	Supportive care (n=42)	Acupressure (n=42)	F (anova)	P value
Fifth minute Apgar score	M±SD	9.66 ± .693	9.90 ± .297	9.79 ± .470	2.405	.095
	Maximum	10	10	10		
	Minimum	7	9	8		
	Upper limit	9.88	10.00	9.93		
	Lower limit	9.44	9.81	9.64		

**Table (3): Comparison between the Nulliparous Women in the Intervention and Control Groups regarding the Visual Analogue Scale for pre and post intervention at Cervical Dilatation (3-4) cm .**

Stage	Parameters	Control (n=42)	Supportive care (n=42)	Acupressure (n=42)	P value
Visual analogue scale at cervical dilatation (3-4)	M±SD Pre	7.76 ± 1.625	7.76 ± 1.650	7.14 ± 1.372	.116
	M±SD Post	-----	5.52 ± 1.348	5.21 ± 1.180	.266
	Post Hoc Mean Differences - Sig. (Supportive care)	.006 / 1.000	-----	.619 / .165	-----
	Post Hoc Mean Differences - Sig. (Acupressure)	-.613- / .174	-.619- / .165	-----	-----

**Table (4): Comparison between the Nulliparous Women in the Intervention and Control Groups regarding the Visual Analogue Scale for pre and post intervention at Cervical Dilatation (7-8) cm.**

Stage	Parameters	Control (n=41)	Supportive care (n=42)	Acupressure (n=42)	P value
Visual analogue scale at cervical dilatation (7-8)	M±SD Pre	9.90 ± .374	8.98 ± .811	9.05 ± .854	.000*
	M±SD Post	-----	7.02 ± .869	6.86 ± .814	.367
	Post Hoc Mean Differences - Sig. (Supportive care)	-.926- / .000*	-----	-.071- / .891	-----
	Post Hoc Mean Differences - Sig. (Acupressure)	-.855- / .000*	.071 / .891	-----	-----

#### 4. DISCUSSION

The present study was conducted to compare the effects of maternal supportive care and acupressure on labor pain intensity and Apgar score. The hypothesis was “Parturient woman who will receive maternal supportive care or acupressure during their active phase of labor will exhibit a reduction in labor pain intensity and higher Apgar score than those who received routine intervention”.

The present study revealed that, Apgar score of the newborn at 1st minute of delivery for supportive care and acupressure groups were high compared with control group. There was a statistical significant difference between three groups regarding the first minute Apgar score. These results agreed with the study of *Ali et al., (2017)* who “compare the effects of maternal supportive care and acupressure during labor on labor pain intensity, and Apgar score.”. They revealed that, the frequency of Apgar score ≥ 8 in the first minute was higher in the supportive care and acupressure groups compared with the control group, and the difference was statistically significant (P<0.000) [5].



Moreover, the study conducted by *Akbarzadeh et al., (2016)* who “investigate the effects of maternal supportive care and acupressure (at BL32 acupoint) on infant’s Apgar score”. They revealed that, The frequency of first-minute Apgar scores  $\geq 8$  was higher in the acupressure and supportive care groups compared to the control group [4].

Also, the study of *Haghighi et al., (2016)* who “evaluate the effect of continued support of midwifery students in labour on the childbirth and labour consequences”. In which their results showed that, Apgar scores in the supportive group, compared to those in the non-supportive group, significantly increased at minutes 1 and 5 ( $p < 0.001$  and  $p = 0.04$ , respectively) [11].

On the other hand, the study conducted by *Gregson et al., (2015)* who “examined the induction of labor using acupressure in primiparous mothers who passed the gestation”, revealed that there was no significant effect of acupressure on Apgar score in the treatment group and the control group. Also, the study conducted by *Patty et al., (2017)* when they examined “the effect of acupressure on APGAR Score of newborn in primigravida”. These results showed that, there was no significant difference of APGAR score in the experiment and control group; but there was a significant effect of acupressure on the duration of the first stage of labor [10, 15].

Also the study of *Mehri et al., (2019)* who conducted a study to investigate “Effects of Acupressure on Labor Length and Outcome in Nulliparous Women: A Clinical Trial”. They showed that, there was no statistical significant difference between the study and control groups regarding the 1<sup>st</sup> minute Apgar score [14].

In the present study, there was a statistical significant difference in labor pain intensity between supportive care and acupressure group for post intervention at cervical dilatation (7-8) cm dilatation . This is supported by the study *Akbarzadeh et al., (2014)* who “compare the effects of supportive care and acupressure on the pregnant women's pain intensity and delivery outcome.” in which after the intervention, the intensity of pain reduced in the supportive care ( $3.54 \pm 1.328$ ) and acupressure groups ( $3.44 \pm 0.907$ ) compared to the control group ( $9.40 \pm 1.010$ ), and there was a statistically significant difference between three groups ( $P < 0.001$ ) [3].

This is in line with research of *Ghonemy et al., (2017)* who “evaluate the effect of continuous support provided by nurses during labor on the duration of the active phase of labor”. Their results revealed that, the mean visual analogue score show statistically significant differences between time points as the study group was reported less level of pain score than the control one [9].

Also the study of *Abd El-Razek, (2012)*, who examined “Effect of Presence of Trained Significance Others on Labor Outcomes and Mother's Satisfaction”. The results showed that, there were significant differences among two studies group regarding pain intensity in relation to cervical dilatation CX (3-4) cm, CX (5-7) cm, and CX (8-10) [2].

Moreover, the study of *Safarzadeh et al., (2012)* who assessed the “Effect Of Doula Support On Labour Pain And Outcomes In Primiparous Women In Zahedan, Southeastern Iran: A Randomized Controlled Trial”. The results showed that, no significant difference in the severity of pain at the beginning of active labour (4 cm cervical dilatation) was observed between the two groups ( $p=0.447$ ). However, there was a significant difference in the severity of pain between the two groups at the end of the second phase of labour (10 cm cervical dilatation) ( $p=0.001$ ) [19].

On the other hand, the study of *Mafetoni et al., (2016)* who analyzed the “effects of acupressure on labor pains during child birth”. They found that, the averages for the pain measured using the VAS were not different for the three groups that were a part of the study ( $p\text{-value}=0.0929$ ) [13].

## 5. CONCLUSION

Based on the findings the study concluded that, Supportive care and acupressure are non-pharmacological methods which significantly elevating the infant’s Apgar score, and reducing the labor pain intensity for the parturient women. In consideration that, the effect of supportive care measures were higher than acupressure.

**In the light of the findings of the current study the researcher recommends:**

1-Changing maternity hospitals policy to allow a supportive care person to accompany with the parturient woman (husband, friend, family member) from the beginning of labor to the end of it.

2- Providing a training program for health care practitioners (midwives; nursing staff; and student nurses) to be able to apply supportive care measures and acupressure correctly.

3- Supportive care during labor, and acupressure should be added to undergraduate curriculum as an important new topics, further researches are recommended for evaluating other points of acupressure in achieving better labor outcome.

4- Preparation of pamphlets and booklets about supportive care measures for parturient women that contains figures and instructions, be attractive, and in a simple language that are easy to be understood in a labor ward.

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