

## Effect of Foot Reflexology on Relieving Labor Pain and Enhancing Satisfaction among Parturient Women

<sup>1</sup>Wafaa Mostafa Ahmed Gamel, <sup>2</sup>Madiha Mohamed Tosson, <sup>3</sup>Yousif A.

<sup>1</sup>Lecturer of Maternal Health Nursing and Newborn, Faculty of Nursing, Damietta University, Egypt

<sup>2</sup>professor of Obstetrics and Gynecology Nursing, Faculty of Nursing, Assuit University, Egypt

<sup>3</sup>Assistant professor of Woman's Health and Midwifery Nursing Department, Faculty of nursing, Mansoura University, Egypt

### Abstract

**Background:** Labor pain management and interventions are important aspects of maternity health care to ensure optimum outcomes for mothers and babies. Reflexology practice is significant to reduce pain intensity, shorten the duration of labor and increase satisfaction. **Aim:** This study aimed to evaluate the effect of foot reflexology on relieving labor pain and enhancing satisfaction among parturient women. **Subject and Methods: Design:** To achieve the study's aim a quasi-experimental design was adopted. **Setting:** This study was conducted at Labor and Delivery Unit at Mansoura University Hospital. **Sample:** A purposive sample of 200 parturient women was recruited in this study and they were selected and then randomly divided into two groups, the control group included 100 parturient women and the study group included 100 parturient women. **Four tools were used to collect data:** (1) structured interviewing questionnaire schedule, (2) Numeric Pain Rating Scale (NPRS), (3) Level of satisfaction was measured using a five-point Likert scale, and (4) Modified partograph. **Results:** There was no significant difference in mean pain scores between the control and intervention groups at baseline ( $p>0.05$ ). However, the differences in mean pain scores between the control and intervention groups were highly statistically significant 30 minutes, 1 hour, and 2 hours after the intervention. **Conclusion:** Foot reflexology is an effective non-pharmacological method in relieving labor pain and enhancing satisfaction. **Recommendation:** Foot reflexology should be utilized by nurses as a non-pharmacological strategy to manage labor pain and enhance satisfaction among parturient women.

**Keywords:** Foot reflexology, Labor, Pain, Parturient women, Satisfaction

### Introduction:

Labor is the body's natural process of childbirth. It lasts on average 12 to 24 hours for a first birth. Usually, labor is shorter for births after that (**Grow by WebMD, 2022**). Labor is the normal physiologic process defined as uterine contractions resulting in dilatation and effacement of the cervix, which culminates in expulsion of the fetus and the products of conception. Labor has 4 stages: the 1st stage starts with the onset of regular contractions, the 2nd stage starts with full cervical dilation, the 3rd stage starts immediately after fetal delivery and ends with delivery of the placenta, and the

4<sup>th</sup> stage consists of a postpartum recovery period, generally lasting about two hours. The primary factors required for labor to progress normally are the three Ps: power (uterine contractions), passenger (the fetus), and passage (the maternal pelvis) (**Oiseth et al., 2021**).

The first stage of labor, which is much longer than the second and third stages of labor combined has been divided into three phases. The latent or preparatory phase that begins at the onset of regularly perceived uterine contractions and ends when rapid cervical dilatation begins, the active phase begins from cervical dilatation of 4 to 7 cm. The transition

phase begins from cervical dilatation of 8 to 10 cm (**lowdermilk & Perry 2009**). Labor is considered a physiological and psychological challenge that women have to go through because it is associated with the most desirable event in life, bringing out a new life. Unfortunately, almost all deliveries are accompanied by pain (**Orr, 2017; Ashagrie & et al., 2020**).

Pain is a common, normal, and healthy physical phenomenon during childbirth. The pain interpretation and pain experience of new mothers deeply impact their mental health, maternal-infant relationship, and transition to motherhood. Childbirth caregivers may accept labor pain as a meaningful, pleasant, and positive gift, which is the first and most important step toward effective pain management (**Gau M. & Kao C., 2013**).

Most women believe that labor pain is the most severe and distressing pain they could experience (**Costa-Martins et al., 2014**). This pain occurs due to the physiological process of labor in the form of uterine contractions. During the first stage of labor, the pain is mainly related to cervical dilatation, uterine muscle hypoxia at the time of contraction, uterine corpus ischemia, and cervical nerve compression (**Sari & Christiani, 2016; Lee & Neumeister, 2020**).

Pain experienced during labor is probably the most painful event in the lives of women. Labor pain is often described as the worst pain in a woman's life, but the experience is highly variable. Although many factors have been linked to labor pain, it is difficult to assess the individual effects of these factors because labor is a dynamic process, and pain intensity changes throughout labor (**Smith et al., 2018**).

Physiologically, pain occurs when sensory nerve endings called nociceptors (also referred to as pain receptors) come into contact with a painful or noxious stimulus. The resulting nerve impulse travels from the sensory nerve ending to the spinal cord, where

the impulse is rapidly shunted to the brain via nerve tracts in the spinal cord and brainstem. The brain processes the pain sensation and quickly responds with a motor response in an attempt to cease the action causing the pain (**Ashagrie et al., 2020**).

Uncontrolled labor pain can be harmful to both the mother and the fetus. Excessive pain causes parturient women to become fearful and anxious, which leads to an increase in catecholamine secretion, which raises blood pressure. Increased catecholamine also causes pelvic muscle strain, which results in resistance to the uterus's repulsive force as well as the repulsive force exerted by laboring women. As a result, labor pain worsens and labor time lengthens. Additionally, labor pain is a strong respiratory stimulation, causing a significant increase in minute ventilation and oxygen intake during contractions. Severe respiratory alkalosis and fetal hypoxia are caused by hyperventilation. Furthermore, peripheral vasoconstriction, which restricts blood supply to the placenta and consequently leads to unfavorable outcomes, may develop as a result of stress and panic produced by extreme labor pain and negative fetal health (**Janssen et al., 2015; Byford & Weaver, 2016**).

As a result, it is critical to adequately control labor discomfort. There are many options for reducing labor pain, both pharmaceutical and non-pharmacological. If at all possible, nonpharmacologic options for pain control in labor should be attempted before resorting to pharmacologic treatment. Relaxation, imagery, and visualization, as well as massages, have all been advocated as nonpharmacological methods for relieving labor pain. Massage relieves discomfort and gives physical contact with the expecting mother, heightening the sense of relaxation and lowering emotional tension (**Hensley, 2017; Herinawati et al., 2019**).

Pain relief methods can be divided into two main groups: Pharmacological and nonpharmacological pain management treatments. Almost every drug used for labor

analgesia in the mother can pass through the placenta, which is one of the most severe constraints related to pharmacological pain reduction. Both the mother and the fetus suffer as a result of this. In the second stage of delivery, the fetus' respiratory system may be impaired, and the mother may endure protracted labor and reflex problem. Simplicity, safety, and maintaining fetal homeostasis are three characteristics that must be satisfied to treat pain in midwifery, and non-pharmacological approaches meet all three. There are no side effects for either the mother or the fetus, and there is no effect on birth (Cunningham et al., 2015).

Reflexology is a pain-relieving technique that is both non-invasive and non-pharmacological. It is based on a system of zones and reflex areas on the feet and palms that mirror an image of the complete body in the same order and location as in the body (including muscle, nerve, gland, and bone). Although the mechanism of action of reflexology remains a mystery, some possibilities have been offered. The pain gate hypothesis, neural impulse theory, greater secretion of endorphins and encephalins that help relieve pain, enhanced lymphatic nerve and blood flow and subsequently increased elimination of toxins from the body are some of these (Tiran & Chummun, 2015).

The majority of women were satisfied with their care in labor. Factors significantly associated with high levels of satisfaction were implementation of natural methods for pain relief during labor in vaginal delivery, adequate preparation for labor and if personal wishes were listened to by staff (Geary, & Perinat, 2017).

Reflexology is a non-pharmacological pain treatment technique. In reflexology, the balance of the body is restored and comfort is improved by applying pressure on reflexive spots on the foot and sometimes the palm that corresponds to each area of the body. Pressure on specific reflex points on the sole and palm during disease is thought to shatter calcium

crystals and uric acid stored in nerve endings, open blocked nerve pathways, and enhance blood flow throughout the body, according to reflexologists. The pituitary gland, hypothalamus, solar plexus, and uterine stimulation reduce pain, anxiety, and tension during delivery. During pregnancy, reflexology has been utilized to treat a variety of physiological issues such as nausea and vomiting, constipation, edema, exhaustion, headaches, labor pain relief, and breastfeeding support (Hanjani, et al., 2015).

Maternity nurse play an important role in managing and reducing labor pain which is an important goal of birthing care and a significant aspect of midwifery services. Nurses play an important role in giving clear, accurate, brief, and evidence-based information about effective non-pharmacological pain management measures to pregnant women. Nurses must also assist women in labor in choosing an effective pain treatment modality that is compatible with their beliefs and preferences through shared decision-making, as well as implementing the chosen mode. As a result, nurses should be up to date on the most recent scientific studies on labor pain relief techniques (Abdulaziz, 2017; Mirzaiinajmabadi, 2018).

Also, the most fundamental goals of nursing practice toward women during labor are to provide comfort and control discomfort. Nurses who understand the physiology of pain are the most successful in managing a mother's labor discomfort. In addition, the nurse provides support and assistance to the woman while using nonpharmacologic pain management and relaxation techniques. During labor, the nurse should inquire about the woman's feelings to assess the success of the pain management strategies employed. Appropriate actions, such as trying other nonpharmacologic approaches, can then be planned or continued for effective care (Abd Elfattah et al., 2015).

**Significance of the study:**

---

Labor pain is a problem that has not received enough attention, although one of the intra-partum management goals is to relieve pain and provide comfort to the parturient woman. Furthermore, efforts to alleviate labor pain itself continue to prioritize pharmacological methods, while non-pharmaceutical strategies are still poorly understood and less utilized by health care providers (Yosepha et al., 2020). At the previous selected setting no natural pain relieve measures were applied during labor which may lead to uncomfortable and dissatisfying labor experience among parturient women, consequently lead to stressful and discomfort experience among parturient women. Additionally, foot reflexology during labor was enhanced parturient women satisfaction and relieves labor pain (Khomsah et al., 2017). Foot reflexology was a nursing concern because nurses had played a multidisciplinary role as a direct health care provider who must utilize best evidence research finding as foot reflexology during labor while providing supportive and comfort measures among parturient women. While, as a manager must design and implement guideline and protocol for nurses concerning foot reflexology during labor. Moreover as counselor and educator must instruct parturient women concerning importance of foot reflexology. While, as researcher assist in implementing evidence based research.

#### **Operational definition:**

**Foot reflexology:** is the application of pressure to areas on the feet (or the hands). Reflexology is generally relaxing and may help alleviate stress. The theory behind reflexology is that areas of the foot correspond to organs and systems of the body.

#### **Aim of the study:**

The current study aimed to evaluate the effect of foot reflexology on relieving labor pain and enhancing satisfaction among parturient women.

#### **Research hypotheses:**

H.1 Parturient women who receive foot reflexology will show significant relieve of pain more than those who didn't participated.

H.2. Parturient women who receive foot reflexology will show more satisfaction than those who didn't participated.

#### **Subjects and Method:**

**Design:** To achieve the study's aim a quasi-experimental design was adopted. In this design, subjects are assigned to either the intervention or control group. The baseline measures of the dependent variables were performed for all subjects. Then subjects in the intervention group only received the proposed intervention. After that, all subjects were post-tested to measure the degree of change in the dependent variables (LoBiondo-Wood & Haber, 2018).

**Setting:** This study was conducted at Labor and Delivery Unit at Mansoura University Hospital, Mansoura city, Dakahlia government, Egypt. Labor and Delivery Unit consist of the examination room, nursing staff room, room for parturient women, postpartum room and two operating room for vaginal delivery. The department is located on the hospital's underground floor. Mansoura University Hospital provides free services for women during pregnancy, labor, and postpartum periods.

#### **Sample size:**

The sample size was calculated based on a power analysis of 0.95 ( $\beta=1-0.95=0.5$ ) at alpha .05 (one-sided) with a large effect size (0.5) was used as the significance.

A purposive sample of 200 parturient women was recruited in this study and they were selected and then randomly divided into two groups.

#### **Inclusion criteria included:**

- Woman during the vaginal delivery process at the beginning of the active phase of the first phase of labor (cervical dilatation 4-5 cm)
- Their age between 18 and 40 years
- Term gestation (37–42 completed weeks of pregnancy)
- Having a single, healthy fetus in the normal position (i.e., occipital anterior position)
  
- Willingness to participate in the study.

#### **Exclusion criteria included:**

- The presence of foot disease that would contraindicate the application of massage.
- Used pain medication, analgesia and anesthesia during the first stage of delivery.
- A woman with pre-existing medical conditions including diabetes, hypertension, renal, or cardiac disease.
- A woman with obstetrical conditions arising during pregnancy including antepartum hemorrhage, gestational hypertension, gestational diabetes, polyhydramnios, and oligohydramnios.

#### **Four tools were used to collect data:**

**Tool (I)** structured interviewing questionnaire schedule: It was developed by the researchers after reviewing the related literature (**Abd-Allah, 2017 and Ministry of Health and Population, Egypt, 2018**). It included two parts:

**Part (1):** It is included questions related to demographic characteristics and obstetrical history of parturient women, such as; age, educational level, and residence working status.

**Part (2):** It is included questions related to the obstetrical history of parturient women, such as; pregnancy & labor condition at admission, gravidity, and parity, type of previous delivery, and their sources of information.

**Tool (II)** Modified partograph for labor progress: It was adopted from **WHO, (2000)**. The partograph has been used to collect data related to labor progress. This tool included three main parts:

**Part 1-** Fetal condition that includes fetal heart rate, color of liquor, and degree of molding

**Part 2-** The progress of labor that includes cervical dilatation, descent of head, and uterine contractions

**Part 3-** Maternal condition that includes blood pressure, pulse, temperature, and urine analysis for albumen, protein and volume

#### **Tool (III) Numeric Pain Rating Scale (NPRS):**

**The NPRS was adopted from McCaffery, et al., (1989):** It was used to assess the pain intensity experienced by the woman during labor. It contained a blank line anchored at each end of the line by adjectives that describe the extremes of pain. To facilitate measurement, a 10 cm line usually is used. The NPRS is a horizontal bar numbered from zero to ten, which reflects the pain intensity of the respondents. Respondents were asked to select a whole number that best reflects pain intensity they feel on a scale from 0, "no pain," to 10, "severe pain". A Score given by the respondent was categorized and interpreted as follows: "0" interpreted as "no pain," "1 to 3" as "mild pain," "4 to 6" as "moderate pain," and "7 to 10" as "worst or severe pains" The NPRS was validated earlier and its use for assessing pain intensity had been anticipated.

#### **Tool (IV) Level of satisfaction was measured using a five-point Likert scale (Ward, &Gordon, 1996):**

Level of parturient women's satisfaction was measured using five-point Likert scale: (1 = very dissatisfied, 2 = dissatisfied, 3 = neutral, 4 = satisfied and 5 = very satisfied) and checklist. The reliability coefficient (Cronbach

s,  $s - \alpha$ ) test of this instrument was 0.97. The questionnaire was modified from the American Pain Society satisfaction survey, American Pain Society patient-outcomes questionnaires–modified. Level of parturient women's satisfaction expressed through 5-point Likert scale. Patients' level of satisfaction was based on the demarcation threshold formula  $[(\text{total highest score total} - \text{lowest score})/2] + (\text{total lowest score})$ . A patient who scored less than 79.5 points out of 130 was considered as dissatisfied whereas 79.5 and above was considered as satisfied.

#### **Validity of Tools:**

Tools were reviewed by five experts' professors in the field of maternity/obstetric nursing to test content validity. No modifications for the tools were done according to the experts' judgment on the clarity of sentences, appropriateness of the content, and sequence of items.

#### **Reliability of the tools:**

The reliability of tools was tested using Cronbach's alpha. The reliability coefficient for tool II was (0.89), tool III was (0.89), and tool IV was (0.97) which means that the tools were reliable.

#### **Pilot Study:**

A pilot study was done on 10% of the sample (10 parturient women) to test the feasibility and applicability of different items of the tool to establish the most practical and comprehensive way of obtaining necessary data. The participants in the pilot study were excluded from the main study sample.

#### **Ethical consideration:**

Official permission was obtained from the director of the selected hospital and the head of the labor and Delivery Unit in the selected setting. The researchers introduced themselves to parturient women and informed them about the aim of this study to obtain their acceptance to participate in this study. Data collection was voluntary and was strictly

confidential. The objective and methodology of the study for all parturient women were explained by researchers. The right to refuse participation in the study was confirmed and the consent of the participants to participate in this study was obtained orally.

#### **The procedure of Data collection:**

The necessary official permissions for data collection were obtained by submitting an official letter issued from the dean of faculty of nursing to directors of the study setting. Data were collected within six months from the beginning of December 2020 to the end of May 2021. The researchers visited the study setting two days a week (Sunday and Thursday) from 9:00 am to 1:00 pm. The study was conducted through: preparation, interview and assessment, implementation, and evaluation.

#### **Preparation for the study:**

A thorough review of related literature has been done to construct data collection tools. Also, official permission to conduct the study was obtained from concerned authorities. The investigator was certified in foot reflexology under an authorized trainer.

#### **Interview and assessment:**

After enrollment, the researchers interview each parturient woman individually to obtain data related to demographic data and obstetrical history through using the structured interviewing questionnaire schedule. The questions were asked in Arabic and the responses were documented by researchers. In addition, the parturient woman was asked to rate their pain level on the NPRS to obtain the baseline assessment of pain. The time taken to complete this assessment was about 15-20 minutes.

#### **Implementation:**

On admission, the researcher introduced herself and explained the purpose of the research. The sample was divided into two

groups, the control group included 100 parturient women and the study group included 100 parturient women.

Parturient women in the control group received routine care according to the hospital protocol of care included drug administration such as analgesic to relieve pain and providing emotional support. While the parturient woman in the foot reflexology group received routine care in addition to foot reflexology.

In addition, an initial assessment used for the control group such as assessing demographic data and obstetrics characteristics included a structured interviewing questionnaire), assessing the level of pain using tool II (NPRS), assessing the level of satisfaction was measured using a five-point Likert scale using tool III, assessing progress of labor using instrument two (the modified partograph) using tool IV.

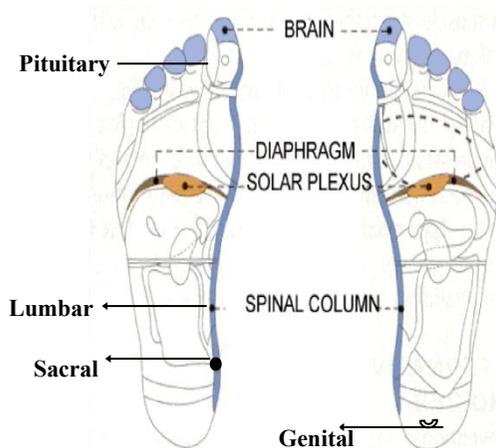


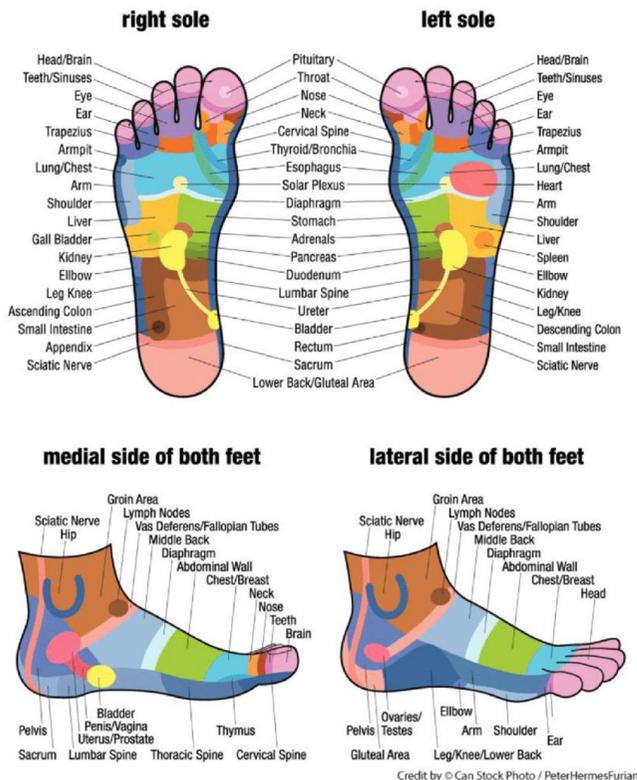
Fig (1): Feet areas for reflexology

Abdulaziz Kh., El-Refaye Gh., Abd El Hameed H., Ibrahim F., (2017), Effect of foot reflexology on pain and outcomes of labor, The 18<sup>th</sup> International Scientific Conference Faculty of Physical Therapy Cairo, 16-17 March, 2017

The researcher was applied mild massage on all feet of the woman then the pressure was applied to points on feet that correspond to the uterus in the body. These points are: (1) A point that lies between the fleshy pads under the big toe and the next toe. (2) A point that lies just below the center of the ball of the foot. (3) A half-moon-shaped point that lies from where the toes join the foot to the farthest end of the ball of the foot (Sundari, 2011). When the participants of the study group were at a dilation of 4-5 cm (active phase), reflexology was performed by the researcher for 20 minutes on each foot (total 40 minutes for both feet).

The frequency of massages depended on the frequency of contractions during those 40 minutes (Dolatian, et al., 2011). A point (1) that lies between the fleshy pads under the big toe and next toe: The researcher holds one of the woman's feet firmly in their hands and applied strong pressure at the beginning of a contraction with their finger or thumb, easing the pressure off as the contraction finished. A point (2) that lies just below the center of the ball of the foot: Again, on the next contraction the researcher hold one of the woman's feet firmly in their hands and applied strong pressure at the beginning of a contraction with their finger or thumb, easing the pressure off as the contraction finished. A half-moon shaped points (3) that lie from where the toes join the foot to the farthest end of the ball of the foot: Again, on the next contraction the researcher wrapped four of their fingers around the ball(s) of the foot, applied pressure during the followed contraction, easing the pressure off as the contraction finished. After the half-moon-shaped points, massage was finished; the cycle was repeated in the same foot for 20 minutes. The cycles of foot reflexology were applied in the second foot as the first foot for 20 minutes. Then the researcher followed women until after delivery and assessing labor progress and level of pain. Repeated assessment included pain assessed after 1 hour, at cervical dilatation 6-7cm and 8- 10cm of the 1st stage of labor, at the 2nd stage of labor and at the 3rd stage of labor. Assessment the progress of labor, fetal

## Foot Reflexology Chart



condition, and maternal condition was done by the partograph.

**Fig (2): Foot Reflexology Chart**

[https://www.researchgate.net/figure/Foot-Reflexology-Chart-Credit-by-Can-Stock-Photo-Inc-Peter-Hermes-Furain-Permission\\_fig1\\_324785947/download](https://www.researchgate.net/figure/Foot-Reflexology-Chart-Credit-by-Can-Stock-Photo-Inc-Peter-Hermes-Furain-Permission_fig1_324785947/download)

### Evaluation:

The researchers assess the level of pain intensity at three points of time: 30 minutes, one hour, and then two hours after performing the proposed intervention foot reflexology.

Parturient women were asked to rate their pain level on the NPRS.

The researchers assess the labor progress and satisfaction level at three points of time: 30 minutes, one hour, and then two hours after performing the proposed intervention foot reflexology.

### Statistical analysis:

Collected data were organized, coded, and entered into a computer. All statistical analyses were performed using a statistical package for social science version 26.0 (SPSS, Chicago, IL). The arithmetic mean and standard deviation were used for quantitative variables to describe the central tendency of observations and to measure the dispersion of results around the mean. The Student's t-test was used for comparison between two variables with continuous quantitative data, while a one-way analysis of variance (ANOVA) test was used for comparison among more than two variables with continuous quantitative data. Chi-square [X<sup>2</sup>] test was used for comparison of variables with categorical data. Statistical significance was set at p

### Results:

**Table 1** illustrated the mean age of the parturient women was  $21.14 \pm 10.32$  and  $23.10 \pm 7.45$  years in the study group and control group respectively. Regarding education, it was clear that (56%) of the parturient women in the study group had secondary education compared to 50% in the control group. In the study group, the same table pointed out that (67%) of parturient women was housewives compared to 62% in the control group. Regarding residence, (73%) of parturient women in the study group was living in urban areas compared to 70% in the control group. In addition, there was no statistically significant difference between the study and control groups ( $P > 0.05$ ) concerning their demographic.

**Table 2** showed that there was no significant difference between the two groups regarding obstetrical history. Concerning gravidity, 65% and 66% of the study and control group respectively were gravida  $\geq 2$ . Also, 71% and 66% of the parturient women their parity was  $1 < 3$  respectively in study and control groups. Regarding their types of previous delivery, it was observed that (75% and 67% respectively) in both the study group and the control group were delivered vaginally.

**Figure (1):** Revealed that 70% of the studied parturient women reported that the main source of information regarding foot reflexology was doctors.

**Table (3)** in the study and control groups, mean scores of labor length during the three stages was clarified. According to this table, women in the study group had shorter labor durations at all stages, with a highly statistically significant difference between the study and control groups ( $P < 0.001^{**}$ ).

During the initial stage of labor, **Table (4)** revealed the mean scores of vital signs of the parturient women in the research and control groups. The findings revealed that there was no statistically significant difference in vital sign readings between the study and control groups on admission ( $P > 0.05$ ). In the case of cervical dilatation (4-7 cm), there was a highly statistically significant difference in pulse measurement between the study and control groups ( $P > 0.05$ ). With cervical dilatation (8-10 cm), there was a highly statistically significant difference in systolic and diastolic blood pressure and pulse measurement between the study and control groups ( $P > 0.05$ ).

**Table (5)** showed that there was no a statistically significant difference regarding mean of fetal heart rate between study and control groups during first stage of Labor.

**Figure (2):** Highlighted the distribution of parturient women regarding NIPS among the study group and control group. In the study group, 58% of parturient women had no pain compared to 7% in the control group. Also, (38%) and (18%) at  $P < 0.001$  had moderate pain in the study group and control group respectively. Only (7 %) had severe pain in the study group but (75%) had severe pain in the control group.

**Table (6)** demonstrated the pain scores of parturient women compared among the two groups (pre-intervention) and at 30 minutes, 1 hour, and 2 hours post-intervention. As shown during the pre-intervention assessment, the mean pain scores did not show significant differences among the two groups ( $p > 0.05$ ). However, at 30 minutes, 1 hour, and 2 hours post-intervention, the differences indicated highly statistically significant pain scores among the two groups ( $< 0.001$ ).

**Figure (3):** Portrayed the distribution of parturient women regarding their satisfaction level among the study and control groups. It was observed that (35% and 15%) of the parturient women were satisfied and very satisfied in the study group respectively compared to 20% and 3% in the control group. Also, indicated that (22% and 5%) in the study group were dissatisfied and very dissatisfied compared to (15% and 45%) in the control group respectively.

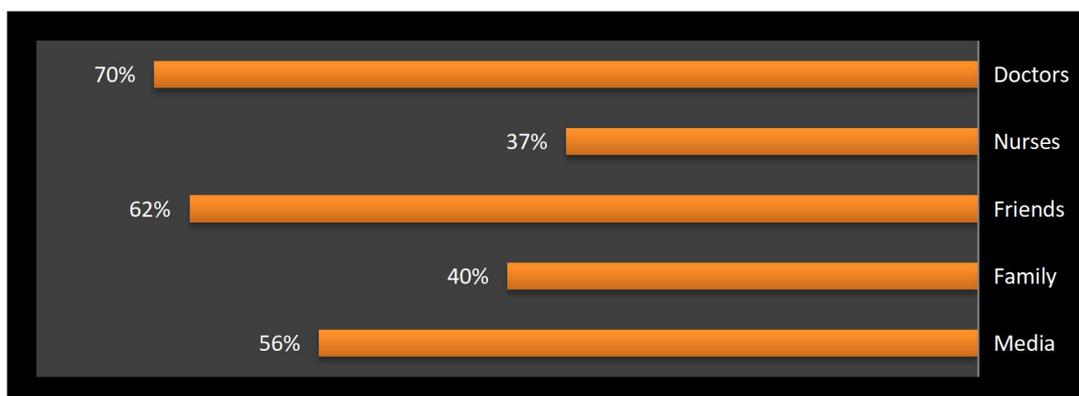
**Table (1): Frequency distribution of the Studied Parturient Women regarding Socio-Demographic Characteristics (n=200)**

Demographic characteristics	Study group (n=100)		Control group (n=100)		X2	p-value
	No.	%	No.	%		
<b>Age</b>						
- 18 < 30	57	57.0	61	61	1.34	>0.05
- 30 ≤ 40	43	43.0	39	39		
<b>Mean ±Stander deviation</b>	21.14 ± 10.32		23.10 ± 7.45			
<b>Education</b>						
-Primary education	21	21.0	27	27	3	>0.05
-Secondary education	56	56.0	50	50		
-University education	23	23.0	23	23		
<b>Working status:</b>						
-Working	33	33	38	38	0.185	>0.05
-Housewives	67	67	62	62		
<b>Residence:</b>						
-Urban	73	73	70	70	0.275	>0.05
-Rural	27	27	30	30		

NS-non-significant &gt;0.05

**Table (2): Frequency distribution of the Studied Parturient Women regarding Obstetric History (n=200)**

Obstetric history	Study group (n=100)		Control group (n=100)		X2	P-value
	No.	%	No.	%		
<b>Gravidity:</b>						
- 1	35	35	34	34	1.281	0.527
- ≥ 2	65	65	66	66		
<b>Parity</b>						
- 1 < 3	29	29.0	34	34.0	1.23	0.162
- > 3	71	71.0	66	66.0		
<b>Types of the previous delivery</b>						
- Cesarean	25	25.0	33	33	1.93	0.320
- Vaginal	75	75.0	67	67		

**Figure (1): Distribution of the studied parturient women regarding their source of knowledge about foot reflexology (200)**

**Table (3): Mean duration of labor among the studied parturient women during the three stages in both the study and the control groups**

Duration of labor stages	Study group (n=100)	Control group (n=100)	t-test	P-value
	Mean ±SD	Mean ±SD		
Duration of first stage	301.00±31.06	347.38±17.82	15.17	<0.001
Duration of the second stage	27.53±4.52	38.68±6.34	16.13	<0.001
Duration of the third stage	10.43±2.06	15.37±1.68	22.23	<0.001

\*\*A Highly Statistical significant  $p \leq 0.001$

**Table (4): Mean vital signs of the studied parturient women in the study and control groups during the first stage of labor (n=200)**

Vital signs	Study group (n=100)	Control group (n=100)	t-test	P-value
	Mean ±SD	Mean ±SD		
<b>On admission</b>				
Systolic BP (mmHg)	123.40±5.47	122.40±6.00	1.17	>0.05
Diastolic BP (mmHg)	77.64±5.05	76.02±4.49	2.63	>0.05
Pulse	75.02±6.82	73.47±5.82	16.13	>0.05
Temperature	37.19±.28	37.22±.27	22.23	>0.05
<b>With cervical dilatation 4-7 cm</b>				
Systolic BP (mmHg)	123.25±5.34	120.83±6.68	3.26	>0.05
Diastolic BP (mmHg)	76.42±5.13	76.82±4.35	0.651	>0.05
Pulse	84.23±8.14	70.52±3.53	16.90	<0.001**
Temperature	37.17±.27	37.18±.27	0.118	>0.05
<b>With cervical dilatation 8-10 cm</b>				
Systolic BP (mmHg)	123.23±5.35	122.42±6.02	1.17	<0.001**
Diastolic BP (mmHg)	77.66±5.06	76.03±4.48	2.63	<0.001**
Pulse	75.03±6.84	73.48±5.83	16.13	<0.001**
Temperature	37.19±.27	37.23±.28	22.23	>0.05

\*\*A Highly Statistical significant  $p \leq 0.001$

**Table (5): Mean of fetal heart rate among the studied parturient women in the study and control groups during first stage of labor (n=200)**

Vital signs	Study group (n=100)	Control group (n=100)	t-test	P-value
	Mean ±SD	Mean ±SD		
<b>On admission</b>	137.54±13.33	139.16±12.65	.942	>0.05
<b>During intervention</b>				
1 <sup>st</sup> measure	136.65±12.92	139.04±12.66	1.413	>0.05
2 <sup>nd</sup> measure	139.43±12.87	139.42±13.36	1.232	>0.05
3 <sup>rd</sup> measure	136.54±12.33	137.47±13.18	.669	>0.05

A Statistical significant  $p \leq 0.05$

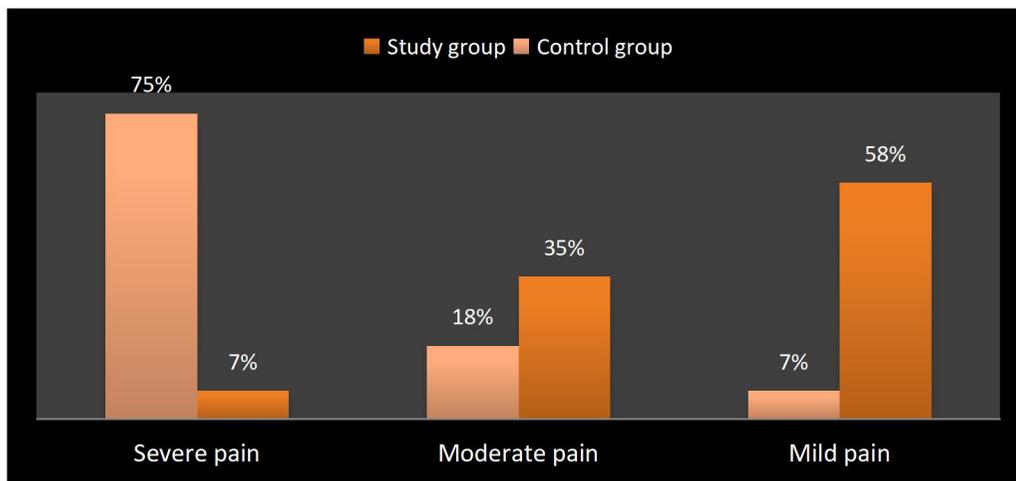


Figure (2): Percentage distribution of parturient women regarding their pain level after intervention (n=200)

Table (6): comparison of mean pain scores at baseline and after intervention between both study and control groups

Mean pain scores	Study group (n=100)	Control group (n=100)	t-test	P-value
	Mean ±SD	Mean ±SD		
Pre-intervention	8.0 ±0.3	8.2 ±0.7	0.442	0.660
30 min. after intervention	6.2 ±1.3	8.2 ±0.8	5.294	<0.001
1 hr. after intervention	6.9 ±1.2	8.3 ±0.5	5.491	<0.001
2 hrs. post intervention	6.9 ±1.1	8.5 ±0.7	5.238	<0.001

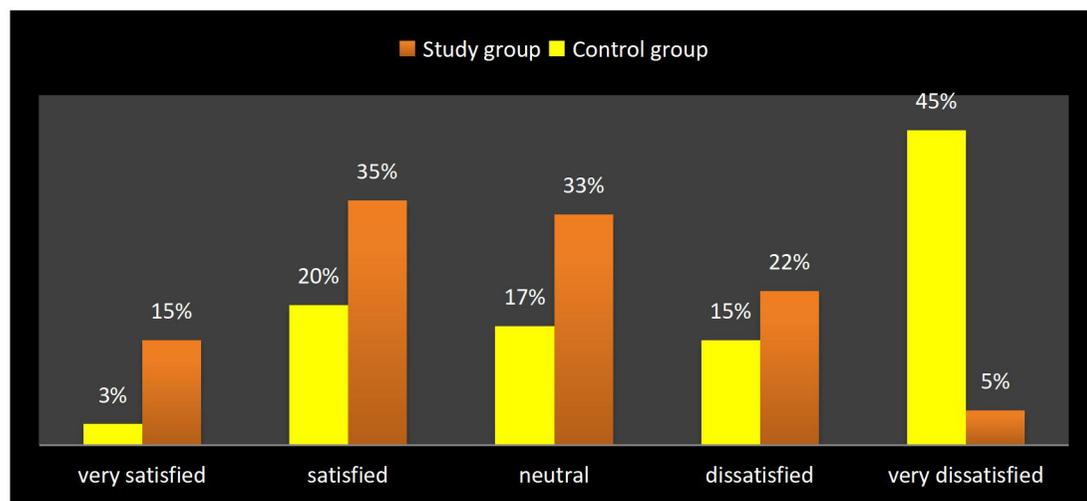


Figure (3): Percentage distribution of parturient women regarding their level of satisfaction after intervention among both groups (n=200)

## Discussion:

For parturient women, labor-related pain is a common occurrence. Labor pain has been proven to be one of the most extreme forms of pain that a woman can feel in her lifetime. To alleviate the discomfort and improve their satisfaction, a variety of approaches have been used (**Murtiningsih & Andani, 2018**). So this study aimed to evaluate the effect of foot reflexology on relieving labor pain and enhancing satisfaction among parturient women.

As regards duration of labor throughout the three stages among the study and the control groups, the result of the present study indicated that, there was a shorter duration of all stages of labor with a highly statistically significant difference between study and control groups ( $P < 0.001^{**}$ ). The results of the present study agreed with **Hanjani, et al., (2018)**, who evaluated the effect of foot reflexology on the outcomes of labor on Primiparous. The results clarified that the duration of labor in the reflexology group significantly was lower than the control group.

Furthermore, **Abd ElFattah, et al., (2015)** found that all stages of labor took less time, with a very statistically significant difference between the reflexology and control groups for the first stage and a statistically significant difference between the two groups for the third stage. Furthermore, our findings were consistent with those of **Hanjani, et al., (2015)**, who investigated the effect of foot reflexology on anxiety, pain, and labor outcomes in primigravida women and found that reflexology shortened labor time in the reflexology group. The progress of labor, as seen by a shorter labor time, could be attributable to the use of reflexology techniques, which reduced adrenaline and nor adrenaline and boosted endorphins and inner oxytocin, resulting in a shorter labor time and would consequently increase uterine muscle contractions and activities and could affect the duration of the labor (**Abasi, et al., 2018**).

**Mirzaei, et al., (2016)**, who evaluated the influence of foot reflexology on labor duration and severity of first-stage labor pain, disagreed with the findings of this study. Both the study and control groups had the same labor lengths, according to the findings.

The results showed that there was no statistically significant difference in vital signs readings between the study and control groups throughout the first stage of labor ( $P > 0.05$ ). There was a highly statistically significant difference in pulse measurement between the study and control groups when cervical dilatation (4-7 cm) was used ( $P 0.05$ ). The current findings are reinforced by **Hafez (2014)**, who found statistically significant differences between the two groups in terms of the influence of reflexology on vital signs of mothers, particularly heart rate and blood pressure, during the active phase of labor. Furthermore, these findings corroborated **Goweily's (2015)** findings, which stated that the mean pulse rate, systolic and diastolic blood pressure, and total blood pressure BP in the intervention group was lower than the control group. The improvement in vital signs could be attributed to the general relaxation that occurs in the body when reflex sites are triggered. Stress messages ended and sympathetic nervous system activity diminished after this relaxation. As a result, it is assumed that women who had reflexology had lower blood pressure, heart rate, and respiratory rate than women who did not receive it because their worry and stress levels were reduced (**Moeini, et al., 2011**).

Concerning fetal heart rate measures during the first stage of labor, the results showed that there was no statistically significant difference in mean fetal heart rate between study and control groups at different measurements during the first stage of labor. The findings of this study were consistent with those of **Hafez (2014)**, who studied "Effect of reflexology relaxation technique regimen on pregnancy outcome among pregnant women with cardiac disease" and found no statistically significant differences between two groups in

terms of fetal heart rate during active acceleration of the first stage of labor and active deceleration.

The result of the present study highlighted the distribution of parturient women regarding numerical pain scale (NPS) and only less than ten percent had severe pain in the study group but three-quarters of the control group had severe pain. From the researcher's point of view, the reason is that reflexology had positive effects on reducing fatigue, pain and enhancing satisfaction. It may be related to explain that pressure on feet activates large diameter fibers that closed the pain gate, thereby inhibiting the transmission of pain (Hughes, et al., 2011).

The current study results showed that pre-intervention assessment, the mean pain scores did not show significant differences among the two groups ( $p>0.05$ ). The current study's findings are similar to those of Hanjani, et al., (2013), who investigated the effect of foot reflexology on labor pain intensity and duration in parturient women. Their findings revealed that there was no statistically significant difference between the reflexology and control groups in terms of labor pain severity before intervention ( $p>0.05$ ).

The current study results showed that post-intervention, the differences indicated highly statistically significant pain scores among the two groups ( $<0.001$ ). From the researchers' point of view is indicated the success of foot reflexology intervention. As a result of our intervention, the differences indicated highly statistically significant pain score in the reflexology group confirms the H1 hypothesis of the study.

The findings of this study resembled those of Abd ElFattah, et al., (2015), who looked at the effects of foot reflexology on pain and other aspects of labor in parturient women. At the second stage of labor, there was a statistically significant difference between the study and control groups.

Also, this is consistent with the findings of Jenabi et al., (2018) in Iran who studied "The effect of reflexology on relieving the labor pain" and found out that massaging the reflex points positively reduced labor pain. Similarly, Moghimi Hanjani, et al., (2015) conducted a study about "The effect of foot reflexology on anxiety, pain, and outcomes of the labor in primigravida women" and found that reflexology reduced the severity of labor pain.

The result is supported by McNeil et al., (2016) who studied the "relationship between antenatal reflexology and intra-natal outcomes" and showed that reflexology was effective in reducing the severity of pain which are all consistent with the results of this study.

The results are in the same line with Bahri et al., (2019) who did a study about "The effect of foot reflexology in the fourth stage of labor on postoperative pain and bleeding" and reported that reflexology had a positive effect on post-labor pain at the fourth stage of labor and pain intensity after the intervention was lower in the intervention group than the control group which could indicate the positive effect of foot reflexology on reducing the severity of pain.

The results of two systematic reviews and meta-analysis showed that the efficiency of reflexology can be enhanced by increasing the time of intervention in each reflexology session (Hasanpour et al., 2019 and Wang et al., 2020).

Goweily, (2015) did a study on the efficacy of reflexology on first-stage labor pains and discovered that there was a significant difference in labor pain intensity between the reflexology and control groups. After the reflexology sessions, the results showed a significant reduction in the intensity of labor pain in the reflexology group. This result is consistent with the present findings.

In a study done by Bagheri et al., (2018) investigating the effect of reflexology on the length of labor, reflexology was found to

effectively reduce pain in all active phases of labor, particularly in the 5-7 and 8-10 cm dilatations. Their results are consistent with our findings too.

The result of the present study findings revealed that more than one-third of the parturient women were satisfied in the study group and only five percent in the study group were dissatisfied. These findings indicated the success of using reflexology in enhancing satisfaction. These findings were in agreement with **Mohan & Varghese (2021)**, who conducted a study among fifty primigravida mothers in labor to evaluate the effect of reflexology on relieving labor pain and assess the recipient's opinion regarding foot reflexology; the results revealed that all of the primigravida mothers in experimental group had a positive experience with foot reflexology. All of them were comfortable with the procedure and more than half of the subjects were highly satisfied with foot reflexology given in labor.

The results are supported by **Dolatian et al., (2017)**, who studied "The Effect of Reflexology on Pain Intensity and Duration of Labor on Primiparas" and found that the use of reflexology in maternity care appears to demonstrate high levels of maternal satisfaction. Reflexology is a relatively new area of care and can help to reduce pain and increase satisfaction. It is a simple and convenient technique that requires no hardware tools, just with the aid of adequately trained, to reduce the labor pain of pregnant women and increase satisfaction.

In this study, we found that more than one-third of the parturient women were satisfied in the reflexology group and only five percent were dissatisfied of parturient women in the reflexology group This result supports the H<sub>2</sub> of the research. **Baljon et al. (2020)** found that pregnant women in the experimental group were highly satisfied compared to the control group and this study is in parallel to our findings.

### **Conclusion:**

Based on the results of the present study it was concluded that:

- Foot reflexology is an effective non-pharmacological method in relieving labor pain and enhancing satisfaction.
- Parturient women who practiced foot reflexology in the study group had fewer labor pains and more satisfaction than parturient women who did not practiced.
- Reflexology is a relatively new area of care in midwifery and can help to reduce the cumulative rate of elective caesarean section which is mainly due to fear of vaginal delivery.

### **Recommendations:**

Based on the findings of this study, the following are recommended:

- Foot reflexology should be utilized by nurses as non-pharmacological strategy to manage labor pain and enhance satisfaction among parturient women
- Awareness of maternity nurses about foot reflexology should be raised to be implemented into practice.
- Replication of the current study on a larger probability sample and in other settings to generalized results.
- Parturient women should be equipped with evidence-based knowledge regarding foot reflexology before labor.
- Compare the effect of other techniques of reflexology such as face and hand with this study in the future.

### **References:**

- Abasi, Z., Abedian, Z., and Fadaei, A., (2018):** The Effect of massage on the duration of first stage labor. *Arak Medical University Journal*. 11(1).
- Abd Elfattah, H., Metwaly, S., & Khedr, N., (2015):** Outcomes of Foot Reflexology on the Pain and Certain Features of the Labor for the Primiparous Women. *Life Science Journal*.12 (6)

- Abd-Ella, N. (2018):** Effect of Effleurage Massage on Labor Pain Intensity in Parturient Women. *Egyptian Journal of Health Care*, 9(2), 331-341.
- Abdulaziz, S., El-Refaye, E., Abd El Hameed, A., & Ibrahim M. (2017):** Effect of foot reflexology on pain and outcomes of labor. The 18th International Scientific Conference 16-17.
- Adams, J., Frawley, J., Steel, A., Broom, A., & Sibbritt, D. (2015):** Use of pharmacological and nonpharmacological labour pain management techniques and their relationship to maternal and infant birth outcomes: examination of a nationally representative sample of 1835 pregnant women. *Midwifery*, 31(4), 458-463.
- Ashagrie, H. E., Fentie, D. Y., & Kassahun, H. G. (2020):** A review article on epidural analgesia for labor pain management: A systematic review. *International Journal of Surgery Open*, 24, 100-104.
- Bagheri, L., Ghiasi, A., & Ahmadnia, E. (2018):** Effect of reflexology on the length of labor: a systematic review and meta-analysis of clinical trials. *Iran J Obstet Gynecol Infertil*; 21(1):105–14.
- Bahri, N., Sharifi, N., Hadizadeh, F., & Azizi, H. (2019):** The effect of foot reflexology in the fourth stage of labor on postoperative pain and bleeding. The first regional conference on neuroscience, Ghonabad University of Medical Sciences. Available at: <https://civilica.com/doc/967607/>.
- Baljon J., Romli H., Ismail H., Khuan L., & Chew H., (2020).** Effectiveness of breathing exercises, foot reflexology and back massage (BRM) on labour pain, anxiety, duration, satisfaction, stress hormones and new born outcome among primigravida during the first stage of labor in Saudi Arabia: A study protocol for a randomized controlled trial. *BMJ Open*, 10(6), 1–13.
- Byford, S., & Weaver, E. (2016):** Pain Relief in Labour: How Can We Improve Intrapartum Care?. *Open Journal of Obstetrics and Gynecology*, 6(13), 785-793.
- Cunningham, F.G., Leveno, K.J., Bloom, S.L., Hauth, J.C., Gilstrap, L.C., & Wentorm KD. (2015):** Williams Obstetrics. New York. McGraw-Hill.
- Debra Rose Wilson (2021):** Foot Reflexology Chart: Points, How to, Benefits, and Risks, *Ph.D., MSN, R.N., IBCLC, AHN-BC, CHT* — Written by Daley Quinn on January 20.
- Dolatian, M., Hasanpour, A., Heshmat, R., & Alavimajd, H. (2011):** The effect of reflexology on intensity of labor pain. *Iran Red Crescent Med J*; 13(7):475-79.
- Dolatian, A., Hasanpour, Sh., Montazeri, R., Heshmat, H., & Alavi, M. (2017):** The Effect of Reflexology on Pain Intensity and Duration of Labor on Primiparas M *Iran Red Crescent Med J*; 13(7):475-479 ©Iranian Red Crescent Medical Journal
- Gau M. & Kao C., (2013):** Miserable labor pain? Myths and nursing care, *Hu Li Za Zhi*. Dec; 60(6):11-5. Doi: 10.6224/JN.60.6.11., available at: <https://pubmed.ncbi.nlm.nih.gov/24310548>
- Geary, M., & Perinat, J. (2017):** Maternal satisfaction with management in labour and preference for mode of delivery; 25(5):433-9.
- Goweily, M., (2015):** Efficacy of Reflexology on First Stage Labour Pains. *Journal of Health, Medicine and Nursing* . ISSN 2422-8419 An International Peer-reviewed Journal. 18(1).
- Grow by WebMD, (2022),** Stages of Labor, available at: <https://www.webmd.com/baby/guide/pregnancy-stages-labor#1>
- Goweily, M., (2015):** Efficacy of Reflexology on First Stage Labour Pains, *Journal of Health, Medicine and Nursing*, ISSN 2422-8419 An International Peer-reviewed Journal, 18(1).
- Hafez, O.D. (2014):** Effect of reflexology relaxation technique regimen on pregnancy outcome among pregnant women with cardiac disease. *B.Sc.Nursing*. Faculty of Nursing. Cairo University.
- Hanjani, S.M., Tourzani, Z.M., & Shoghi, M., (2015):** The Effect of Foot Reflexology on Anxiety, Pain, and Outcomes of the Labor in Primigravida Women. *Tehran University of Medical Sciences*. 53(8):507-511.

- Hasanpour, M., Mohammadi, M.M., & Shareinia, H. (2019):** Effects of reflexology on premenstrual syndrome: a systematic review and meta-analysis. *Biopsychosocial Med*; 13:25. <https://doi.org/10.1186/s13030-019-0165-0>.
- Hensley, J. G., Collins, M. R., & Leezer, C. L. (2017):** Pain management in obstetrics. *Critical Care Nursing Clinics*, 29(4), 471-485.
- Herinawati, H., Hindriati, T., & Novilda, A. (2019):** The Effect of Effleurage Massage on Stage I Labor Pain in the Active Phase in the Independent Practice of Midwives Nuriman Rafida and the Independent Practice of Midwife Latifah Jambi City in 2019. *J Ilm Univ Batanghari Jambi*; 19:590-601.
- Hanjani, S.M., Tourzani, Z.M., and Shoghi, M., (2015):** The Effect of Foot Reflexology on Anxiety, Pain, and Outcomes of the Labor in Primigravida Women. *Tehran University of Medical Sciences*. 53(8):507-511.
- Hanjani, S.M., Torzani, Z.M., Shoghi, M., and Ahmadi, G., (2018):** effect of foot reflexology on pain intensity and duration of labor on primiparous, *Journal of Semnan University of Medical Sciences*. 14(2): 166-171.
- Janssen, P., Shroff, F., & Jaspar, P. (2015):** Massage therapy and labor outcomes: A randomized controlled trial. *Int J Ther Massage Bodywork*; 5(4):15-20.
- Jenabi, E., Hajiloo, Mohajeran, M., & Torkamani, M. (2018):** The effect of reflexology on relieving the labor pain. *Iran J Obstet Gynecol Infertil*; 14(8):34-8.
- Khomsah, Y. S. B., Suwando, A., & Ariyanti, I. (2017):** The Effect of Acupressure and Effleurage on Pain Relief in the Active Phase of the First Stage of Labor in the Community Health Center of Kawunganten, Cilacap, Indonesia. *Belitung Nursing Journal*, 3(5), 508-514.
- Kumar, M., Chandra, S., Ijaz, Z., & Senthilselvan, A. (2014):** Epidural analgesia in labour and neonatal respiratory distress: a case-control study, *Archives of Disease in Childhood-Fetal and Neonatal Edition*, 99(2), F116-F119.
- Lee, G. I., & Neumeister, M. W. (2020):** Pain: pathways and physiology, *Clinics in plastic surgery*, 47(2), 173-180.
- LoBiondo-Wood, G. & Haber, J. (2018):** Nursing research: methods and critical appraisal for evidence-based practice (9th ed.) Elsevier Pp 171- 179.
- Lowdermilk D & Perry S., (2009),** *Maternity & women's Health care* 10th ed. United States of America: Mosby Co., 481.
- McCaffery, M., Beebe, A., et al. (1989):** Pain: Clinical Manual for Nursing Practice. St. Louis, MO: Mosby.
- McNeill, J.A., Alderdice, F.A., & McMurray, F. (2016):** A retrospective cohort study exploring the relationship between antenatal reflexology and intranatal outcomes. *Complement Ther Clin Pract*; 12(2):119-25.
- Ministry of Health and Population, Egypt. (2018):** Egypt Demographic and Health Survey. Cairo, Egypt and Rockville, Maryland, USA: Ministry of Health and Population and ICF International.
- Mirzaei, F., Kaviani, M., and Jafari, P., (2016):** Effects of foot reflexology on pain intensity and duration of first stage labor, *The Iranian Journal of Obstetrics, Gynecology and Infertility*. 13 (1) [Persian]
- Mirzainajmabadi, K., Makvandi, S., Mirteimoori, M., & Sadeghi, R. (2018):** An Update on the Effect of Massage and Inhalation Aromatherapy with Lavender on Labor Pain Relief: A Systematic Review and Meta-analysis. *Journal of Obstetrics, Gynecology and Cancer Research (JOGCR)*, 3(1), 29- 37.
- Moeini, M., Kahangi, L.S., Valiani, M., and Heshmat, R., (2011):** The effect of reflexotherapy on patients' vital signs before coronary artery bypass graft surgery. *Iran J Nurs Midwifery Res*. 16(1): 8-12.
- Moghimi-Hanjani, S., Mehdizadeh-Tourzani, Z., & Shoghi, M. (2015):** The effect of foot reflexology on anxiety, pain, and outcomes of the labor in primigravida women. *Acta Med Iran*; 53 (8):507-11.

- Mohan M., & Varghese L., (2021)**, Effect of Foot Reflexology on Reduction of Labour Pain Among Primigravida Mothers, *International Journal of Therapeutic Massage and Bodywork*—Volume 14, Number 1, March 2021.
- Mollart, L. (2013)**: Single blind trial addressing the differential of two reflexology techniques versus rest, on ankle and foot oedema in late pregnancy. *Complement Ther Nurs Midwifery*; 9:203-8. [14556770] [doi: 10. 1016/S1353-6117(03)00054-4]
- Oiseth S., Jones L., Maza E., (2021)**: Normal and Abnormal Labor, *Lecturio*, <https://www.lecturio.com/concepts/normal-and-abnormal-labor/>
- Orr, P. M., Shank, B. C., & Black, A. C. (2017)**: The role of pain classification systems in pain management. *Crit Care Nurs Clin North Am*, 29(4), 407-418.
- Sari, K., & Christiani, N. (2016)**: Musik dan masase dapat mengurangi nyeri persalinan kala I ibu primigravida. *Jurnal Keperawatan Soedirman*, 10(3), 203-209.
- Smith, C.A., Levett, K.M., Collins, C.T., Dahlen, H.G., Ee, C.C., & Sukanuma, M. (2018)**: Massage, reflexology and other manual methods for pain management in labour. *Cochrane Database Syst Rev*; (3):1-88.
- Sundari, G.D., (2011)**: Effectiveness of Foot Reflexology on Reduction of Pain and Duration of Labour during First Stage of Labour among Primigravida Mothers in Selected Hospitals, Hassan, Karnataka. Master of Science in nursing, OBG Nursing, College of Nursing, B.M. Road, Hassan, Karnataka.
- Tiran, D., & Chummun, H. (2015)**: The physiological basis of reflexology and its use as a potential diagnosis tool. *Complement Ther Clin Pract* 2015; 11:58-64. [15984227] [doi: 10. 1016/j.ctnm.2004.07.007]
- Wang, W., Hung, H., Chen, Y., Chen, K., Yang, S., & Chu, C. (2020)**: Effect of foot reflexology intervention on depression, anxiety, and sleep quality in adults: a meta-analysis and metaregression of randomized controlled trials. *Evid Based Complement Alternat Med*; 2654353:2020. <https://doi.org/10.1155/2020/2654353>.
- Ward, S., & Gordon, D. B. (1996)**: “Patient satisfaction and pain severity as outcomes in pain management: a longitudinal view of one setting’s experience,” *Journal of Pain and Symptom Management*, vol. 11, no. 4, pp. 242–251.
- Yosepha, D., Ginting, G. R., Tarigan, L., Ginting, R. I., & Maharani, S. (2020)**: The Effect of Effleurage Massage on the Intensity of Primigravida Stage I Labor Pain Latent Phase.