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**Address:** Mashhad Nursing and Midwifery School, Ebn-e-Sina St., Mashhad, Iran  
**P.O.Box:** 9137913199  
**Tel.:** (098 51) 38591511-294  
**Fax:** (098 51) 38539775  
**Email:** [EBCJ@mums.ac.ir](mailto:EBCJ@mums.ac.ir)

EVIDENCE BASED CARE



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## Effect of Reflexology on the Side Effects of Chemotherapy in Cancer Patients: An Integrative Review

Hesam Gholamzadeh<sup>1</sup>, Mahnaz Ilkhani<sup>2\*</sup>, Ahmad Ameri<sup>3</sup>, Nezhat Shakeri<sup>4</sup>

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### Abstract

**Background:** The global cancer incidence and the number of survivors are increasing. Therefore, it is necessary to pay more attention to the side effects of treatment.

**Aim:** The aim of this study was to assess the effect of reflexology on the side effects of chemotherapy in cancer patients.

**Method:** For finding the related articles, the researchers searched several databases including PubMed & ProQuest and valid websites including ScienceDirect, Google Scholar, Scientific Information Database, and Magiran. The key terms of “reflexology, cancer, and chemotherapy” individually and combined together were searched in Parisian and English, and the studies performed from 2009 to 2018 were extracted. Due to the lack of sufficient studies carried out into the outcome of reflexology on chemotherapy, both Persian and English articles were used.

**Results:** A total of 57 studies were extracted from the databases and valid websites; five of which met the inclusion criteria. All selected studies were clinical trials.

**Implications for Practice:** Reflexology can be used as a non-pharmacologic nursing intervention to alleviate the side effects of chemotherapy and improve the quality of life of cancer patients.

**Keywords:** Cancer, Chemotherapy, Reflexology

1. Student Research Committee, School of Nursing & Midwifery, Shahid Beheshti University of Medical Sciences, Tehran, Iran
2. Assistant Professor, School of Nursing and Midwifery, Shahid Beheshti University of Medical Sciences, Tehran, Iran
3. Associate Professor, Department of Radiation Oncology, Imam Hossein Hospital, Shahid Beheshti University of Medical Sciences, Tehran, Iran
4. Assistant Professor, Department of Biostatistics, School of Paramedical Sciences, Shahid Beheshti University of Medical Sciences, Tehran, Iran

\* Corresponding author, Email: [m\\_ilkhani@sbm.ac.ir](mailto:m_ilkhani@sbm.ac.ir), [m\\_ilkhani@yahoo.com](mailto:m_ilkhani@yahoo.com)

## Introduction

Chronic disease patients suffer not just from the disease but also from the side effects of treatment methods (1). The number of cancer survivors is increasing; therefore, paying attention to the side effects of treatment modalities and their effects on patients' quality of life is of paramount importance (2). Although chemotherapy, as a cancer treatment technique, can improve the survival of cancer patients, it may result in adverse effects and considerable problems for patients that are frequently neglected (3).

Fatigue, vomiting, diarrhea, dermal changes, and peripheral neuropathy are among these side effects that affect the patients' quality of life (4). Cancer patients often have problems coping with their new situation and may experience serious physical stress and psychological distress. Most patients and their families try to find the most effective way to treat. In most cases, patients seek complementary and alternative medicine (CAM) to alleviate the side effects of common cancer treatments (5).

The use of CAM by cancer patients is of vital importance. In Europe, about 40% of all cancer patients use CAM during their oncology treatment. Reflexology is one of the available interventions in manual complementary therapies, which provides a good opportunity for nurses to take care of patients (6, 7). Nurses consider complementary therapies as adjunctive therapy methods for improving patients' condition (3).

Reflexology and foot massage are different because reflexology involves the application of more surface contact and deeper pressure to the specific points of the foot by fingers that is similar to a kinetic movement such as that of a caterpillar. There are several points on the soles of hands and feet correspond to specific organs. In this method, self-treatment mechanisms become activated and physiological responses increase.

Reflexology is based on the neural stimulation and enhancing blood flow that leads to relaxation through physiological changes (8, 9). The pressure of fingers on reflex areas causes stimulation of hundreds of nerve endings in the foot sole and releasing endorphins. These hormones block the transmission of pain and, lead to relaxation and numbness, reduce stress, and increase tranquility (10).

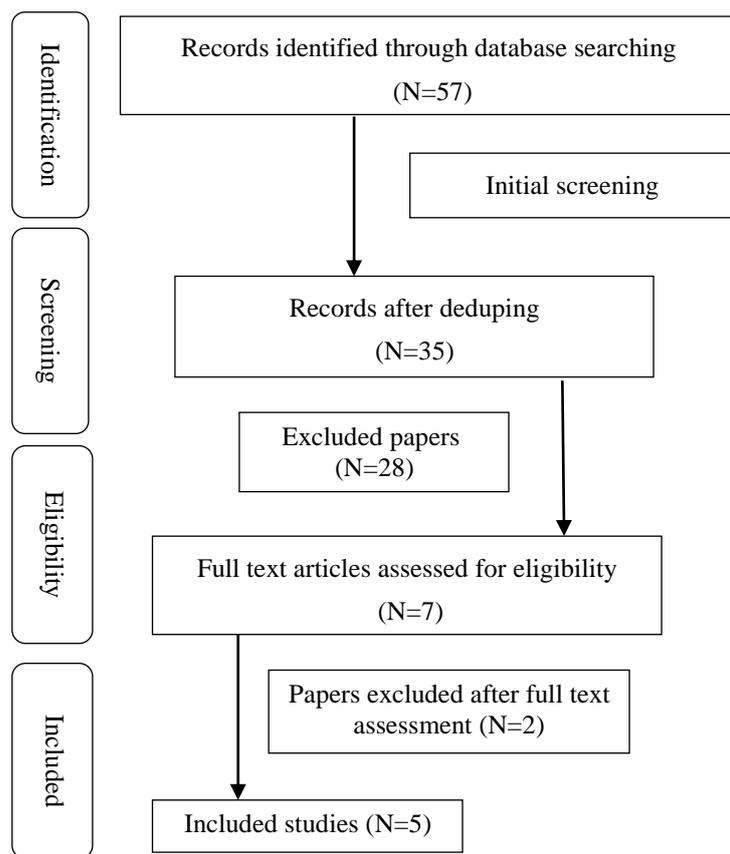
It seems that nurses play an important role in helping patients with acceptance and conducting non-pharmacological therapies such as CAM in order to control symptoms. This task cannot proceed until the nurses obtain enough information about the effectiveness of these therapies (11). As reflexology has become popular among nurses, its effects should be evaluated. More evidence is needed to support the use and benefits of reflexology for reducing the side effects of chemotherapy. Therefore, the current integrative study was performed to review the effect of reflexology on the adverse effects of chemotherapy.

## Methods

This integrative review follows the proposed steps by Preferred Reporting Items for Systematic Reviews and Meta-Analyses. A flowchart of the trial selection process is shown in Figure 1.

A survey was conducted to find similar studies using the key terms of reflexology, cancer, and chemotherapy in PubMed and ProQuest databases from 2009 to 2018. Only published studies in journals were assessed; grey literature such as dissertations and conference summaries were not included in the study. Persian articles were searched using valid websites including ScienceDirect, Google Scholar, Scientific Information Database, and Magiran (Magazine Iran). The inclusion criteria entailed the language of Persian or English, being a clinical trial, examining the direct or comparative effects of reflexology on the side effects of chemotherapy, and being published in the last 10 years with the full text available. However, the studies with less than 40 participants in each group or with insufficient information about the research methodology and lack of control group were excluded.

In the first online search strategy, 57 studies related to the research were found. The number of articles dropped to 35 after removing duplicates. After screening titles and abstracts, 28 articles were discarded and the number of articles dropped to seven. Two studies were excluded, since the experimental and control groups were the same, and the number of articles decreased to five. Two members of the project evaluated each of the chosen studies to determine whether they were eligible.



**Figure 1. Flowchart of the trial selection process**

**Table 1. Evaluation of the quality of randomized clinical trials included in this study**

Study	Randomization	Blinding	Drop-out	Jadad Score
Kurt and Can (2018)	Adequate (++)	NA** (0)	DS*** (+)	3
Wyatt et al. (2017)	UA* (+)	NA (0)	DS (+)	2
Ozdelikara and Tan (2017)	UA (+)	NA (0)	NA (0)	1
Uysal et al. (2016)	UA (+)	NA (0)	DS (+)	2
Pedram Razi et al. (2013)	UA (+)	NA (0)	NA (0)	1

\* unclear, \*\* not available, \*\*\* described

As shown in Table 1, all eligible papers were fully studied and a Jadad scale was used to validate and evaluate the methodology of the selected articles. Jadad scoring is a scale allocating the trials a score of between zero (very poor) and five (rigorous). The Jadad scale focuses on randomization [0-2], blinding [0-2], and withdrawals and dropouts [0-1] to evaluate the methodological quality of primary research (12).

## Results

According to the objectives, the studies were classified based on the effects of reflexology into the following groups: Effect on general symptoms, Effect on psychological effects, Effect on quality of life, and Effect on chemotherapy-induced peripheral neuropathy. A summary of the final articles reviewed is shown in Table 2.

Finally, five studies met the inclusion criteria. Three studies were conducted in Turkey, one in the United States, and one in Iran. In most of the studies, reflexology was delivered by a reflexologist with a valid certificate. Key information about the studies is summarized in Table 3.

**Table 2. Summary of the final articles reviewed**

Authors	Year	Purpose of study	Key findings
Uysal et al.	2016	Effects of foot massage using two different methods on symptoms in colorectal cancer patients	They reported that classical massage was effective in reducing pain intensity and the incidence of abdominal distention. Nevertheless, foot reflexology was alleviated pain and exhaustion, reduced the incidence of abdominal distention and urinary frequency, and improved the quality of life. In addition, nurses could use massage and reflexology alongside regular care to control patients' symptoms and improve their quality of life (13).
Wyatt et al.	2017	Effects of a reflexology intervention delivered by friends or family at home compared to control over attention to the quality of life, concerning the health of women suffering from progressive breast cancer undergoing chemotherapy	The effects of the intervention were evaluated using linear interaction models in the 5 <sup>th</sup> and 11 <sup>th</sup> weeks to gauge the severity of symptoms and effects on daily activities, function field, social support, quality of care of the patient, and life satisfaction. Initial analysis of the main effect of the intervention on primary and secondary outcomes showed a significant decrease in cumulative symptom severity in the reflexology group compared to the control group ( $P < 0.01$ ). There was a significant difference in symptom severity ( $P = 0.02$ ) and interference effect in the reflexology group compared to the control group in the aspects of function field, social support, quality of communication, and life satisfaction in the 5 <sup>th</sup> and 11 <sup>th</sup> weeks. This study showed that reflexology was effective in reducing the symptom severity of cancer patients and interaction with daily activities (14).
Ozdelikara and Tan	2017	Effect of reflexology on the quality of life of breast cancer patients	In this study, it was demonstrated that reflexology had positive effects on the general health of patients with breast cancer undergoing chemotherapy. This method increased their function and had potential benefits because it reduced the complications of chemotherapy and the symptoms of the disease. According to the results of the mentioned study, reflexology increased the quality of life in patients suffering from breast cancer (15).
Pedram Razi et al.	2013	Effect of reflexology on quality of life of breast cancer patients during chemotherapy	The results showed that there was a significant difference between the three groups in terms of the total score of quality of life at the post-intervention phase ( $P < 0.001$ ). It had a significant effect on different aspects of quality of life in the test group compared to the placebo and control groups (10).
Kurt and Can	2018	Reflexology in the management of chemotherapy induced peripheral neuropathy	Kurt and Can's study showed that reflexology application did not lead to differences in peripheral neuropathy severity between two control and experimental groups ( $P > 0.05$ ). It only led to improvement in sensory functions in the experimental group. It was determined that reflexology was an effective approach in improving patients' activity levels, walking ability, routine work-related activities, communication with other people, sleep patterns and enjoyment of life, as well as sensory, motor, and autonomic functions in the experimental group. However, there was no significant difference in terms of the effect of reflexology on improving the mentioned parameters related to chemotherapy-induced peripheral neuropathy between the two groups. Finally, it was determined that reflexology was not an effective method in the management of patients' activity levels, walking ability and motion and autonomic functions related to chemotherapy-induced peripheral neuropathy. However it was effective in the management of patients' sensory functions related to chemotherapy-induced peripheral neuropathy ( $P = 0.024$ ) (4).

**Table 3. Key features of included studies**

Study Authors (year) Modality/Procedure	Study design	Type and stage of cancer/Outcomes measured	Control or comparison intervention(s)	Sample n (total) Age mean (sd)/mean (range)	No. sessions Frequency Duration (minutes)	No. provider	Site of reflexology	Outcomes (tools)
1. Kurt and Can (2018) Feet reflexology	RCT*; Two groups	Not specified/Peripheral neuropathy (Grade II-IV)	Standard care protocol of clinic	60 Experimental : 58.3 (11.24) Control: 57.86 (10.56)	12 Weekly 20	Not specified	Cervical and brain region of feet	Quality of life ((EORTC QLQ-CIPN-20), Brief Pain Inventory
2. Wyatt et al. (2017) Feet reflexology	RCT; Two groups	Stage III or IV breast cancer/Symptom management (severity and interference)	No interventions were administered	256 Reflexology: 58.09 (11.62) Attention Control: 54.80 (10.30)	4 Weekly 30	Not specified	Thumb-walking pressure	M.D. Anderson Symptom Inventory (MDASI) Quality of Life Index (QLI) Multidimensional Scale of Perceived, Patient Reported Outcomes Measurement Information System (PROMIS), Social Support (MSPSS) Tool, Quality of Relationship Tool
3. Ozdelikara and Tan (2017) Feet reflexology	RCT; Two groups	Stage II breast cancer/General health status Quality of life	Routine nursing care	60 Experimental: 50.93 (11.27) Control: 51.06 (10.97)	3 Three chemotherapy cycles 30-40	1	Reflexology techniques were performed on all system on both feet	EORTC QLQ C30 Quality of Life Scale (3 <sup>rd</sup> version) (European Organization for Research and Treatment of Cancer Core QoL Questionnaire)
4. Uysal et al. (2016) Feet reflexology	RCT; Three groups 1. Feet reflexology 2. Classical massage for dorsum and the soles of the feet 3. Control group	Stage II or III colorectal cancer/Symptom management Quality of life	Routine treatment and care	60 Reflexology group: 56.05 (15) Classical massage group: 60.60 (8.10) Control group: 60.35 (8.61)	10 Twice a week 20	1	Reflex points of each foot	Common Terminology Criteria for Adverse Events (CTCAE V4), Cancer Quality of Life Questionnaires (EORTC QLQ) C30 and CR29
5. Pedram Razi et al. (2013) Feet reflexology	RCT; Three groups 1. Feet reflexology 2. Control group 3. Placebo group	Stage II or III breast cancer/Symptom management Quality of life	Usual care	60 Experimental: (20-39 y): 8 (age>40 y): 12 Control: (20-39 y): 8 (age>40 y): 12 Placebo: (20-39 y): 9 (age>40 y): 11	3 Weekly 30	1	Reflex points of each foot	Cancer Quality of Life Questionnaires (EORTC QLQ) C30 and BR 23

\* Randomized clinical trial

## Discussion

The effect of reflexology on different conditions was evaluated in four systematic reviews (16-19). Wang et al. evaluated the efficacy of reflexology in different conditions and found that there was no evidence for any specific effects of reflexology on any condition, and they did not suggest reflexology as routine care. About cancer patients, Wang et al. only mentioned that the reflexology was an attempt to improve the physical and mental unpleasant symptoms of cancer and its treatment and did not perform a deeper evaluation of the subject (16).

Kim et al. evaluated the effect of reflexology on problem-based treatment of breast cancer and found that the existing evidence could not support reflexology as an effective method in the care of patients with breast cancer (17). Ernst, in two systematic reviews in 2009 and 2011, evaluated clinical trials on reflexology and did not report it as an effective and useful therapy for any medical condition (18-19). Although some of the research plans seem good, others have drawbacks in their designs, and the quality of the majority of the evaluated randomized clinical trials was poor. The sample size of each group is important for increasing the generalization of the results. Therefore, the results of the three studies were not generalizable due to a small sample size ( $n < 40$ ), and they were excluded (20-22). Reflexology has been evaluated in different conditions, and it shows that reflexologists believe in the effectiveness of this technique in all these conditions. Nevertheless, medical claims always should be supported by proper evidence (18). Only one study (4) evaluated the symptoms of chemotherapy-induced peripheral neuropathy (4). Kurt and Can indicated the positive effect of reflexology on the sensory functions of patients with peripheral neuropathy (4).

The study conducted by Uysal et al. was a small study with a short-term follow-up. However, its result showed that reflexology might be more useful for cancer patients than foot massage or no interventions (13). There were significant differences between the time periods of the interventions. The number of sessions of reflexology varied from 3 to 12, and the length of time for reflexology in each session varied from 20 to 60 minutes. This level of variety made it difficult to arrive at a particular conclusion. Since the studies used different tools for measuring symptoms, pain evaluation, physical function, and quality of life, or had different control groups, quantitative comparison of the results seems difficult.

Although we have attempted to gather all of the related clinical trials, we cannot be sure that this goal has been achieved. It is necessary to mention that this review only included studies that were published during the period 2009-2018 and were in English or Persian. Short-term follow-ups were another main restriction in the current study; therefore, the long-term effects of reflexology are unknown. Moreover, none of the reviewed studies evaluated the adverse effects of reflexology, meaning it would be best to consider the side effects of reflexology in future studies.

### **Implications for Practice**

In general, this integrative review showed that reflexology can reduce pain and increase physical function, balance, and quality of life in cancer patients. However, the current efficacy evidence of reflexology should be evaluated in patients using reflexology to manage their symptoms. They should be aware that currently, there is no strong evidence that supports reflexology. This integrative review showed that the evidence for the efficacy of reflexology is scattered; however, it was not indicated that reflexology was ineffective. According to the current review of the literature, it was found that none of the studies pointed to the side effects of reflexology. Accordingly, further studies are recommended with the consideration of these side effects.

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### **Conflicts of Interest**

The authors declare no conflict of interest in this study.

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