Reflexology in Childbirth Pain Management

Hadis Rahimi[1], Hossein Elyasi[1], Nasrin Galehdar[2]

[1] *Department of Medical Sciences, School of Medicine, Lorestan University of Medical Sciences, Khorramabad, Iran*

[2] *Department of Surgical Technology, School of Paramedicine, Lorestan University of Medical Sciences, Khorramabad, Iran*

Received: 12 Oct. 2020; Accepted: 28 May 2021

Abstract- This study was conducted to review the related articles and draw a final conclusion regarding the application of reflexology for delivery (labor and cesarean section) pain management in women all over the world. In this systematic review, relevant articles were searched in Google Scholar, PubMed, Cochrane Library, Science Direct, and Scopus databases from the year 2000 to 2018. All the human clinical trials that examined the effects of reflexology methods on delivery pain (labor or Cesarean section) were included, and others were excluded from the study. All the 18 included original articles (with 1391 patients) reported that reflexology significantly reduces the pain of delivery, confirming its decreasing effect on labor, Cesarean section, and post-delivery pain. Results of all articles showed that if true reflexology is performed on the right location of the body and at the appropriate time, the pain of delivery can be significantly decreased. Reflexology is appropriate pain relief and prophylaxis for any kind of pain, especially delivery and post-delivery pain. It is a safe remedy with no adverse effects reported so far.

Acta Med Iran 2021;59(6):312-321.

Keywords: Childbirth pain; Complementary medicine; Reflexology

Introduction

The application of pressure to areas on feet, hands, ears, and other parts of the body is called reflexology (1-3). Reflexology may be an effective method to alleviate stress and is commonly relaxing. The theory behind reflexology states that these areas correspond to organs and systems of the body (4,5). Its proponents believe that pressure applied to these areas affects the organs and has health benefits. Foot charts guide reflexologists when they apply pressure to specific areas (6-8). Rubber balls, rubber bands, and sticks of wood are the items these practitioners sometimes utilize for assistance. Practitioners of reflexology are, among others, chiropractors, physical therapists, and massage therapists (9-12).

Several studies conducted by the National Cancer Institute and the National Institutes of Health show that reflexology may lessen pain and psychological symptoms, such as nervousness and depression, and improve relaxation and sleep (13-17). Studies also report that reflexology may have profits in the palliative care of people with cancer (18-24). Reflexologists claim that reflexology is also able to treat a wide range of medical conditions such as asthma, diabetes, and cancer. However, scientific evidence is required to verify these claims (25-27).

Reflexology is generally believed to be safe, even though very vigorous pressure may cause discomfort for some people. Besides, it is an alternative treatment for a variety of conditions and has been used for thousands of years. In ancient times, the Chinese and Egyptians had documented practices very similar to reflexology as treatments for certain afflictions. This method involves the reflexologist exerting pressure on specific regions in the hands, feet, and ears that affect certain reflex areas of the body (28-31). The theory behind reflexology is to align your qi, but even for those who normally do not have much trust in reflexology, there are numerous studies backing up the claims of reflexologists. This method is not broadly accepted in the medical world, but a large number of physicians worldwide have been

Corresponding Author: N. Galehdar
Department of Surgical Technology, School of Paramedicine, Lorestan University of Medical Sciences, Khorramabad, Iran
Tel: +98 9163611417, Fax: +98 2142910703, E-mail address: Galehdar_n@yahoo.com

employing reflexology for generations with astonishingly positive results (32-36).

The benefits of reflexology include its capability to stimulate nerve function, increase energy, boost circulation, and induce a deep state of relaxation (37-44). Furthermore, it helps stimulate the central nervous system and avoid migraines (45-50). This sort of massage speeds up recovery after an injury or surgery, decreases sleep disorders, and relieves depression and pain. It also helps facilitate the treatment of different types of cancer and alleviate pregnancy-related pains, even those occurring after delivery (51-63).

Whether you work in an office, plant, field, hospital, or any other place, there is a good chance that you put heavy weights and stress on your feet every day. It is not always the back; stress can manifest itself in the other parts of our body too. This special area of massage therapy also includes hands and ears, making it a holistic massage (64,65).

When an egg is fertilized by a sperm, the result is pregnancy. Then, an embryo grows inside a woman's uterus and develops into a baby (66,67). In humans, this process lasts about 264 days from the date of fertilization. Labor happens in three phases. The first phase begins with contractions and continues until the cervix has become thinner and dilated to about 4 inches wide (68,69). The second phase is the active one, in which the mother starts to push the embryo downward. Crowning is when the baby's scalp can be seen and, a short time after, the baby is born (70,71). In the third phase, the placenta exits the uterus. During pregnancy, the placenta supplies food and oxygen to the baby (72,73). Both mother and baby are monitored thoroughly during labor. The majority of women can have a baby through normal vaginal delivery. When there are complications, the baby may need to be delivered surgically by a Cesarean section (74,75).

Pain during labor is created by pressure on the cervix caused by contractions of the muscles of the uterus. This pain can be felt as strong cramping in the abdomen, back, and groin, as well as an achy feeling (76-78). Some women also experience pain in their sides or thighs. Other reasons for pain during labor include pressure on the bladder and bowels by the baby's head and the stretching of the birth canal and vagina. Every woman has a different feeling of pain during labor (79,80). Although labor is often thought of as one of the most painful events experienced by humans, it varies highly from woman to woman and even from pregnancy to pregnancy. Women experience labor pain differently. For some, it feels like menstrual cramps; for others, severe pressure; and for others, extremely strong waves that feel like diarrheal cramps (81-86).

Many pregnant women all over the world search for a method to reduce the pain of delivery, and many of these methods have their own risks and problems. Reflexology is a safe and proven way to decrease various types of pain. Therefore, the present study was conducted to review the related articles and draw a final conclusion regarding the application of reflexology for delivery pain management.

Materials and Methods

Relevant articles were searched in Google Scholar, PubMed, Cochrane Library, Science Direct, and Scopus databases by searching English article topics same to our topic and equal and same to our article keywords (Reflexology, acupressure, massaging in combination with labor, labor pain, cesarean, cesarean pain, delivery, delivery pain, post-delivery pain management, childbirth pain, and pain management) from 2000 to 2018. All the articles were searched by two members of our research group in a double-blind manner for better quality and accuracy of the work. All the studies that examined the effect of reflexology methods on delivery pain (labor and Cesarean section) were included, and others were excluded from this study.

In the first search, 463 articles were found. After removing duplications, 294 articles remained, and after removing articles belonging to years before 2000 as well as those related to any kind of massage therapy except for reflexology, 114 articles remained. Finally, after the examination of articles' abstracts, 18 articles met the inclusion criteria and were included. The search process is showed in Figure 1.

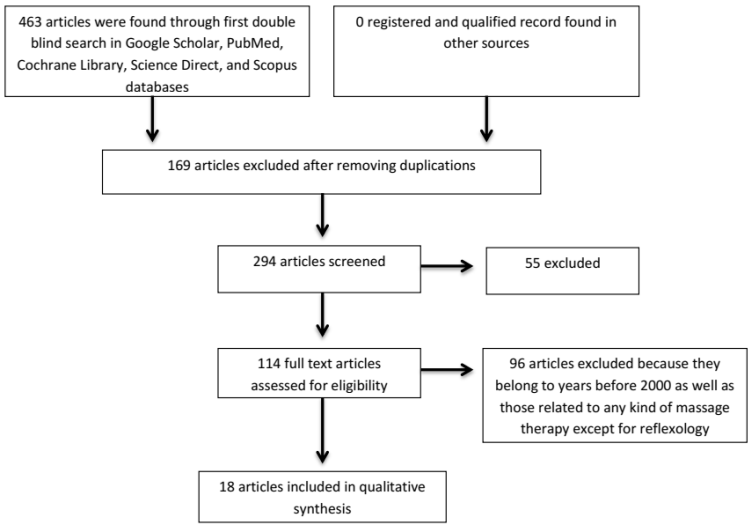

Figure 1. The searching strategy in preferred reporting items for systematic reviews and meta-analyses (PRISMA) flow diagram

Results

Five internet databases were selected for searching about records of reflexology (Google Scholar, PubMed, Cochrane Library, Science Direct, and Scopus) in addition to various books. Any study before the year 2000 and any other study that worked on massage and unspecialized massaging were excluded. We extracted data about the first author, year of publication, delivery type, and all of the important results of the included records and showed them in Table 1.

Table 1. Studies on the effect of reflexology and their outcomes

Row	First author	Year	Delivery type	Number of participants	Results
1	Mehrnoosh Khoshtarash	2012	Cesarean section	62	The severity of pain in the first day was significantly decreased in comparison to the time before reflexology and the control group ($p<0.001$ and $p<0.0001$, respectively). The severity of pain after the second stage was also significantly decreased in the case group in comparison with the control group ($p<0.001$). Physiologic parameters in the case group (systolic and diastolic blood pressure, pulse rate, and respiration rate) showed no significant differences in comparison with the control group (87).
2	Soheila Moghimi Hanjani	2015	Labor	80	Applying the reflexology method reduced pain severity (30, 60, and 120 minutes after intervention) and also significantly reduced anxiety level and duration of labor ($p<0.001$). Besides, a significant difference was seen between the two groups in terms of the frequency distribution of the type of labor and Apgar score ($p<0.001$). Results indicated that reflexology decreases labor pain intensity, duration of labor, anxiety, and frequency distribution of natural delivery while raising Apgar scores (88).
3	M. Dolatian	2010	Labor	120	Pain intensity in all three dilatation stages was significantly lower in the reflexology group ($p<0.001$). However, in the comparison between the supported group and the routine care group, the severity of pain was lower in the supported group only in the 4-5cm dilatation, and there was no significant difference between these two groups during 6-7 and 8-10cm dilatation (89).
4	Mahboubeh Valiani	2010	Labor	88	In this study, there was no major difference between the groups before the intervention. In the reflexology group, there was an important difference between the PRI before and that after the four stages of intervention ($p<0.001$). The PRI was changed significantly between the studied groups following intervention ($p<0.001$). The active phase of labor length significantly differed across groups, but this difference was not significant during the second ($p=0.29$) and the third ($p=0.27$) stage. The alteration between the 1st-min and the 5th-min Apgar score ($p<0.001$) and hemorrhage rate between the two groups were significantly different ($p=0.02$) (90).
5	M. Dolatian	2011	Labor	120	All the three stages of cervical dilatation pain severity were significantly lower in the reflexology (intervention) group in the duration of the 4-5cm dilatation stage. Women in the reflexology group reported less intense pain compared to those receiving routine care, but there were no important differences in the later stages of labor. This shows that reflexology managed to reduce the duration and pain of the first, second, and third stages of labor (91).
6	Soheila Moghimi Hanjani	2012	Labor	80	In this study, there were no significant differences between the two groups before the intervention ($p=0.15$). After reflexology, the difference in anxiety score differed across groups ($p<0.001$) (92).

Cont. table 1

7	Jipi Varghese	2014	Caesarean section	60	Mean PSQI was found to be meaningfully smaller in the reflexology group (p<0.001) compared to the control group. The post-test means a score of pain severity of an experimental group was meaningfully lesser than that of a control group (X=4.75, X=7.65, t=-10.627, p<.001). Also, there was an important difference between groups in terms of pain severity and requesting pain-reducing medications (p<.001). The hypothesis of this research was accepted, indicating that after receiving foot reflexology, the intervention group showed significant pain relief and improved quality of sleep (93).
8	Soheila Moghimi Hanjani	2013	Labor	80	Labor pain intensity before and immediately after intervention (foot reflexology) did not differ across intervention and control groups (p>0.05). Nevertheless, half, one, and two hours after reflexology, the intensity of labor pain was lower in the reflexology group than in the control group (p<0.001). The duration of labor was significantly lower in the reflexology group than in the control group (p<0.001) (94).
9	Razmjoo, Nastaran	2012	Cesarean section	61	In this study, there was no important difference in pain severity before reflexology between the two groups based on the t-test (p=0.814). After reflexology, however, the difference was significantly based on the Man-Whitney U test (p=0.004). There was no significant alteration between the two groups regarding postoperative anxiety score (p=0.215) (95).
10	Jenabi, Ensiyeh	2012	Labor	70	In this study, the reflexology group had a significant correlation with decreased labor pain (p=0.001), but there was no significant correlation between the place of reflexology and duration of labor (p=0.59) (96).
11	Shayesteh Hassani	2015	Cesarean section	20	The results of this study revealed that there was no significant difference between the two groups before the study. On the other hand, after the reflexology, there was a significant difference between the intervention and control groups. Therefore, reflexology is a useful way to reduce mothers' pain (97).
12	Goweily Eman	2015	Labor	60	Before reflexology, there was no significant difference between the two groups, whereas there was a significant difference between them after reflexology (p=0.0001). There was a significant reduction in physiological and behavioral responses in the reflexology group after intervention sessions. Reflexology can decrease labor pain. Thus, because of the safety of this method, it can be utilized as an alternative for pharmacological methods (98).
13	Mathew Ancy Merin	2016	Labor	30	The calculated t value is 7.54, which is greater than the table value of 2.763 (p<0.05). This shows that there is a significant reduction in the intensity of pain in the experimental group (99).
14	Hajighasemali	2014	Labor	106	Kruskal-Wallis test indicated no significant difference in pain severity at the start of the study and before the first intervention among the three groups. However, the statistical test showed significant differences between the first intervention and before and after the second intervention among them. The intensity of pain increased significantly in the routine care group (p=0.001). Findings indicated that the average pain score was lower in the acupressure group than the reflexology group, but the Mann-Whitney U test found no significant difference. The pain intensity of labor before and after intervention examined with the Wilcoxon test in both stages indicated that there was no significant difference after intervention in comparison with the time before the intervention in acupressure and reflexology groups. However, in the routine care group, the intensity of pain was significantly increased (p=0. 001) (100).
15	Moghimi Hanjani	2012	Labor	80	Duration of labor was significantly lower than in the intervention group than in the control group (p<0.001). the difference between the type of delivery and the 1st- and 5th-minute Apgar score between the two groups was significant (p<0.001) (101).
16	Bagheri, K.	2009	N/A	60	During delivery, pain severity and stress increased, and the *t*-test showed that pain severity was meaningfully smaller in the intervention group in three phases of delivery. Moreover, stress showed a significant difference in the latent phase across both groups (102).
17	Thottingal	2013	Cesarean section	60	The paired t-test score (14.26) shows that there is a significant difference between pretest and posttest pain scores at the 0.05 level in the experimental group. The independent t-test (38.8) indicated that there was a significant difference between the experimental and control groups on the first day. On the second day, the paired t-test (17.02) revealed that there was a significant difference between pretest and posttest pain scores at the 0.05 level, and the independent t-test (36.3) demonstrated that there was a significant difference between experimental and control groups (103).
18	Yılar Erkek Zümrüt	2018	Labor	154	Mean STAI TX-1 scores were measured before reflexology in the latent and active phases of labor and early in the postpartum period (four times in total). Mean STAI TX-1 scores were higher in the experimental group than the control group (p<0.001). Mean STAI TX-1 scores post-reflexology application (when cervical dilation was 3–4 cm) and during the active phase of labor (when cervical dilation was 6–8 cm) of the pregnant women in the experimental group were lower than those of the control group (respectively p=0.010 and p<0.001). In the experimental group, there was no statistically significant difference between mean STAI TX-1 scores pre- and post-reflexology (p=0.820). Mean STAI TX-1 scores in the early postpartum period were similar across experimental and control groups (p=0.08) (104).

All the 18 included original articles about the effect of reflexology on delivery pain conducted foot reflexology and found that this significantly decreased the pain of delivery and confirmed its pain reduction

role for labor, Cesarean section, and post-delivery pain.

Based on the several foot reflexology chart and included articles in this study, several zones on the sole of the foot, especially three forth of the low part of foot bottom and its internal margins, are the main determining parts to deal with the pain of about abdomen to pelvic regions and so related to delivery pain. Exerting massage on these specific points or just massaging the whole foot sole was effective and significant in all studies.

Here, 18 clinical trials and 1391 patients with delivery pain were surveyed. Results of all articles showed that if true reflexology is performed on the right location of the body and at the appropriate time, the pain of delivery can be significantly decreased.

Approximately 293 patients from all included articles were among the Cesarean section group, and the other was in the labor group, and 363 patients of all were among the post-delivery pain group. All three groups show effective pain decrease with $P<0.01$.

Some articles surveyed and showed that the place of reflexology had no correlation with delivery time.

Between all 1391 patients surveyed in this study, in each article, we found reflexology is conducted for 15 to 40 minute for each foot that. In most studies, reflexology was conducted simultaneously for feet, and in some studies, this was conducted on one foot then another, but all analyzed data showed that the whole of these methods was effective with $P<0.01$.

Information, including the first author of each article, year of publication, type of delivery, number of participants, and the outcomes of each article, are presented in Table 1.

Discussion

Reflexology stimulates the nerve endings in the foot, which sends feedback to other parts of the body by the spinal cord. Reflexology promotes relaxation in blood circulation and eliminates the waste of tissue metabolism from the site. These effects cause changes in heart rate and variations in baroreceptor reflexes (105-108). Reflexology specifically increases blood pressure. These changes can be useful in promoting healing and increasing the capacity of human organisms to respond to internal and external challenges (109-112).

Skin contact in reflexology causes a release of hormones and neuropeptide oxytocin which affects the autonomic nervous system as well as cardiac and vascular systems. Oxytocin inhibits pituitary, adrenal, hypothalamic, and alpha-adrenergic activities. This hormone also reduces the level of catecholamine that increases blood pressure and cardiac output (113-118).

Changes in the sensitivity of barometric receptors in different situations can increase or decrease blood pressure. Also, these baroreceptors have an inhibitory effect on the brain under the influence of reflexology, thereby decreasing muscle tension and stimulating sleep and the inhibition of the sensory nerves of the spinal cord that decreases pain and anxiety (119-123).

Dysfunction in each part of the body and even the normal functioning of the body leads to the formation of uric acid and calcium crystals, usually occurring in the feet and their nerves. This sediment prevents the flow of lymph and even blood. Reflexology causes this material to be discarded, resulting in the flow of lymph and blood in the area (124-128). In reflexology, pressure on the foot causes cell receptors to open the ion channels in the plasma, thereby causing a local action potential and transmitting these messages to the spine and the brain (129,130).

Here, we conducted a systematic review to study any articles focusing on the effects of reflexology on any kind of delivery pain from 2000 to 2018. All the studies reported that reflexology significantly reduces delivery pain even in the Cesarean section and the post-Cesarean period. A number of excluded studies from the present article had administered body massage or acupressure for the reduction of delivery pain, and some of them found fewer pain-reduction effects in delivery. This clarifies the effect and the difference of reflexology between similar complementary and alternative medicines.

In conclusion, reflexology is found to be a desirable pain relief and prophylaxis for various types of pain, especially for delivery and post-delivery pain. This method is a safe remedy with no adverse side effects reported so far. Further studies are required to find other kinds of reflexology and their effects on the human body.

References

1. Stephenson NL, Weinrich SP, Tavakolil AS. The effects of foot reflexology on anxiety and pain in patients with breast and lung cancer. Oncol Nurs Forum 2000;27:67-76.
2. Byers DC. Better health with foot reflexology. USA: Ingham Publishing, Incorporated, 1983.
3. McVicar A, Greenwood C, Ellis C, LeForis C. Influence of study design on outcomes following reflexology massage: an integrative and critical review of

interventional studies. J Altern Complement Med 2016;22:739-50.
4. Frambes D, Sikorskii A, Tesnjak I, Wyatt G, Lehto R, Given B. Caregiver-Reported Health Outcomes: Effects of Providing Reflexology for Symptom Management to Women With Advanced Breast Cancer. Oncol Nurs Forum 2017;44:596-605.
5. McVicar A, Greenwood C, Ellis C, LeForis C. Influence of study design on outcomes following reflexology massage: An integrative and critical review of interventional studies. J Altern Complement Med 2016;22:239-50.
6. McCullough JE, Liddle SD, Close C, Sinclair M, Hughes CM. Reflexology: A randomised controlled trial investigating the effects on beta-endorphin, cortisol and pregnancy related stress. Complement Ther Clin Pract 2018;31:76-84.
7. Smith C, Levett K, Collins C, Dahlen H, Ee C, Suganuma M. Massage, reflexology and other manual methods for pain management in labour. Cochrane Database Syst Rev 2018;3:CD009290.
8. McCullough JE. Factors influencing reflexology treatment outcomes during pregnancy [dissertation]. Coleraine: Ulster University., 2015.
9. Arslan F, Guven SD, Özcan A, Vatansev H, Taşgin Ö. The Effect of Exercise, Reflexology and Chrome on Metabolic Syndrome. Int J Sport Health Sci 2018,7:77-85.
10. Demirtürk F, Yilar Erkek Z, Alparslan Ö, Demirtürk F, Demir O, Inanir A. Comparison of reflexology and connective tissue manipulation in participants with primary dysmenorrhea. J Altern Complement Med 2016;22:38-44.
11. Unal KS, Akpinar RB. The effect of foot reflexology and back massage on hemodialysis patients' fatigue and sleep quality. Complement Ther Clin Pract 2016;24:139-44.
12. McCullough JE, Liddle SD, Sinclair M, Close C, Hughes CM. The physiological and biochemical outcomes associated with a reflexology treatment: a systematic review. Evid Based Complement Alternat Med 2014;2014:٥٠٢١٢٣.
13. Buchanan DR, White JD, O'mara AM, Kelaghan JW, Smith WB, Minasian LM. Design Issues in Cancer-Symptom–Management Trials Using Complementary and Alternative Medicine: Lessons From the National Cancer Institute Community Clinical Oncology Program Experience. J Clin Oncol 2005;23:6682-9.
14. White JD. Complementary and alternative medicine research: a National Cancer Institute perspective. Semin Oncol 2002;29:546-51.
15. Wyatt G, Sikorskii A, Rahbar MH, Victorson D, You M. Health-related quality-of-life outcomes: a reflexology trial with patients with advanced-stage breast cancer. Oncol Nurs Forum 2012;39:568-77.
16. Ruedy J, Kaufman DM, MacLeod H. Alternative and complementary medicine in Canadian medical schools: a survey. CMAJ 1999;160:816-7.
17. Hafner AW, Zwicky JF, Barrett S. Reader's guide to alternative health methods. American Medical Association, 1992.
18. Stephenson N, Dalton JA, Carlson J. The effect of foot reflexology on pain in patients with metastatic cancer 1. Appl Nurs Res 2003;16:284-6.
19. Stephenson NL, Swanson M, Dalton J, Keefe FJ, Engelke M. Partner-delivered reflexology: effects on cancer pain and anxiety. Oncol Nurs Forum 2007;34:127-32.
20. Yang JH. The effects of foot reflexology on nausea, vomiting and fatigue of breast cancer patients undergoing chemotherapy. Taehan Kanho Hakhoe Chi 2005;35:177-85.
21. Hodgson H. Does reflexology impact on cancer patients' quality of life? Nurs Stand 2000;14:33-8.
22. Kohara H, Miyauchi T, Suehiro Y, Ueoka H, Takeyama H, Morita T. Combined modality treatment of aromatherapy, footsoak, and reflexology relieves fatigue in patients with cancer. J Palliat Med 2004;7:791-6.
23. Wilkinson S, Lockhart K, Gambles M, Storey L. Reflexology for symptom relief in patients with cancer. Cancer Nurs 2008;31:354-60.
24. Sharp DM, Walker MB, Chaturvedi A, Upadhyay S, Hamid A, Walker AA, et al. A randomised, controlled trial of the psychological effects of reflexology in early breast cancer. Eur J Cancer 2010;46:312-22.
25. Brygge T, Heinig JH, Collins P, Ronborg S, Gehrchen PM, Hilden J, et al. Reflexology and bronchial asthma. Respir Med 2001;95:173-9.
26. Jeong IS. Effect of self-foot reflexology on peripheral blood circulation and peripheral neuropathy in patients with diabetes mellitus. J Korean Acad Fundamentals Nurs 2006;13:225-34.
27. Kim JI, Lee MS, Kang JW, Do Young Choi, Ernst E. Reflexology for the symptomatic treatment of breast cancer: a systematic review. Integr Cancer Ther 2010;9:326-30.
28. Crane B. Reflexology: The Definitive Practitioner's Manual: Recommended by the International Therapy Examination Council for Students and Pratitioners. USA: Element, 1997.
29. Williamson J, White A, Hart A, Ernst E. Randomised controlled trial of reflexology for menopausal symptoms. BJOG 2002;109:1050-5.
30. Blunt E. Foot reflexology. Holist Nurs Pract

2006;20:257-9.
31. Eghbali M, Safari R, Nazari F, Abdoli S. The effects of reflexology on chronic low back pain intensity in nurses employed in hospitals affiliated with Isfahan University of Medical Sciences. Iran J Nurs Midwifery Res 2012;17:239-43.
32. Mohamed MA, El Bandrawy AM, Gabr AA. Do Foot Reflexology and Relaxation Training Decrease Premenstrual Symptoms in Adolescent Females. Int J Physiother 2016;3:522-8.
33. Sahiner NC, Bal MD. A Randomized Controlled Trial Examining the Effects of Reflexology on Children With Functional Constipation. Gastroenterol Nurs 2017;40:393-400.
34. Rollinson K, Jones J, Scott N, Megson IL, Leslie SJ. The acute (immediate) effects of reflexology on arterial compliance in healthy volunteers: A randomised study. Complement Ther Clin Pract 2016;22:16-20.
35. Embong NH, Soh YC, Ming LC, Wong TW. Revisiting reflexology: Concept, evidence, current practice, and practitioner training. J Tradit Complement Med 2015;5:197-206.
36. Icke S, Genc R. Effect of Reflexology on Infantile Colic. J Altern Complement Med 2018;24:584-8.
37. Hughes CM, Krirsnakriengkrai S, Kumar S, McDonough SM. The effect of reflexology on the autonomic nervous system in healthy adults: a feasibility study. Altern Ther Health Med 2011;17:32-7.
38. Wright S, Courtney U, Donnelly C, Kenny T, Lavin C. Clients' perceptions of the benefits of reflexology on their quality of life. Complement Ther Nurs Midwifery 2002;8:69-76.
39. Tiran D, Chummun H. The physiological basis of reflexology and its use as a potential diagnostic tool. Complement Ther Clin Pract 2005;11:58-64.
40. Özdemir G, Ovayolu N, Ovayolu Ö. The effect of reflexology applied on haemodialysis patients with fatigue, pain and cramps. Int J Nurs Pract 2013;19:265-73.
41. Jang SH, Kim KH. Effects of Seff-Foot Reflexology on Stress, Fatigue and Blood Circulation in Premenopausal Middle-Aged Women. J Korean Acad Nurs 2009;39:662-72.
42. Sudmeier I, Bodner G, Egger I, Mur E, Ulmer H, Herold M. Changes of renal blood flow during organ-associated foot reflexology measured by color Doppler sonography. Forsch Komplementarmed. 1999;6:129-34.
43. Nazari F, Soheili M, Hosseini S, Shaygannejad V. A comparison of the effects of reflexology and relaxation on pain in women with multiple sclerosis. J Complement Integr Med 2016;13:65-71.
44. Wang MY, Tsai PS, Lee PH, Chang WY, Yang CM. The efficacy of reflexology: systematic review. J Adv Nurs 2008;62:512-20.
45. Gantt WH. Reflexology, schizokinesis and autokinesis. Conditional reflex: a Pavlovian journal of research & therapy 1966;1:57-68.
46. Ghavami H, Imani N, Shams S, Khalkhali HR. The effect of applying reflexology massage on Nitroglycerin Induced Migraine Type Headache. Eur J Integr Med 2016;8:32.
47. Wojciech K, Pawel L, Halina RZ. Effects of feet reflexology versus segmental massage in reducing pain and its intensity, frequency and duration of the attacks in females with migraine: a pilot study. J Tradit Chin Med 2017;37:214-9.
48. Williams J, Mitchell M. Midwifery managers' views about the use of complementary therapies in the maternity services. Complement Ther Clin Pract 2007;13:129-35.
49. Safonov MI, Naprienko MV. Analysis of the efficacy of reflexology in the complex treatment of chronic migraine. Zh Nevrol Psikhiatr Im S S Korsakova 2017;117:22-5.
50. Bagheri-Nesami M, Shorofi SA, Zargar N, Sohrabi M, Gholipour-Baradari A, Khalilian A. The effects of foot reflexology massage on anxiety in patients following coronary artery bypass graft surgery: a randomized controlled trial. Complement Ther Clin Pract 2014;20:42-7.
51. Bakir E, Baglama SS, Gursoy S. The effects of reflexology on pain and sleep deprivation in patients with rheumatoid arthritis: A randomized controlled trial. Complement Ther Clin Pract 2018;31:315-9.
52. Kapila A, Chaplin P, Herd A, Knife N, Patel A. Can reflexology help in managing physical and psychological symptoms in breast cancer patients?. Eur J Surg Oncol 2018;44:881.
53. Whatley J, Street R, Kay S, Harris P. Use of reflexology in management of lymphoedema after surgery for breast cancer–The lived experience of patients with secondary lymphoedema. Eur J Integr Med 2016;4:588-9.
54. Ebadi A, Mahmoudi H. The effect of foot reflexology massage on the level of pain during chest tube removal after open heart surgery. Iran J Crit Care Nurs 2014;7:15-22.
55. Hudson BF, Davidson J, Whiteley MS. The impact of hand reflexology on pain, anxiety and satisfaction during minimally invasive surgery under local anaesthetic: A randomised controlled trial. Int J Nurs Stud 2015;52:1789-97.
56. Valizadeh L, Seyyedrasooli A, Zamanazadeh V, Nasiri K. Comparing the effects of reflexology and footbath on sleep quality in the elderly: a controlled clinical trial. Iran

Red Crescent Med J 2015;17:e20111.
57. Grady LH. The Effects of Reflexology Treatment on Sleep Quality in Shift Workers [dissertation]. United Kingdom: Cardiff Metropolitan University., 2016
58. Naseri M, Rahmani A, Nerir B, Salari M, Farahani MM. Effect of Foot Reflexology Massage and Foot Bath on the Sleep Quality of Patients with Acute Coronary Syndrome: A Comparative Study. J Crit Care 2016;9:e10294.
59. Choi MS, Lee EJ. Effects of foot-reflexology massage on fatigue, stress and postpartum depression in postpartum women. J Korean Acad Nurs 2015;45:587-94.
60. Soheili M, Nazari F, Shaygannejad V, Valiani M. A comparison the effects of reflexology and relaxation on the psychological symptoms in women with multiple sclerosis. J Educ Health Promot 2017;6:11.
61. Kim CS, Yoo KS, Hong SH. The Effects of Foot Reflexology on Arthralgia, Ankylosis, Depression, and Sleep in Community-dwelling Elderly Women with Osteoarthritis. J Korean Acad Nurs 2014;25:207-16.
62. Close C, Sinclair M, Mc Cullough J, Liddle D, Hughes C. A pilot randomised controlled trial (RCT) investigating the effectiveness of reflexology for managing pregnancy low back and/or pelvic pain. Complement Ther Clin Pract 2016;23:117-24.
63. Whatley J, Street R, Kay S, Harris PE. Use of reflexology in managing secondary lymphoedema for patients affected by treatments for breast cancer: A feasibility study. Complement Ther Clin Pract. 2016;23:1-8.
64. Atkins RC, Harris P. Using reflexology to manage stress in the workplace: a preliminary study. Complement Ther Clin Pract 2008;14:280-7.
65. Coyle K, Basen-Engquist K, Kirby D, Parcel G, Banspach S, Collins J, et al. Safer choices: reducing teen pregnancy, HIV, and STDs. Public Health Rep 2001;116: 82-93.
66. Dimmock S, Troughton PR, Bird HA. Factors predisposing to the resort of complementary therapies in patients with fibromyalgia. Clin Rheumatol 1996;15:478-82.
67. Perales M, Calabria I, Lopez C, Franco E, Coteron J, Barakat R. Regular exercise throughout pregnancy is associated with a shorter first stage of labor. Am J Health Promot 2016;30:149-54.
68. Buzaglo N, Harlev A, Sergienko R, Sheiner E. Risk factors for early postpartum hemorrhage (PPH) in the first vaginal delivery, and obstetrical outcomes in subsequent pregnancy. J Matern Fetal Neonatal Med 2015;28:932-7.
69. Gallagher AC, Hersh AR, Scrivner KJ, Tilden E, Caughey AB. 579: Operative vaginal delivery compared to cesarean section modeled for a second pregnancy: a cost-effectiveness analysis. Am J Obstet Gynecol 2018;218:S347.
70. Arrowsmith S, Wray S, Quenby S. Maternal obesity and labour complications following induction of labour in prolonged pregnancy. BJOG 2011;118:578-88.
71. Begley CM, Gyte GM, Devane D, McGuire W, Weeks A. Active versus expectant management for women in the third stage of labour. Cochrane Database Syst Rev 2011;11:CD007412.
72. Lipski A, Pariente G, Baumfeld Y, Rotem R, Yezersky M, Press F, et al. 192: Association between placental complications during the third stage of labor and delivering a small for gestational age (SGA) neonate. Ame J Obstet Gynecol 2018;218:S128-9.
73. Coffee Jr JC, Sale H, Henderson MT. Securities regulation: Cases and materials. USA: Foundation Press, 2015.
74. Heidari G, Malek-Sadeghi N, Sheikhi E, Elyasi H, Rahimi H. Frequency of Vaginal Delivery in Women with Previous Cesarean Section: A Single Referral Center Experience. World Fam Med 2018;16:70-4.
75. Whitburn LY, Jones LE, Davey MA, Small R. Supporting the updated definition of pain. But what about labour pain? Pain 2017;158:990-1.
76. Adams J, Frawley J, Steel A, Broom A, Sibbritt D. Use of pharmacological and non-pharmacological labour pain management techniques and their relationship to maternal and infant birth outcomes: examination of a nationally representative sample of 1835 pregnant women. Midwifery 2015;31:458-63.
77. Karlsdottir SI, Halldorsdottir S, Lundgren I. The third paradigm in labour pain preparation and management: the childbearing woman's paradigm. Scand J Caring Sci 2014;28:315-27.
78. Levett KM, Smith CA, Dahlen HG, Bensoussan A. Acupuncture and acupressure for pain management in labour and birth: a critical narrative review of current systematic review evidence. Complement Ther Med 2014;22:523-40.
79. Floris L, Irion O. Association between anxiety and pain in the latent phase of labour upon admission to the maternity hospital: A prospective, descriptive study. J Health Psychol 2015;20:446-55.
80. Bergh IH, Johansson A, Bratt A, Ekström A, Mårtensson LB. Assessment and documentation of women's labour pain: a cross-sectional study in Swedish delivery wards. Women Birth 2015;28:e14-8.
81. Parthasarathy S, Ravishankar M, Hemanthkumar VR. Reported Pain During Labour–A Qualitative Study of Influencing Factors among Parturient During Confinement in Private or Government Hospital. J Clin Diagn Res 2016;10:UC01-3.
82. Weibel S, Jelting Y, Afshari A, Pace NL, Eberhart LH,

Jokinen J, et al. Patient-controlled analgesia with remifentanil versus alternative parenteral methods for pain management in labour. Cochrane Database Syst Rev 2017;4:CD011989.
83. Eri TS, Bondas T, Gross MM, Janssen P, Green JM. A balancing act in an unknown territory: A metasynthesis of first-time mothers ′experiences in early labour. Midwifery 2015;31:e58-67.
84. Tan DJ, Sultana R, Han NL, Sia AT, Sng BL. Investigating determinants for patient satisfaction in women receiving epidural analgesia for labour pain: a retrospective cohort study. BMC Anesthesiol 2018;18:50.
85. Quinn K, Spiby H, Slade P. A longitudinal study exploring the role of adult attachment in relation to perceptions of pain in labour, childbirth memory and acute traumatic stress responses. J Reprod Infant Psychol 2015;33:256-67.
86. Hassani S, Hassani K. The Effect of Foot Reflexology on Physiologic Indices and Pain Severity Following Cesarean Delivery. Res J Med Sci 2015;9:114-7.
87. Hanjani SM, Tourzani ZM, Shoghi M. The effect of foot reflexology on anxiety, pain, and outcomes of the labor in primigravida women. Acta Med Iran 2015;53:507-11.
88. Dolatian M, Hasanpour A, Heshmat R, Alavi Majd H. The effect of reflexology on pain intensity of labor. ZUMS J;18:52-61.
89. Valiani M, Shiran E, Kianpour M, Hasanpour M. Reviewing the effect of reflexology on the pain and certain features and outcomes of the labor on the primiparous women. Iran J Nurs Midwifery Res 2010;15:302-10.
90. Dolatian M, Hasanpour A, Montazeri S, Heshmat R, Majd HA. The effect of reflexology on pain intensity and duration of labor on primiparas. Iran Red Crescent Med J 2011;13:475-9.
91. Moghimi Hanjani S, Shoghy M, Mehdizadeh Torzani Z, Ahmadi G, Khodadvastan Shahraki M. The Effect of foot reflexology on anxiety during of labor on primiparous. Ann Mil Health Sci Res 2012;10:219-24.
92. Varghese J, George J, Gowda YS. A randomized control trial to determine the effect of foot reflexology on intensity of pain and quality of sleep in post caesarean mothers. IOSR J Nurs Health Sci 2014;3:39-43.
93. Moghimi Hanjani S, Shoghi M, Ahmadi G. Effect of foot reflexology on pain intensity and duration of labor on primiparous. Koomesh 2013;14:166-71.
94. Razmjoo N, Yousefi F, Esmaeeli H, Azizi H, Lotfalizadeh M. Effect of foot reflexology on pain and anxiety in women following elective cesarean section. Iran J Obstet Gynecol Infertil 2012;15:8-16.
95. Jenabi E, Hajiloo Mohajeran M, Torkamani M. The effect of reflexology on relieving the labor pain. Iran J Obstet Gynecol Infertil 2012;14:34-8.
96. Hassani S, Hassani K. The Effect of Foot Reflexology on Physiologic Indices and Pain Severity Following Cesarean Delivery. Res J Med Sci 2015;9:114-7.
97. Smith CA, Levett KM, Collins CT, Dahlen HG, Ee CC, Suganuma M. Massage, reflexology and other manual methods for pain management in labour. Cochrane Database Syst Rev 2018;3:CD009290.
98. Mathew AM, Francis F. Effectiveness of Foot Reflexology in Reduction of Labour Pain among Mothers in Labour Admitted at PSG. Int J Nurs Stud 2016;8:11-5.
99. Hajighasemali S, Akbari A, Amir S, Baghban AA, Heshmat R. Comparison between Effect Acupressure on SP6 Point and Reflexology on the Severity of First-Stage Labor Pain. J Jahrom Univ Med Sci 2014;12:15-22.
100. Moghimi Hanjani S, Ahmadi G, Shoghi M, Mehdizadeh Torzani Z. The Effect of Foot Reflexology on the Outcomes of Labor on Primiparous. J Urmia Nurs Midwifery Fac 2012;10:700-5.
101. Metin ZG, Ozdemir L. The effects of aromatherapy massage and reflexology on pain and fatigue in patients with rheumatoid arthritis: a randomized controlled trial. Pain Manag Nurs 2016;17:140-9.
102. Thottingal S. A Study to Assess the Effect of Foot Reflexology on Pain and Discomfort of Mothers after Caesarean Sction in a Selected Hospitals Banglore [dissertation]. Int J Adv Nurs Manag (IJANM)., 2014
103. Yılar Erkek Z, Aktas S. The Effect of Foot Reflexology on the Anxiety Levels of Women in Labor. J Altern Complement Med 2018;24:352-60.
104. Linde K, Hondras M, Vickers A, Ter Riet G, Melchart D. Systematic reviews of complementary therapies–an annotated bibliography. Part 3: Homeopathy. BMC Complement Altern Med 2001;1:5.
105. Campbell B, Good CA, Kitchell RL. Neural mechanisms in sexual behavior. I. Reflexology of sacral segments of cat. Proc Soc Exp Biol Med 1954;86:423-6.
106. Frankel BS. The effect of reflexology on baroreceptor reflex sensitivity, blood pressure and sinus arrhythmia. Complement Ther Med 1997;5:80-4.
107. Lashley KS. Cerebral control versus reflexology: a reply to Professor Hunter. J Gen Psychol 1931;5:3-19.
108. Lee YM. Effect of self-foot reflexology massage on depression, stress responses and immune functions of middle aged women. J Korean Acad Nurs 2006;36:179-88.
109. Park HS, Cho GY. Effects of foot reflexology on essential hypertension patients. J Korean Acad Nurs 2004;34:739-50.
110. Cho GY, Park HS. Effects of 6-week foot reflexology on

the blood pressure and fatigue in elderly patients with hypertension. J Korean Acad Fundamentals Nurs 2004;11:138-47.

111. Lu WA, Chen GY, Kuo CD. Foot reflexology can increase vagal modulation, decrease sympathetic modulation, and lower blood pressure in healthy subjects and patients with coronary artery disease. Altern Ther Health Med 2011;17:8-14.
112. Mc Vicar AJ, Greenwood CR, Fewell F, D'arcy V, Chandrasekharan S, Alldridge LC. Evaluation of anxiety, salivary cortisol and melatonin secretion following reflexology treatment: a pilot study in healthy individuals. Complement Ther Clin Pract 2007;13:137-45.
113. Mollart L. Single-blind trial addressing the differential effects of two reflexology techniques versus rest, on ankle and foot oedema in late pregnancy. Complement Ther Nurs Midwifery 2003;9:203-8.
114. Brown CA, Lido C. Reflexology treatment for patients with lower limb amputations and phantom limb pain—An exploratory pilot study. Complement Ther Clin Pract 2008;14:124-31.
115. Tipping L, Mackereth PA. A concept analysis: the effect of reflexology on homeostasis to establish and maintain lactation. Complement Ther Nurs Midwifery 2000;6:189-98.
116. Tiran D, Mackereth PA. Clinical Reflexology E-Book: A Guide for Integrated Practice. UK: Elsevier Health Sciences, 2010.
117. Kemper KJ, Vohra S, Walls R. The use of complementary and alternative medicine in pediatrics. Pediatrics 2008;122:1374-86.
118. Padial ER, López NT, Bujaldón JL, Villanueva IE, del Paso GR. Cardiovascular effects of reflexology in healthy individuals: evidence for a specific increase in blood pressure. Altern Med Stud 2012;2:4.
119. Mackereth P, Dryden SL, Frankel B. Reflexology: recent research approaches. Complement Ther Nurs Midwifery 2000;6:66-71.
120. Ernst E. Is reflexology an effective intervention? A systematic review of randomised controlled trials. Med J Aust 2009;191:263-6.
121. Jones J, Thomson P, Lauder W, Howie K, Leslie SJ. Reflexology has an acute (immediate) haemodynamic effect in healthy volunteers: a double-blind randomised controlled trial. Complement Ther Clin Pract 2012;18:204-11.
122. Jones J, Thomson P, Irvine K, Leslie SJ. Is there a specific hemodynamic effect in reflexology? A systematic review of randomized controlled trials. J Altern Complement Med 2013;19:319-28.
123. Ghaffari F, Pour Ghaznein T. The reflexology of sole on tiredness intensity in pregnant women. Caspian J Intern Med 2010;1:58-62.
124. Mak HL, Cheon WC, Wong T, Liu YS, Tong WM. Randomized controlled trial of foot reflexology for patients with symptomatic idiopathic detrusor overactivity. Int Urogynecol J 2007;18:653-8.
125. Quinn F, Baxter GD, Hughes CM. Complementary therapies in the management of low back pain: a survey of reflexologists. Complement Ther Med 2008;16:9-14.
126. Hall NM. Reflexology: a guide to its technique and current use. Nurs Resid Care 2001;3:64-7.
127. Jones, Jenny, Stephen, Leslie. "Reflexology: Science or Belief?" STORRE: University of Stirling, 2012:27-60.
128. Green VL, Alexandropoulou A, Walker MB, Walker AA, Sharp DM, Walker LG, et al. Alterations in the Th1/Th2 balance in breast cancer patients using reflexology and scalp massage. Exp Ther Med 2010;1:97-108.
129. Sharp DM, Walker MB, Chaturvedi A, Upadhyay S, Hamid A, Walker AA, et al. A randomised controlled trial of the psychoneuroimmunological effects of reflexology in women with early-stage breast cancer. Breast Cancer Res 2010;12:P26.
130. Shobeiri F, Manoucheri B, Parsa P, Roshanaei G. Effects of counselling and sole reflexology on fatigue in pregnant women: a randomized clinical trial. J Clin Diagn Res. 2017;11:QC01-04.