

USE OF REFLEXOLOGY IN DIABETES MANAGEMENT ZASTOSOWANIE REFLEKSOLOGII W LECZENIU CUKRZYCY

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- B. Data collection/entry
zebranie danych
- C. Data analysis/statistics
dane – analiza i statystyki
- D. Data interpretation
interpretacja danych
- E. Preparation of manuscript
przygotowanie artykułu
- F. Literature analysis/search
wyszukiwanie i analiza literatury
- G. Funds collection
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Summary

Diabetes is a significant chronic disease that creates a serious burden on individuals and society. Chronic diseases are among the main factors that cause deterioration in the quality of life of individuals, limitations in their daily lives and premature deaths. Diabetes can lead to dysfunction in all the body's systems when not treated in a timely and well-treated manner. In order to manage the complex symptoms of diabetes, patients sometimes turn to complementary and alternative therapies in addition to medical treatment. The aim of complementary practices is to create a healing environment, to raise awareness of the individual and to reveal the power of self-healing. Diabetes patients generally use complementary and alternative therapies for diabetes treatment or general health. It is known that patients with diabetes use complementary and alternative therapies to lower/balance blood sugar and prevent diabetes complications. Complementary and alternative treatment methods generally used in diabetes are yoga, acupuncture, reflexology, aromatherapy and herbal therapies. This article was compiled to be both informative and helpful for future research due to the lack of sufficient studies on the effects of reflexology in the treatment of patients with diabetes.

Keywords: manual therapy, symptom management, reflexology, chronic diseases, diabetes

Streszczenie

Cukrzyca jest poważną chorobą przewlekłą, która stanowi duże obciążenie dla pacjentów i społeczeństwa. Choroby przewlekłe są jednym z głównych czynników powodujących pogorszenie jakości życia pacjentów, ograniczenia w ich codziennym życiu i przedwczesne zgony. Cukrzyca może prowadzić do dysfunkcji wszystkich układów organizmu, jeśli nie jest leczona w odpowiednim czasie i w odpowiedni sposób. Aby poradzić sobie ze złożonymi objawami cukrzycy, pacjenci czasami sięgają po terapie uzupełniające i alternatywne oprócz leczenia medycznego. Celem praktyk komplementarnych jest wytworzenie sprzyjającego zdrowieniu środowiska, podniesienie świadomości danej osoby i poznanie siły zawartej w samoleczeniu. Pacjenci z cukrzycą zazwyczaj stosują terapie uzupełniające i alternatywne w celu leczenia cukrzycy lub poprawy ogólnego stanu zdrowia. Wiadomo, że diabetycy stosują terapie uzupełniające i alternatywne w celu obniżenia/wyrównania poziomu cukru we krwi i zapobiegania powikłaniom cukrzycy. Powszechnie stosowane w cukrzycy komplementarne i alternatywne metody leczenia to joga, akupunktura, refleksologia, aromaterapia i terapie ziołowe. Niniejszy artykuł został opracowany w celu uzyskania zarówno informacji, jak i pomocy w przyszłych badaniach ze względu na aktualny brak odpowiednich prac naukowych dotyczących wpływu refleksologii na leczenie u diabetyków.

Słowa kluczowe: terapia manualna, leczenie objawów, refleksologia, choroby przewlekłe, cukrzyca

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Introduction

Reflexology is defined as a form of treatment by applying pressure to the reflex points on the feet, which are accepted as the reflection of the organs and regions of the body [1]. The main theoretical basis of reflexology is the idea that the organs and structures of the body correspond to a point in the foot regions [2]. It is stated that reflexology practices date back to before Christ and the first civilizations to apply it were the Chinese and Egyptian ones. However, it is known that during their history Indian, Japanese and Indian tribes also used reflexology [3].

Modern reflexology, on the other hand, was developed from "Zone therapy" theorized by the American Doctor William Fitzgerald in the early twentieth century. Fitzgerald suggested that the body can be divided into 10 vertical and equal regions. He stated that manipulation and pressure techniques applied around these regions on the feet and hands may have an impact on physio-pathological conditions elsewhere in the same vertical regions [2]. The points of the organs on the soles of the feet are similar to those in our body. When two feet come together, an image similar to a human body occurs. This image is a guide for reflexology practice, like a map. Thus, by applying pressure to the reflection points of the organs on the foot, it is ensured that they help treatment and symptom management throughout the body [4].

Diabetes mellitus is one of the significant chronic diseases that is increasing in frequency in the world which negatively affects the quality of life. Diabetes causes high blood sugar levels caused by decreased insulin production or insulin resistance. Diabetics may need to constantly monitor their blood sugar levels and take insulin several times a day. Diabetes also causes microvascular (nephropathy, neuropathy, retinopathy) and macrovascular (ischemic heart disease, hypertension, cerebrovascular disease, peripheral vascular disease) complications in patients. Diabetes is a chronic disease that can cause various acute and chronic neuropathies affecting the nerves, plexus and/or roots. Diabetic neuropathies affect approximately half of patients. The severity of neuropathic pain usually increases at night and, accordingly, causes symptoms such as sleep disturbance, fatigue, weakness, and anger in individuals during the day. These symptoms affect patients' general health perception and life satisfaction, limit their daily activities, and restrict them from fulfilling their roles in the family and society. At the same time, diabetic neuropathies can cause significant morbidity and mortality and increase the risk of foot ulceration and amputation [5-7].

In chronic diseases such as Diabetes, it is necessary to make changes in the lifestyle of the individual in order to prolong life and increase the quality of life. However, it is known that Diabetes requires long-term treatment, has acute and chronic complications, and has difficulties in transforming the training received into routine behavior [6]. In addition to these, the fact that the patient is emotionally and physically worn out in this process causes him/her to resort to different applications than medical treatments. Complementary and alternative therapies (CAM) have an important place among these applications [7].

Integrative and complementary practices have become a reality in healthcare. Within this approach, foot reflexology is a therapeutic and integrative method that acts as a simple and easily applicable alternative [8]. Meta-analysis studies and systematic reviews report that foot reflexology is a promising method for improving sleep, fatigue, pain, mood, nausea, and quality of life in various populations [9]. In the literature, it has been observed that when foot reflexology massage is applied to diabetic patients, it reduces neuropathy complaints, changes the hemoglobin level, increases peripheral circulation, and has a positive effect on general fatigue and mood. It is known that hope is a fundamental element in chronic patients and has high effects on adaptation to the disease. The hopelessness experienced in patients with diabetes can negatively affect both the positive response and adaptation of patients to treatments, thus reducing their quality of life. Studies have shown that foot reflexology can be used in diabetic patients with neuropathic pain. It is reported that it reduces pain levels, neuropathic pain symptoms such as burning, painful coldness, tingling, pins and needles, numbness and

itching, and increases hope levels and quality of life. It is also stated that foot reflexology applied to patients has positive effects on blood sugar and the glycemic index [10-12]. In line with this information, the effectiveness and benefits of the application of reflexology in symptom management in diabetes patients are included in the article.

Reflexology effect mechanism

Reflexology is the application of pressure with the thumb and index finger to the points corresponding to the organs, glands and body parts on the feet [13]. Pressure on the relevant point activates electrochemical nerve impulses, thereby stimulating the nervous system. The resulting stimulus is perceived by the peripheral nervous system and a message is generated. This message is transmitted to specific organs and glands to create a response [14]. Thus, it provides relief and reduction in symptoms related to the disease in individuals.

Uses of reflexology

The use of reflexology has been increasing in recent years. It is seen that its use for the side effects of treatment has become widespread especially in individuals with chronic diseases [15]. Reflexology is generally used to increase the health and well-being of the individual in neurological diseases, musculoskeletal diseases, autoimmune diseases, digestive system diseases, obstetrics, palliative care and some psychiatric diseases [1].

Reflexology generally is used to solve problems such as stress, anxiety, depression and panic attacks, fatigue and insomnia in individuals. It is also widely used in the treatment of chronic painful conditions such as migraine, headache, back and joint pain, muscle aches, cancer pain, in solving some urinary system problems, and in eliminating dermatological problems such as eczema, allergies, skin rashes, and in supporting wound healing, strengthening immunity, and reducing the side effects that occur due to chemotherapy [16,17].

Situations where reflexology application is objectionable

Reflexology has no known side effects. However, there are some situations where it is considered objectionable to apply it [15]. It is inconvenient to apply reflexology in the first trimester of pregnancy and in risky situations during pregnancy, in sudden infections and febrile diseases, in the presence of open wounds in the area where the massage is applied, in patients with varicose veins, DVT (Deep Vein Thrombosis), heart diseases, femur fractures, medical emergencies and malignant melanoma [1,18].

Aim of the work

The purpose of the review is to examine the effect of reflexology, which is increasingly used today, on diabetes symptoms with evidence-based studies.

Methods

During the preparation of the review, studies from the last 10 years were examined in Pubmed, Web of Science, and Google Academy databases, using the words "Diabetic", "Diabetes", "Type 2 diabetes", "Reflexology", and "Foot reflexology" in English. The evidence levels of the obtained studies were evaluated using the classification system determined by the Joanna Briggs Institute (Table 1).

Table 1. Levels of evidence for effectiveness (Joanna Briggs Institute) [19]

Level of evidence	Evidence type
Level 1	Experimental designs
Level 1.a	Systematic review of Randomized Controlled Trials (RCTs)
Level 1.b	Systematic review of RCTs and other study designs
Level 1.c	RCT
Level 1.d	Pseudo-RCTs
Level 2	Quasi-experimental designs
Level 2.a	Systematic review of quasi-experimental studies
Level 2.b	Systematic review of quasi-experimental and other lower study designs
Level 2.c	Quasi-experimental prospectively controlled study
Level 2.d	Pre-test-post-test or historic/retrospective control group study
Level 3	Observational-analytic designs
Level 3.a	Systematic review of comparable cohort studies
Level 3.b	Systematic review of comparable cohort and other lower study designs
Level 3.c	Cohort study with control group
Level 3.d	Case-controlled study
Level 3.e	Observational study without a control group
Level 4	Observational-descriptive studies
Level 4.a	Systematic review of descriptive studies
Level 4.b	Cross-sectional study
Level 4.c	Case series
Level 4.d	Case study
Level 5	Expert opinion and bench research
Level 5.a	Systematic review of expert opinion
Level 5.b	Expert consensus
Level 5.c	Bench research/single expert opinion

Research Questions

1. Is reflexology practice effective on diabetic symptoms in diabetic patients?
2. Is reflexology practice effective on peripheral neuropathic pain in diabetic patients?
3. Is reflexology practice effective on blood sugar control in diabetic patients?

Inclusion and exclusion criteria

Inclusion criteria for the articles included in the research:

- the research was conducted between 2012 and 2022;
- the research must be published in English;
- the research must involve working with a group of patients with type 2 diabetes;
- there must be an access to the full text of the articles;
- the research must be of a randomized controlled and experimental design.

Exclusion criteria for the articles included in the research:

- Compilations, systematic reviews-meta-analysis, abstracts, thesis studies, case reports and scale development studies are not included.

Use of reflexology in diabetes management

Chronic diseases are among the main factors that cause deterioration in the quality of life of people, their limitations in their daily lives and their premature death [20]. Diabetes, one of the chronic diseases, is a very common disease and its number is increasing day by day. The prevalence of diabetes has doubled over the past 20 years, and it is estimated that by 2045, 693 million adults worldwide will be affected by diabetes [21,22]. Type 2 diabetes, which is the most common in patients diagnosed with diabetes, has been shown to be associated with lifestyle factors such as physical inactivity, obesity, and nutrition, as well as genetic predisposition [23]. Conditions such as physical inactivity, excessive calorie intake, nutritional imbalance and stress make it difficult for individuals to keep their glycemic index under control and cause acute and chronic complications [20,24]. Acute complications seen in diabetes patients are hypoglycemia, diabetic ketoacidosis (DKA), and hyperglycemic hyperosmolar nonketotic coma (HHNK). Chronic complications seen in patients are divided into micro and macrovascular. Among these, the complications that have the most impact on the patient's life are retinopathy, nephropathy and neuropathy [25]. Diabetic foot ulcers are seen in individuals as a result of the neuropathy [26]. The loss of pain sensation in the neuropathic foot provides a basis for traumas and the development of ulcers. This situation can lead to a deterioration in the quality of life, an increase in treatment costs and amputations [25].

Diabetes patients generally use CAM for diabetes treatment or general health [27]. According to studies, these are aimed at reducing/balancing blood sugar and preventing diabetes complications among diabetic patients. It is stated that the purpose of using CAM in diabetes is symptom and complication management [7,28]. CAM methods are generally used in diabetes, yoga, acupuncture, reflexology, aromatherapy and herbal treatments. It is seen that patients mostly prefer to use herbal methods because they are easy to use [27].

Reflexology aims to stimulate the reflexes of the endocrine glands and organs responsible for the metabolism of glucose and associated with hyperglycemia in diabetes. Massaging reflex points such as the stomach, small intestine, liver and pancreas helps to regulate carbohydrate metabolism, allowing the blood glucose level to return to the normal range [29]. In the study conducted by Yodsirajinda et al. [12] the HbA1c values of the elderly with type 2 diabetes decreased and the Ankle Brachial Index (ABI) value increased as a result of the application of reflexology [Level 1.c] [12]. In the study of Thomas [30], as a result of foot reflexology applied to the groups with different antidiabetic treatment options, it was determined that the glycemic control of the individuals in the intervention group improved compared to the values before the application [Level 2.d] [30]. As a result of neuropathy, which is one of the microvascular complications of diabetes, burning, stinging neuropathic pain occurs in peripheral areas (especially in the feet), which is exacerbated during resting times and at night. The quality of life of the patient is adversely affected due to this neuropathic pain. Thanks to reflexology, the organs and structures that cause diabetes-related neuropathic pain are stimulated and pain transmission to the brain is inhibited [29,31,32]. It was found that foot reflexology applied to patients with diabetic neuropathy increased the quality of life of individuals by reducing the neuropathic pain [Level 1.c] [29,32].

Considering the duration of reflexology application in the studies, it is seen that 12 sessions lasting at least 30 minutes are generally applied [Level 1.c] [32-34]. There is no definite and specific application periods and sessions in the literature for the application of reflexology in diabetes patients. However, in the opinion of reflexologists, a massage that lasts at least 30 minutes and covers the reflex points of the pancreas in both feet should be applied [Level 1.c] (Table 2) [30,35-37].

Table 2. Reflexology application in diabetes

Application areas	Recommended duration
<ul style="list-style-type: none"> - Reflex points are located on both feet. - The head of the gland (pancreas) is located on the right foot. - The left foot has a body and a tail. 	<ul style="list-style-type: none"> - 30-60 min. - The healthcare professional should decide on the appropriate number of sessions for the patient.

In other studies on reflexology application in diabetes, it was concluded that foot reflexology reduces neuropathic pain symptoms such as burning, painful coldness, tingling, pins and needles, numbness and itching, and increases hope levels and the quality of life [33 (Level 1.c), 36 (Level 1.c), 37 (Level 2.c)] (Table 3).

Table 3. Studies on the use of reflexology in diabetes management

Author, year, level of evidence	Study location	Method	Respondents	Results
Gomaa et al. (2022), Level 2.c [40]	Egypt	Quasi-experimental design	Type 2 diabetes mellitus	It has been stated that neuropathy-specific quality of life, modified neuropathy sensory disability, peripheral circulation and blood sugar levels improve after reflexology.
Rashwan et al. (2022), Level 2.c [42]	Egypt	Quasi-experimental research	Type 2 diabetes mellitus	It was determined that the pain decreased and the ABI reached normal values in the reflexology applied group.
Sari et al. (2022), Level 3. [41]	Indonesia	Single group pretest-posttest	Elderly with type 2 diabetes mellitus	Reflexology accelerated the use of glucose, resulting in lower blood sugar levels.
Can Cicek et al. (2021), Level 1.c [38]	Türkiye	Randomized controlled trial	People aged 65 and over with diabetes	As a result of the study, older adults with diabetes showed decreased glycemic control and diabetic peripheral neuropathy.
Megda et al. (2020), Level 1.c [43]	Brazil	Randomized clinical trial	Patients with diabetic neuropathy	It was determined that after reflexology, the balance levels of diabetic patients improved and there was a response in muscle electrical activity.
Martinez et al. (2018), Level 1.c [45]	Brazil	Randomized controlled and blind clinical trial	Type 2 diabetes mellitus	Reflexology has increased the quality of life of diabetic patients and improved their role-physical, pain and role-emotional aspects.
İbrahim ve Rizk (2018), Level 2.c [34]	Egypt	Two-group pretest-posttest quasi-experimental	Patient with peripheral diabetic neuropathic pain	There was a significant change in the pain levels of the patients after the reflexology application.
Thomas (2016), Level 2.d [30]	India	Two-group experimental design	Diabetics who are on oral hypoglycemic or insulin therapy and who are undergoing foot treatment	Reflexology application has been shown to reduce blood sugar levels in patients.
Yodsirajinda et al. (2016), Level 2.d [12]	Thailand	Randomized controlled two-group pretest-post-test design	Older adults with type 2 diabetes mellitus	It is stated that foot reflexology reduces the HbA1c level and reduces the severity of diabetic foot complications.

Author, year, level of evidence	Study location	Method	Respondents	Results
Silva et al. (2015), Level 1.c [39]	Brazil	Randomized controlled trial	Type 2 diabetes mellitus	It had a beneficial effect on elasticity/ turgor, moisture, perspiration, skin texture and integrity/ skin peeling, and foot disorders in the participants.
Dalal et al. (2014), Level 1.c [32]	India	Randomized controlled trial	Patients with diabetic neuropathy	As a result of the study, it was stated that neuropathic pain decreased, hyperpigmentation decreased and the skin color returned to normal, and the quality of life of the patients increased.

Looking at the results of all these studies, it is seen that the application of reflexology will be beneficial to patients by reducing the symptoms of diabetes and provide a better symptom management.

Discussion

The use of reflexology in chronic diseases is increasing. It is known to be especially effective in managing the symptoms of diseases and reducing the side effects of treatments [15]. The purposes for which reflexology is used in diabetes are generally for blood sugar control, peripheral neuropathy management and improving quality of life. Studies have been conducted on the effect of reflexology on lowering blood sugar and relieving pain. For example, in a study by Yodsirajinda et al. [12], the HbA1c values of the elderly with type 2 diabetes decreased and the ABI value increased as a result of the application of reflexology. In the study of Thomas [30], as a result of foot reflexology applied to the groups with different antidiabetic treatment options, it was determined that the glycemic control of the individuals in the intervention group improved compared to the values before the application [30]. In other studies, it has been stated that the application of reflexology reduces blood sugar levels and A1c values in patients with diabetes [39-41]. Based on the results of these studies, it can be said that reflexology application for blood sugar control is effective on patients.

One of the complications that affects diabetic patients and causes a loss of life and limb is peripheral neuropathy. Studies have examined the effectiveness of reflexology on peripheral neuropathy. In the study conducted by Can Çiçek et al., it was observed that diabetic peripheral neuropathy decreased in older adults with diabetes [38]. Likewise, Dalal et al. found that reflexology reduced diabetic neuropathy pain [32]. The results of the study conducted by İbrahim and his friends are similar to the results of the research of Can Cicek and Dalal [32,34,38]. In general, it has been found that foot reflexology applied to patients with diabetic neuropathy improves the quality of life of individuals by reducing neuropathic pain. Based on the results of this study, it is thought that reflexology will be effective in the management of diabetic neuropathy.

Rashwan et al., one of the studies investigating the effectiveness of reflexology, found that the ABI reached normal values in the reflexology applied group [42]. In the study of Megda et al., it was determined that the balance levels of diabetic patients improved after reflexology and a response occurred in muscle electrical activity [43]. In the study conducted by Silva et al. in 2015, it was observed that it had a positive effect on elasticity/turgor, skin texture and integrity/skin peeling, and foot disorders in the application group [39]. As a result of the systematic review by Paju et al., it is stated that reflexology may be effective in increasing the peripheral sensitivity of the feet in diabetic patients [44]. Studies state that balance levels improve, a response occurs in muscle electrical activity, and it has a positive effect on foot disorders. However, it is thought that more studies are required to determine the effectiveness of reflexology on these mentioned conditions in diabetic patients.

Studies on the application of reflexology in diabetes have concluded that foot reflexology reduces neuropathic pain symptoms such as burning, painful coldness, tingling, prickling, numbness and itching, and

increases hope levels and quality of life [33,38,39,45]. In line with these results, it is thought that it can be used as a treatment support in diabetes management in patients.

Conclusions

The aim of complementary practices is to create a healing environment, to raise awareness of the individual and to reveal their own healing power. Diabetes is a complex disease that requires the individual to have the most autonomy and self-care among the chronic diseases. From this point of view, the fact that reflexology does not have side effects as in drug therapy, is easy to apply, is safe, effective and economical, increases its applicability. It is thought to be a complementary approach that can be used throughout life in terms of the physical, emotional and mental well-being of individuals. However, the lack of a standard application for diabetes patients limits its use. In addition, the too few number of studies conducted prevents its use in diabetes patients. To ensure that patients benefit, it is recommended to increase its use and to conduct more randomized controlled studies for a standard practice.

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