Outcomes of Foot Reflexology on the Pain and Certain Features of the Labor for the Primiparous Women

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Abstract: Labor management should focus on the goal of delivering a healthy newborn while minimizing discomfort and complications for the mother. Reflexology is a noninvasive and non-pharmacological method of pain relief. The aim of this study is to evaluate the effect of foot reflexology on the pain and outcomes of labor for the primiparous women. A quasi-experimental research design was utilized in this study. A total of 120 primiparous women were selected by random sampling from Ain Shams University Maternity Hospital. They are divided into two equal study and control groups. Structured interviewing questionnaire, women assessment sheet (Partograph), Numerical Pain Rating Scale, and Satisfaction Rating Scale were utilized to collect data in this study. The result of this study revealed a statistical significant difference between study and control groups regarding mean labour pain score at cervical dilatation 6-8, 9-10 cm, and during third stage of labour. Also, revealed a statistical significant difference between them regarding frequency, duration and intensity of uterine contraction. In addition to shorter duration of the three stages of labour and lesser complication among women in the study group. The study provided evidence that foot reflexology could improve labour outcomes, and decrease complications, and recommended the use of foot reflexology as a non-pharmacological pain relief measures.
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1. Introduction:

Vaginal delivery is a natural process that usually does not require significant medical intervention. Normal labor process can greatly increase the probability of an uncomplicated delivery and postpartum course. Once a woman is in labor, management should focus on the goal of delivering a healthy newborn while minimizing discomfort and complications for the mother ***(1).***

One of the most severe pains known to woman is labor pain ***(2)***, which is synonymous with parturition. Pain is an unpleasant and mental emotional experience, which is accompanied with tissue damage ***(3)***. During delivery, excessive pain leads to fear and anxiety. This stimulates the sympathetic nervous system to increase catecholamine secretion leading to increased blood levels of hormones such as epinephrine. These will further intensify the pain, and potentially prolong the first and second stages of labor, thus resulting in a very unpleasant experience of childbirth ***(4).*** Additionally, prolonged first stage of labor is associated with harmful effects of severe labor pain on mother and fetus, including higher risk of infection, higher probability of postpartum hemorrhage, exhaustion, anxiety and psychosis. Complications of the fetus, including head compression, impaired oxygen supply, low Apgar score and ultimately fetal death ***(5)***.

The pain and discomfort of labor have two origins—visceral and somatic. During the first stage of labor, uterine contractions cause cervical dilation and effacement. Uterine ischemia (decreased blood flow and therefore local oxygen deficit) results from compression of the arteries supplying the myometrium during uterine contractions. Pain impulses during the first stage of labor are transmitted via the T10 to T12 and L1 spinal nerve segments and accessory lower thoracic and upper lumbar sympathetic nerves. These nerves originate in the uterine body and cervix ***(6).*** Today; various pharmacological and non-pharmacological interventions are used to relief the labor pain. Because most of the analgesics have side-effects for mother and baby.

One of the most significant limitations associated with pharmacological pain relief is that almost every drug that is used for labor analgesia in the mother can pass through the placenta. This has deleterious effects on both the mother and the fetus. The fetus' respiratory system may be weakened, and the mother experience long labor and reflex disorder in the second stage of delivery ***(7)***. There principles that are essential to relieve pain in midwifery include simplicity, safety and maintaining fetal homeostasis ***(***8***)***, and the non-pharmacological methods satisfy all of these. There is no effect on delivery, and no maternal or fetal side effects.

Also, non-pharmacological pain relief approaches have different advantages such as lack of side-effect for mother and fetus and also being pleasant for both of them. Some of these approaches are muscle relaxation, respiratory techniques, hydrotherapy, music therapy, and massage therapy (**9**). Some cultures have used massage therapy as a pain relief during labor, for hundreds of years. Massage therapy is a scientific art that implement systematic hand techniques on soft tissue, muscles, tendons, ligaments, and fascia and uses hand, foot, knee and forearm in its techniques ***(10).***

Massage may lead to release of endorphin and reduce the ischemia by amplification of local blood supply. All of these would stimulate the sympathetic system and relax the skeletal muscles ***(11)***. Head, hand, back, and foot massage may be very effective in reducing tension and enhancing comfort. Some evidence suggests that massage may improve management of labor pain ***(12)***. Hand and foot massage may be especially relaxing in advanced labor when hyperesthesia limits a woman's tolerance for touch on other parts of her body. There are various non-pharmacological methods to decrease labor pain including, massage, reflexology, touchtherapy, watertherapy, transcutenous nerve stimulation, aromatherapy and acupressure. Some believed these techniques had been very effective on pain relief while, the pharmacological methods of pain relieving including receiving narcotic drugs as pethidine and the type of topical anesthetics such as pudendal block, spinal block and epidural analgesic***(13)***

Additionally, The Reflexology Association of Canada defines reflexology as a natural healing art based on the principle that there are reflexes in the feet, hands and ears and their referral areas within zone related areas, which correspond to every part, gland and organ of the body. Through application of pressure on these reflexes without the use of tools, crèmes or lotions, the feet being the primary area of application, reflexology relieves tension, improves circulation and helps promote the natural function of the related areas of the body.

Also, Reflexology is a noninvasive and non-pharmacological method of pain relief. This technique can bring about the sense of well being and healthy. In the reflexology, with massage and skin contrast, enkephalins and endorphins are secreted and can reduce the anxiety and pain. In addition, analgesia may be established by pressure on the specific reflex point ***(15).*** Generally, foot reflexology technique would stop the neural transmission of the pain message of the brain and subsequently the perception of pain relief through control gate. It affects the physiological and psychological stimulation points. In the pregnancy, labor and postpartum period, it can be usable for treating many physiological conditions such as nausea, pregnancy vomiting, constipation, edema, headache, fatigue, low back pain and to help breastfeeding ***(16).***

Promoting comfort and controlling pain are two of the most important goals of nursing practice toward woman during labor. Nurses are most effective in managing mother's labor pain if they understand the physiology of pain. Pain physiology involves four stages: transduction, transmission, perception, and modulation (17***)***. Additionally the nurse supports and assists the woman while applying non-pharmacologic interventions for pain relief and relaxation. During labor, the nurse should ask the woman how she feels to evaluate the effectiveness of the specific pain management techniques used. Appropriate interventions can then be planned or continued for effective care, such as trying other non pharmacologic methods (18).

Significance of the study:

The lack of sufficient researches on effectiveness of reflexology for relieving labor pain and improving outcomes among primiparous women has hindered the implementation of non-pharmacological methods of pain in our country with an increasing growth of elective cesarean section and maternal desire without medical indication, there is need for more research in alternative methods of pain management. Egypt was a developing country with limited facilities, so foot reflexology was a safe and inexpensive pain relief measure that can be applied by the nurse. Regarding this, the current study expected to evaluate the outcomes of foot reflexology on the pain and certain features of the labor on the primiparous women.

Aim of the study:

To evaluate the effect of foot reflexology on the pain and outcomes of labor for the primiparous women.

Research Hypothesis:

Primiparous women who will receive foot reflexology technique will have reduction of pain and certain features of the labor compared to those who did not.

2. Subject and methods:-

Design:

A quasi-experimental research design was utilized in this study

Setting:

The study was carried out at the beginning of June 2014 for 6 months in delivery department at Ain Shams University Maternity Hospital.

Study subjects:

Sample type:

A total of 120 primiparous women were selected by random sampling method and the women's presenting orders.

Sample size:

The study was carried out on 120 primiparous women admitted for delivery department and evenly divided into two groups: control group, and reflexology group, each of which included 60women.

The criteria for inclusion were as primiparous women at the age range of 20- 35, literate with single living fetus and gestational age of 37 to 42 weeks. Normal pregnancies and childbirths to date. Cervical dilation from 4cm with normal uterine dynamics in this phase. Pain relieve medication was not used during the study, absence of cognitive or psychiatric problem, intact membranes, no risk factors associated, accept participation and signing the informed consent. Cases were randomly allocated to one of the experiment and control group.

The excluding criteria was as follows: those were not able to understand written and verbal instructions, use of drugs or any procedure that aims to relieve pain. Those who did have damaged tissue and skin on their feet, arthritis, phlebitis, burn wound, injury, inflammation, eczema, cardiovascular, respiratory diagnosis, or psychological problems like (major depression or paranoia); and those who would not feel uncomfortable about letting other people touch their feet.

Tools of data collection:

Structured interviewing questionnaire:

It was developed by the researchers. It was used to collect data about women characteristics such as age, education, occupation, residence and assessment of their knowledge about pain relieving measures during labour as calculated correct and incorrect knowledge.

Women assessment sheet (Partograph)

This sheet was used by the researcher to record the woman physical condition to check for inclusion and exclusion criteria, in addition to their follow up through different stages of labour. It includes assessment of, fetal heart rate, maternal vital signs, cervical dilation, frequency, duration, intensity of contraction, and labour outcomes.

Numerical Pain Rating Scale (NPRS):

This scale was used by the researcher to measure level of labour pain.It is an assessment scale with fixed scale steps, liner line with marks spaced 1cmapart ranging from 0 (no pain) to 10 (worst pain imaginable), and patients are asked to mark a point on the line indicating the intensity of pain. It is widely preferred by national and international investigators for its applicability and clarity in determining the pain intensity of patients **(30).**

It was used to assess pain on admission, after 1, 2, 3, 4, 5, 6, 7,8 hours from admission. Also, before and after intervention at cervical dilatation 3-5 cm, 6-8 cm, and 9-10 cm, and during the second stage of labour.

Satisfaction Rating Scale

It was used for women in both groups to identify their opinion regarding the pain relieving measures. The items in the Satisfaction Rating Scale were divided into 16 positive statements and 4 negative statements. For a positively scored statement, respondent would get a high score (1), if they put tick (√) mark in "Yes" column and would get minimum score (0), if they put (√) in "No" column and vice versa. The level of satisfaction was categorized as; Grading Score (highly satisfied15-20, satisfied7-14, unsatisfied0-6).

Procedure:

Approval from the authorized personnel in Ain Shams Maternity Hospital and accept participation and signing the informed consent from women were obtained to conduct the study; Data were collected through a period of nine months. Sample was assigned randomly for the study into study group, and control group. Sixty women for each. Delivery was attended by the research investigator. Women were assigned as odds number for study, even for control group.

Assessment phase:

This was conducted during admission in which, a base line data was obtained from the mother about the personal back ground, fetal heart rate and maternal vital signs were measured, uterine assessment was done to assess frequency, duration, and intensity of contraction, vaginal examination was done to assess the condition of the cervix and stages of labor.

Implementation phase:

In the intervention group, at the time of entering to the active phase of labor, the intervention was conducted as the following: carrying out reflexology for 20 minutes on each foot (40 minutes in total) as general reflexology including 15 stages; (1)solar plexus, (2&3)area related to the digestive viscera, (4) pelvic area, (5) pituitary, (6)sinuses, (7) upper and lower extremities (external sides of the feet), (8) spinal cord (inner sides of the feet), (9) lungs, (10) shallow chest area, (11&12) the sides on the feet, (13) ovaries, (14) uterus and (15) fallopian tubes; and the specific reflexology including the areas related to labor pain such as liver, spleen, kidney, pituitary, solar plexus and uterus. Specific reflexology was performed during the first stage of labour at cervical dilatation (3-5 cm, 6-8 cm, 9-10 cm) and again during the second stage of labour by emphasis on specific points for at least five minutes. In the control group,

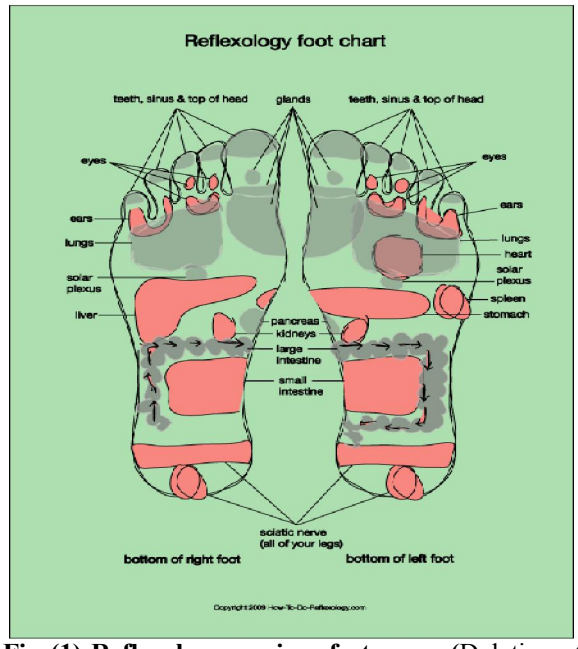

Fig (1) Reflexology session, feet areas (Dolatian *et al.*)[13]

(13) Dolatian *et al.* (2011) :The Effect of Reflexology on Pain Intensity and Duration of Labor on Primiparas. Iran Red Crescent Med J. Jul; 13(7): 475–479.

Massage steps: women were provided a comfortable and unconstrained position and were asked to avoid talking during the intervention unless necessary. during the different phases of first stage of labor at cervical dilatation 4 cm (start of active phase)and also the severity of pain was assessed at 8-10 cm (start of transitional phase) and after first stage of delivery the participants were asked to score their pain by marking the line of NPRS. Finally, the participants were asked to express their idea about the intervention and also if they are willing to use the massage therapy in next deliveries and compared with the control group. The massage was applied to all women by the researchers.

Evaluation phase:

Evaluation was measured by observing woman during the different stages of labor, occurrence of any complication to the woman during labor. After labor, women were asked about their satisfaction about reflexology as a method of pain relieve during labor process

Ethical considerations:

Participants were informed about the nature of the study. All women were informed that their participation is voluntary and they can withdraw from the study at any time. A written consent was obtained from all participants. All information that was provided by participants was confidential and anonymous.

3. Results:

Table (1): revealed a non-significant difference between study and control groups regarding all socio - demographic characteristics except for residence area.

Table (2): displayed a non-significant difference between study and control group regarding their knowledge about pain relieving measures.

Table (3): showed a non-significant difference between study and control groups regarding mean vital signs during the first stage of labour.

Table (4): this table revealed that there was a non-statistical significant difference between both groups regarding mean labour pain score on admission, and after 8 hours, while there is a statistical significant difference between mean pain score at 2,5,6,7, hours and a highly statistical significant difference between them after one hour.

Table (5): presented mean labour pain score before and after intervention. There was a non-significant difference between study and control groups before intervention with a statistical

significant difference between them after intervention at cervical dilatation 6-8 cm, 9-10 cm and at the second stage of labour.

Figure (3): this figure represents a constantly lower mean pain score of the study group compared to the control group after intervention.

Table (6): showed a statistical significant difference between study and control groups regarding their labour progress during active and accelerated phase of labour. It is also clarified a higher mean score of uterine contractions with a highly statistical significant between the two groups.

Table (7): displayed a shorter duration of all stages of labour with a highly statistical significant difference between the two groups regarding the first stage, and a statistical significant difference between them regarding the third stage.

Table (8): indicated labour outcomes of study and control groups. A prolonged active phase fetal distress, more perineal laceration, more maternal distress, prolonged second stage, prolonged placental separation and more post-partum hemorrhage were prevalent among the controls.

Table (9): indicate that 55% of the study group was highly satisfied from pain relieving measures compared to 0% in the control group with a statistical significant difference between them.

Figure (4): display a graphic presentation of numbers distribution among women in both groups regarding their satisfaction from pain relieve measures.

Table (1): Sociodemographic characteristics of women under study

Items	Study n=60		Control n=60		X2 Test	*P* Value
	No	%	No	%		
Age \ Year					0.56	>0.05
18 -	16	26.7	15	25.0		
24 -	41	68.3	40	66.7		
30 - 35	3	5.0	5	18.3		
Education :-					0.26	>0.05
Illiterate	3	5.0	4	6.7		
Read, write	17	28.3	16	26.7		
Secondary level	21	35.0	20	33.3		
University level	19	31.7	20	33.3		
Occupation:					0.034	>0.05
House wife	28	46.7	29	48.3		
Working	32	53.3	31	51.7		
Residence:					6.4	<0.05
Rural	17	28.3	6	10.0		
Urban	43	71.7	54	90.0		

Table (2): women knowledge among two groups regarding pain relieve measures

Items	Study n=60		Control n=60		X2 Test	*P* Value
	No	%	No	%		
Knowledge regarding pain relieve measures:					0.55	>0.05
Correct	34	56.7	38	63.3		
Incorrect	26	43.3	22	36.7		
Methods of pain relieve:					1.25	>0.05
Analgesics	30	50.0	34	56.7		
Hot drinks	15	25.0	11	18.3		
Rest	11	18.3	13	21.7		
Massage	4	6.6	2	3.3		
Source of information					2.07	>0.05
Family	23	35.0	26	43.3		
Friends	21	35.0	18	30.0		
Internet	11	18.3	14	23.3		
Books	5	18.3	2	3.3		

Table (3): Mean vital signs of mothers among study and control groups during first stage of Labor.

Vital signs	Study	Control	T - Test	*P* - Value
	X ± SD	X ± SD		
On admission				
Systolic BP (mmHg)	116.0 ± 11.7	116.7 ± 10.5	0.39	> 0.05
Diastolic BP (mmHg)	75.3 ± 15.8	73.7 ± 16.2		
Temperature	36.65 ± 0.5	36.66 ± 0.5	0.65	> 0.05
Pulse (b/min.)	80.4 ± 0.5	80.5 ± 0.5	0.09	> 0.05
Respirations	19.8 ± 2.0	19.4 ± 2.3	0.78	> 0.05
With cervical dilatation (4-7)-				
Systolic BP (mmHg)	130.2 ± 11.7	133.9± 12.1	1.68	>0.05
Diastolic BP (mmHg)	75.3 ± 15.5	76.7± 15.7	0.5	>0.05
Temperature	36.3 ± 0.4	36.4 ± 0.5	1.13	>0.05
Pulse (b/min.)	80.5 ± 0.4	80.6± 0.5	1.1	>0.05
With cervical dilatation (8-10)				
Systolic BP (mmHg)	134.4 ± 11.3	137.1± 12.8	1.18	>0.05
Diastolic BP (mmHg)	77.6 ± 15.1	79.8 ± 15.9	0.79	>0.05
Temperature	36.31 ± 0.4	36.5 ± 0.6	2.6	>0.05
Pulse (b/min.)	81.7± 0.5	81.9 ± 0.6	2.2	>0.05

Table (4): Mean labor pain score for women among two groups.

Items	Study	Control	T - Test	*P*
	X ± SD	X ± SD		Value
• **On admission:**	3.62±0.5	3.68±0.5	0.67	**> 0.05**
• **After 1 hours**	4.24±0.5	4.65±0.5	**15.6****	**<0.001**
• **After 2 hours**	4.69±0.6	5.53±0.6	**7.6***	**< 0.05**
• **After 3 hours**	5.48±0.6	6.92±0.6	**13.1****	**< 0.001**
• **After 4 hours**	6.14±0.7	7.37±0.7	**9.5****	**< 0.001**
• **After 5 hours**	7.31±0.7	8.16±0.7	**6.5***	**< 0.05**
• **After 6 hours**	7.69±0.8	8.70±0.8	**6.7***	**< 0.05**
• **After 7 hours**	7.84±0.8	8.78±0.8	**6.3***	**< 0.05**
• **After 8 hours**	9.0±0.9	9.3±0.9	**1.8**	**> 0.05**

Table (5): Mean labour pain score for women among two groups.

Items	Study	Control	T - Test	*P*
	X ± SD	X ± SD		Value
Before Intervention:				
(3-5 cm of CD)	**5.4± 0.9**	**5.3± 0.9**	**0.02**	**> 0.05**
After Intervention:				
During 1st stage of labour:				
(3-5 cm of CD)	**5.0 ± 0.9**	**5.2 ± 0.9**	**0.18**	**> 0.05**
(6-8 cm of CD)	**3.5± 0.8**	**4.7 ± 0.8**	**8.6***	**< 0.05**
(9-10 cm of CD)	**2.6± 0.7**	**3.6± 0.8**	**7.1***	**< 0.05**
During 2nd stage of labour:-	**2.1± 0.7**	**2.98± 0.7**	**6.3***	**< 0.05**

Table (6): Labor progress among study and control groups during active and acceleration phase of Labour.

Labour progress	Study	Control	T - Test	*P* - Value
	X ± SD	X ± SD		
• **Frequency of uterine contraction in 10 minutes**	3.2 ± 0.4	2.5 ± 0.6	14.2**	0.001
• **Duration of uterine contraction**	34.2 ± 8.1	30.1± 9.2	2.6*	0.05
• **Intensity of uterine contraction**	2.4±0.5	2.05±0.6	3.3*	0.05

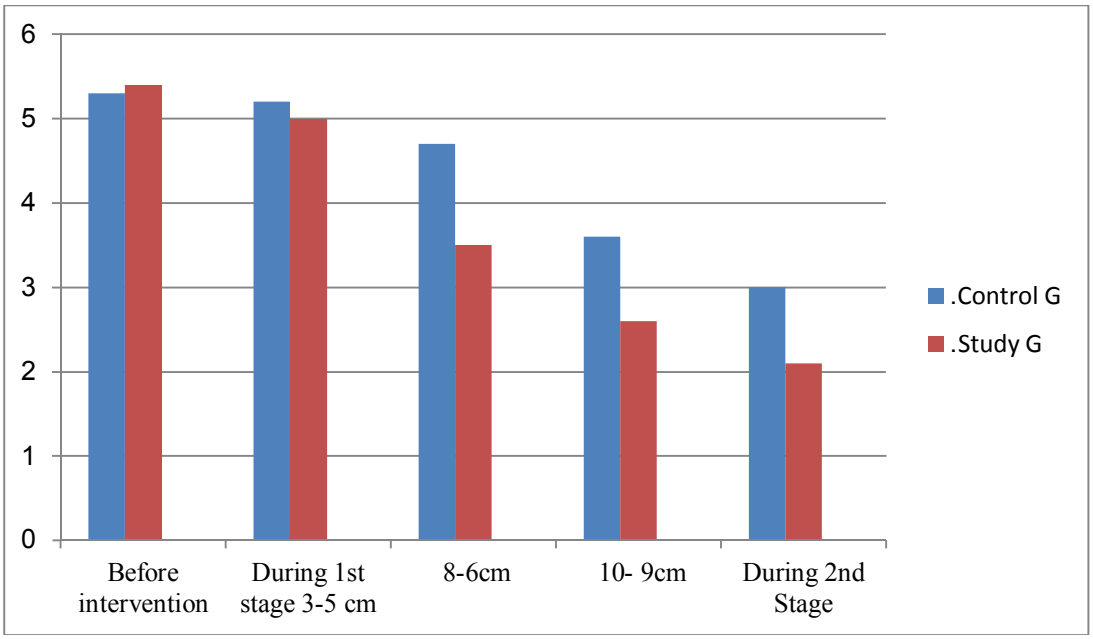

Figure (3): Mean labour pain score for women among two groups

Table (7): Mean duration of labour stages among study and control groups throughout the three stages of Labour.

Duration of labour	Study	Control	T - Test	*P* - Value
	X ± SD	X ± SD		
• **First stage of labour/hrs.**	7.3± 0.4	8.9 ± 0.6	17.8**	0.001
• **Second stage of labour/ minutes**	44.3 ± 0.7	87.2 ± 0.9	0.13	>0.05
• **Third stage of labour/minutes**	8.4±0.5	13.5±0.6	5.1*	<0.05

Table (8): Assessment of labour out comes (maternal)

Labour outcome	Study		Control		X2 - Test	*P* - Value
	No	%	No	%		
During first stage:-						
Maternal distress	1	1.7	3	5.0	2.4	>0.05
Prolonged active phase	2	3.3	10	16.7	23.6 **	0.001
Fetal distress	3	5.0	14	23.3	24.7**	0.001
During second stage:-						
Perineal Laceration	2	3.3	11	18.3	23.9**	0.001
Maternal distress	1	1.7	6	10.0	16.8**	0.001
Prolonged second stage	2	3.3	8	13.3	17.9**	0.001
During third stage:-						
Prolonged placental separation	0	0.0	7	11.7	17.8**	0.001
Post partum hemorrhage	1	1.7	5	8.3	15.3**	0.001

Table (9): women satisfaction among two groups regarding pain relieve measures

Items	Control		Study		X2 Test	*P* Value
	No	%	No	%		
Degree of Satisfaction					**62.6****	**< 0.001**
Highly Satisfy	**0**	**0.0**	**33**	**55.0**		
Satisfy	**25**	**41.7**	**24**	**40.0**		
Un Satisfy	**35**	**58.3**	**3**	**5.0**		

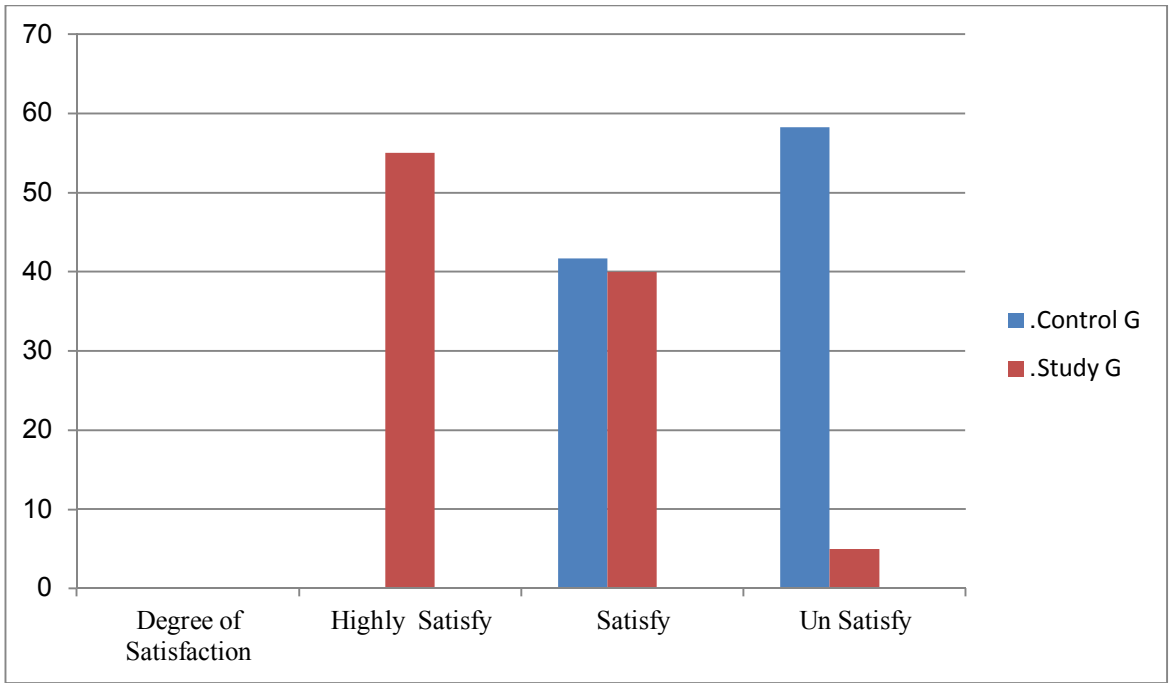

Figure (4): women satisfaction among two groups regarding pain relieves measures: 62.6** / P< 0.001

4. Discussion:

A non-pharmacological or complementary therapies based on sound research findings are needed to supplement pain relief measures during normal vaginal delivery. Reflexology is a mild and noninvasive technique of pain management. Nurses use these therapies to lessen the reception and perception of pain. (19).

A similar two matched groups were recruited in this study to evaluate the effect of foot reflexology on the pain and outcomes of labor for the primiparous women This was evident by the statistically non-significant difference between study and control group regarding their age, education, occupation, their knowledge about pain relieve measures, and their mean vital signs on admission, and during cervical dilation. In addition to their mean labour pain on admission, before intervention, and during the first stage of labour at 3-5 cm of cervical dilation.

The results of the present study showed that there was a significant difference between the two groups in terms of pain intensity. In the reflexology group, the results indicated a significant reduction of pain after the intervention. This study finding is in accordance with a study carried out in Gentofte Hospital, Copenhagen, 58 women out of 65, who had been received reflexology in the labor, experienced a more significant pain relief (20). Also, in accordance with a study done by ***Samuel, and Ebenezer*** (21) they reported that foot reflexology attenuates acute pain in human volunteers and can increased both pain threshold and tolerance in human volunteers exposed to acute pain. These findings indicated the possibility of using reflexology in the management of pain.

Several reasons could be proposed as an effect for reflexology, which is touching skin can cause the release of endogenous endorphins of the body and would reduce the stress; therefore, with stress reduction, the pain would consequently reduce and the opposite is also true. The second reason is that, reflexology can remove the fatigue and anxiety. A third cause, explain that applying pressure on hands or feet activate large diameter fibers to close the pain gate, thereby inhibit the transmission of pain ***(22).***

In the study done by **Abasi, Abeian, & Fadaii (23)** on the effect of reflexology on the labor outcomes found that reflexology can facilitate the labor through increase in uterine contraction, reduce the pain and the need to the intervention. This explanation is emphasized by the current study findings which revealed more frequent uterine contraction among study group women, with a high statistical significant difference between the two groups. In addition to, longer duration and less pain intensity of uterine contraction among study group women with a statistical significant difference between them. The current study also revealed a shorter first stage among study group women with a highly statistical significant difference between the two groups, and shorter third stage for reflexology group with a statistical significant difference between them. Although a shorter second stage among study

group women, it does not reach the level of significance between the two groups.

These findings are in accordance with those of the study of ***Tiran, (24),*** who studied the effect of reflexology on labor pain, they indicated that, reflexology can facilitate the labor progress through increased uterine contractions, reduced intensity of the pain and the need to the augmentation. As well, the study of ***Dolatian et al.,*** **(13**), who studied the effect of reflexology on pain intensity of labor among three groups of mothers, they found that, during cervical dilation of 6-7 cm as well as 8-10 cm, the intensity of pain was significantly lowered in reflexology group as compared with the other two groups (support group, routine care group) (p<0.001), which is similar to our study findings.

These findings were supported by, ***McNeill et al.*** **(25)** who reported that applying reflexology for 60 minutes could reduce the length of the labor. ***McCaughey*** **(26**) also discussed that women who had received reflexology at the time of labor, their labor duration was averagely reduced 6-7 hours.

Explaining the results of the present study, it should be stated that anxiety is the triggering point of pain, fear and muscle rigidity which can cause to increase the adrenaline and epinephrine level which has Anti oxytocine properties and can disrupt the uterine muscle activity and prolong the labor length **(27).** Reflexology by decreasing the adrenaline and noradrenalin and increasing endorphins and inner oxytocine, would increase uterine muscle contractions and activities and can affect the duration of the labor. So, applying reflexology technique may decrease the adrenalin and nordrenaline and increase endorphins; and inner oxtocine, would consequently increase uterine muscle contractions and activities and can affect the duration of the labor ***(23).***

The first hour of the labor is the most important and most dangerous time for the mother. Among the postpartum cares, controlling hemorrhage rate and maternal vital signs (blood pressure, body temperature, pulse rate and respiration) are of high importance. In the present study, postpartum hemorrhage in the control group subjects who received the routine care was significantly higher, while there is no significant difference between both groups regarding their vital signs. These findings were matched with ***Mirzaif et al. (28)*** they study the effect of reflexology on the primiparous women in the Afzalipour Hospital in Kerman, the mean scores of pulse, systolic and diastolic blood pressure of the mothers in the study and control group had no significant difference neither before or after intervention.

The findings of the present study signifying shorter active phase, and fetal distress. Also, less incidence of perineal laceration, maternal distress, and shorter second stage. In addition to absence of prolonged placental separation and less post partum heamorrhage among the study group subjects with a highly statistical significant difference between the two groups. These findings were in accordance with ***Abasi et al. (23)*** in a similar research observed that the effects of reflexology on labor outcomes were perceived as outstanding and both physical symptoms of first stage labor of 5 or 6 hours. The 26-30 years old women seemed to have the longest labors. In total average duration of first stage were 5 hours, second stage 16 minutes, and third stage 7 minutes. This is compared to textbook figures of 16 to 24 of first stage, and 1 to 2 hours second stage.

This may refer to that reflexology can bring about relaxation and comfort in the individual through physiological changes and release of endorphins and anesthesia feeling that can create comfort. Mentioned effects can cause reduction in the maternal stress and increase her peace of mind, with consequent positive effect on the labor progression and her satisfaction.

These findings were in congruent with ***Dolatian, et al., (13)***, on their study, which demonstrated that reflexology could decrease the duration of first, second and third stages of labor as well as alleviate intensity of labor pain. Moreover, the study of ***Mahboubeh, et al., (29),*** who studied the effect of reflexology on the pain and outcomes features of labor on primparous women, indicated that there was a difference in length of the first stage of the labor (active phase) between the two groups, but this difference in terms of duration was not significant in the second and third stages of the labor.

The results of the present study revealed that more than half of the study group women were highly satisfied compared to none of the control group with pain relief measures. These findings were in agreement with ***Mirzai et al.*** (**28**) in a study on the effect of reflexology on the labor outcome found that out of 68 pregnant women who chose reflexology, 61 (89.71%) expressed that reflexology was helpful in reducing the pain, 6 (8.82%) did not feel any effect and one subject increased pain in response to reflexology.

Therefore, the use of reflexology in maternity care appears to demonstrate high levels of maternal and even staff satisfaction. 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. It is a simple and convenient technique that requires no hardware tools, just with the aid of adequately trained staff. Fortunately, the findings of this research supported the hypothesis which was primiparous

women who will receive foot reflexology technique will have positive outcomes compared to those who did not.

Conclusion:

The present study provided evidence that foot reflexology could decrease the intensity of the labout pain, decrease the duration of three stages of labour, improve labour outcomes, and decrease complications. In addition to increase patient satisfaction about non pharmacological pain relief measures.

Recommendations:

Reflexology technique is recommended as an alternative non pharmacological method which can be applied in maternity hospitals.

In service education program could be designed and implemented to empower the nurses to apply this techniques to relieve labour pain, improve labour outcomes, and decrease the incidence of complications.

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