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The Effect of Acupressure on Blood Sugar Reduction in Diabetic Patients: A Systematic Review and Metaanalysis

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Abstract

Background: Diabetes mellitus is one of the most common and costly diseases worldwide. Although there are few reports of the impact of acupressure on the reduction of blood sugar in diabetic patients, no systematic review is available in this regard.

Objective: This meta-analysis study was conducted to investigate the effect of acupressure on blood sugar reduction in patients with diabetes mellitus.

Methods: This study was conducted in accordance with the PRISMA guideline. To find relevant documents, internet searching was performed independently by two researchers and without any time limit till 2019 May 22 on the international databases of PubMed, Scopus, Web of Knowledge, and Google scholar as well as national databases of Magiran and SID. The quality of studies was assessed using the CONSORT checklist. The Stata software (ver.14) was used to analyze the data and the I2 index was used to assess the heterogeneity of the studies.

Results: A total of three studies that have been conducted in Iran and Indonesia were included in the meta-analysis. The data were firstly analyzed using the fixed effects model which indicated a high level of heterogeneity between the studies (I2 = 98.1%, P = 0.0). Afterward, the random effect model was used and the results showed that acupressure can reduce blood sugar by an average of 90.36 mg (-164.77, -15.94, CI: 95%).

Conclusion: Acupressure has a positive effect on reducing blood sugar in patients with diabetes mellitus. However, more studies are needed in this area.

Introduction

Diabetes mellitus is one of the most common and costly diseases worldwide [1]. In this chronic disease, either the pancreas does not produce enough insulin or the body is unable to use insulin effectively. Hyperglycemia is a common effect of uncontrolled diabetes that over time can cause serious damage to body systems, especially the nerves system and blood vessels [2]. Neuropathy [3], retinopathy [4], nephropathy [5], and coronary artery diseases are among the consequences of uncontrolled diabetes [6]. People with overweight, age 45 or older, family history of diabetes, and low levels of physical activity are more likely to develop diabetes. In 2015, about 30.3 million Americans-nearly 1 in 10- had diabetes and 84.1 million were prediabetic [7]. The total estimated cost of diagnosed diabetes in 2017 was $327 billion, including $237 billion in direct medical costs and $90 billion in reduced productivity [8]. According to Iranian Diabetes Association statistics, more than 3 million people in Iran have diabetes [9].

There are several ways to control the symptoms of type 2 diabetes. Appropriate dietary regimen [10], medication and ultimately insulin use are among the common treatments [11-13]. Each of these methods has its own problems. Weight gain, hypoglycemia, and lipodystrophy are among the most common complications of continuous insulin injections [14]. Given these problems, some patients are turning to complementary and alternative therapies to control their blood sugar [15]. According to a review study, acupressure is a useful method in these patients, and in 84% of cases, it has helped control the symptoms of the disease and had not had any complications [16].

Acupressure is an ancient healing art in which the fingers are used to press certain parts of the body [17]. As a non-invasive, easy, and low-cost procedure with no side effects, acupressure has been used to relieve the symptoms of a wide range of health conditions. Acupressure can stimulate energy channels (meridians) and regulate vital body energy [16]. In a study of 60 patients with diabetes mellitus, Zarwasi et al. (2018) have implemented a three-week program of acupressure at specific acupoints. The intervention could reduce fast blood sugar and increased insulin levels in patients with type 2 diabetes [18]. In another study, a combination of acupressure, hypnosis, and meditation could reduce blood sugar in patients with type 2 diabetes [19]. A study in Indonesia also reported that acupressure reduced blood sugar. Furthermore, some of the participants in the latter study experienced improvements in walking, foot wounds, vision, and their cardiac symptoms [20].

However, no review study is available to summarize these studies. Therefore, this meta-analysis study was conducted to investigate the effect of acupressure on blood sugar reduction in patients with diabetes mellitus.

Methods

This systematic review and meta-analysis was conducted on articles published in Iranian and international databases. Search keywords were diabetes mellitus, diabetes, hyperglycemia, FBS, blood sugar, and acupressure. These keywords and their combinations were

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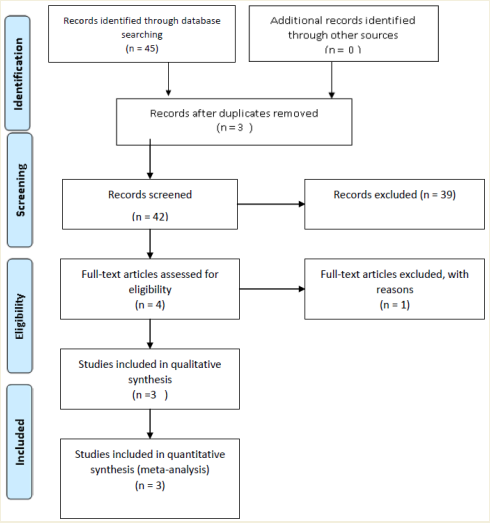

Figure 1: PRISMA flow diagram.

searched in national and international databases, namely PubMed, Scopus, Web of Science, Google Scholar, Scientific Information Database (SID), and MagIran. Where possible, the Boolean operators, namely "AND," "OR," were used to narrow or broaden search results (Table 1). An electronic search was conducted independently by two researchers and without any time limit until 2019 May 22.

The reference list of the articles included in the study was also searched to find other relevant studies. Thus, a total of 45 articles were obtained but 42 articles were then discarded due to being duplicate or inconsistent with the purpose of the present study, and finally, 3 articles remained in the study.

Then, by studying the titles and abstracts of the articles, studies that were completely unrelated to the purpose of the present study were excluded and related studies were reviewed. The 25-item consort checklist was used to assess the quality of the remained articles. Two independent authors completed the checklist separately for each study. The PRISMA guideline was used to write the present article [21].

Inclusion and exclusion criteria

All studies into the effect of acupressure on blood sugar had been published in English and before the 2019 May 22 were retrieved and assessed for eligibility. There were no restrictions on the age of patients and the time of publication. Critic articles, letters to editors, summaries of congressional papers, and dissertations whose results were not available were not included in the study (Figure 1).

Data extraction and analysis

A data collection sheet was used to extract data from the retrieved studies about the topic, authors' name, publication year, country of study, sample size, duration of intervention, sex of patients (one of the articles did not specify the gender of participants), number of participants in the intervention and placebo groups, mean and standard deviation of blood glucose in the intervention group and placebo group before and after the intervention, and mean difference and standard deviation of the intervention and the placebo groups and recorded in excel software (Table 2).

Data Extraction and study selection were performed by two researchers independently and any disagreements were resolved by discussion. After extracting the data from articles, a meta-analysis was performed using STATA software version 14.

Index I^2 was used for heterogeneity assessment and the Random effect model was used for final analysis. In this study, sensitivity analysis and publication bias were not assessed due to the limited number of articles.

Results

Characteristics of the studies a total of 3 studies were included in the meta-analysis. The studies have been published between 2011 and 2018. The duration of intervention in different studies varied from three weeks to 11 weeks. Two studies were conducted in Iran and one in Indonesia. The largest sample size was related to the study performed by Zarvasi et al. [18]. That was conducted on 60 patients and the lowest sample size was related to the study performed by Addison et al. in Indonesia. In a clinical trial, Zarvasi et al. have investigated the effect of self-acupressure on FBS and insulin levels in type2 diabetes patients. A total of 60 patients with diabetes were randomly assigned into two groups of 30. The intervention group received acupressure at ST-36, LIV-3, KD-3, and SP-6 acupoints bilaterally for 20 minutes (5 minutes at each point) for three weeks. Compared to the control group, the insulin level significantly increased (p=0.001) and serum FBS level significantly decreased after the intervention in the acupressure group (p=0.02). In another study [19], Bay and Bay examined the effect of combined therapy using acupressure (on Sp-3 or Sp-6, Liv-1, Lu-7, and P-7), hypnotherapy, and Transcendental Meditation (TM) on the blood sugar level in 20 patients with type 2 diabetes. The intervention was implemented in ten 60-90 min sessions in 10 consecutive days. In the control group, patients received capsules of wheat flour each day for 10 days. The intervention could significantly reduce the mean blood sugar level in the intervention group. In the third study [20], Fitrullah and Rousdy have divided 30 diabetic patients into two groups of 15. The experimental group received acupressure at the Zusanli (ST-36) acupoint for 30 minutes per visit (ranging from 1-3 visits per week) for 11 weeks, and the control group continued their regular treatment.

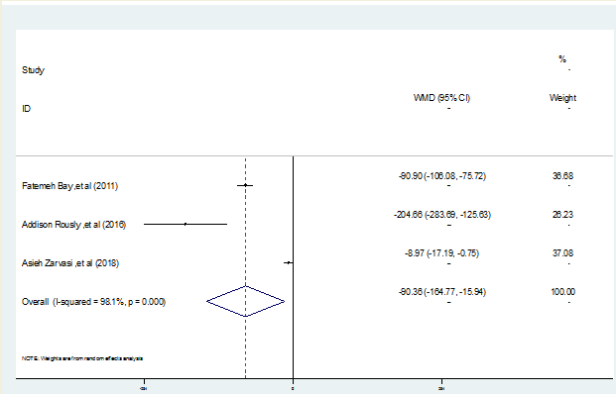

Figure 2: Estimation of a 95% confidence interval for blood glucose reduction.

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Table 1: The search strategy and its results in different databases.

Database	Search strategy
PubMed	Initially, the keywords diabetes and FBS were searched, which yielded 874 articles. In the second phase of the search for "Diabetes mellitus" OR "Hyperglycemia and FBS OR" blood sugar ", 599 articles were obtained. Finally, using the Boolean operator of AND the word "acupressure" was added to the last query, and 5 articles were obtained.
SCOPUS	With the search for "diabetes" AND "FBS", 1344 articles were obtained. In the next step, "Diabetes" OR "Hyperglycemia" AND "FBS" OR "Blood sugar" was searched and 13296 articles were obtained. In the final step, the keyword "Acupressure" was added using the Boolean operator of AND, and 6 articles remained.
Web of Knowledge	At first, the keywords diabetes and FBS were searched and 658 articles were obtained. In the second phase, "Diabetes" and "blood sugar" and "Acupressure" were searched and 3 articles were obtained. When "diabetes" AND "acupressure" were searched, 14 articles were obtained, which only one of them was appropriate.
Google Scholar	Initially, two keywords of "diabetes" and "FBS" were searched and 141,000 articles were obtained. Then the keywords of "diabetes" OR "Hyperglycemia" and "FBS" OR "Blood sugar" were searched and 717000 articles were added, and finally, the keyword "Acupressure" was added and 2250 articles were obtained. Due to the high number of articles, again the same 5 keywords and "diabetes" were re-searched, and 31 articles were obtained that only one of them was appropriate for the purpose of this study.
Magiran and SID	No article found with the combination of the words blood sugar, diabetes, and acupressure

Table 2: Specifications of articles entered into the study.

The first author (Year)	Duration	Sample size	Blood sugar, Mean±SD, mg/dL	
			Intervention group	Control group
Zarvasi (2018)	3 weeks	Total: 60	Baseline: 128.3±35.7	Baseline: 139.63±36.72
		Int.:30	After: 122.23±30.93	After: 142.53±38.26
		Con.:30	Change: -6.07±15.62	Change: 2.9±16.83
Bay (2011)	10 days	Total: 40	Baseline: 217.9±58.2	Baseline: 214.3±44.99
		Int.:20	After: 145.0±57.11	After: 232.3±52.67
		Con.:20	Change: -72.9±25.81	Change: 18±23.08
Fitrullah (2016)	11 weeks	Total: 30	Baseline: 351.53±154.7	Baseline: 261.67±72.01
		Int.:15	After: 111.07±6.62	After: 225.87±29.18
		Con.:15	Change: -240.46±148.76	Change: -35.8±47.48

The result showed that the two groups were significantly different and that acupressure at ST-36 was effective in reducing blood sugar.

Effect of acupressure on blood sugar

The data were first analyzed using the fixed effects model, the result of heterogeneity assessment was statistically significant (I^2 = 98.1%, P < 0.001); hence, the random-effects model was used. This analysis showed that acupressure can reduce blood sugar by an average of 90.36 mg (95% CI: -164.77, -15.94) (Figure 2). The largest decrease in blood sugar was observed in the study by Edison et al. in Indonesia (-204.66 mg/dL). The mean reduction in blood sugar in the studies of bay and Bay and Zarvasi et al. [18,19]. Was -90.90 and -8.97 mg/dL, respectively.

Discussion

The present meta-analysis showed that acupressure can significantly reduce the blood sugar level of patients with diabetes (90.36 mg/dL, on average). Some studies have examined the effects of acupressure in diabetic patients and reported its effectiveness on variables such as anxiety of mothers with gestational diabetes, and anxiety and quality of life in patients with type 2 diabetes. However, few studies have investigated the effectiveness of acupressure on the blood sugar of diabetic patients. Some studies have also pointed to the effect of acupuncture on reducing blood sugar. For example in a study in Turkey, it has been reported that electro acupuncture was more effective than diet restriction and placebo in increasing the serum insulin and decreasing the glucose levels in decreasing the blood glucose and increasing insulin levels. The aforementioned studies, as well as the three studies entered into the present meta-analysis, have shown the positive effects of acupressure and acupuncture on blood sugar. Most of these studies applied acupressure or acupuncture for a short time, however, another study investigated the effects of acupressure therapy on the development and progression of diabetic complications in patients with type 2 diabetes. A three-year follow-up showed that these patients had significantly lower levels of total cholesterol, triglycerides, low-density lipoprotein-cholesterol, and higher levels of high-density lipoprotein-cholesterol. However, no increase was detected in serum creatinine and urine protein as compared with that in controls. Moreover, the mean value of nerve conduction velocity was in the acupressure group was significantly greater than those of controls. Among the studies conducted in this area, a great variation is visible in approaches used (acupressure or acupuncture), intervention protocols, pressure points, and target populations and all these can influence the outcome of the intervention. However, it seems that acupressure, as an easy and safe complementary therapy can be beneficial in decreasing blood sugar and controlling the side effects of diabetes. However, due to the scarcity of the studies and the heterogeneity of the methods and protocols used in the studies, further studies are still needed to evaluate the effects of acupressure on blood sugar of diabetic patients. Furthermore, rigorous clinical trials are needed to compare the effects of acupressure of different acupoints and to find the best acupressure point for reducing the blood sugar, as well as the favorable duration and number of acupressure sessions.

Conclusion

The meta-analysis of the three studies revealed the positive effect of acupressure on decreasing the blood sugar in patients with diabetes. However, further studies are still need.

References

1. Haghayegh A, Ghasemi N, Neshatdoost H, Kajbaf M, Khanbani M (2010)

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Psychometric properties of Diabetes Management Self-Efficacy Scale (DMSES). Iranian Journal of Endocrinology and Metabolism 12: 111-115.

2. Thakur AK, Tyagi S, Shekhar N (2019) Comorbid brain disorders associated with diabetes: therapeutic potentials of prebiotics, probiotics and herbal drugs. Translational Medicine Communications 4: 1-13.
3. Pham VM, Matsumura S, Katano T, Funatsu N, Ito S (2019) Diabetic neuropathy research: from mouse models to targets for treatment. Neural Regeneration Research 14: 1870-1879.
4. Biswas S, Sarabusky M, Chakrabarti S (2019) Diabetic retinopathy, lncRNAs, and inflammation: A dynamic, interconnected network. J Clin Med 8: 1033.
5. Nagib AM, Elsayed Matter Y, Gheith OA, Refaie AF, Othman NF, et al. (2019) Diabetic nephropathy following posttransplant diabetes mellitus. Exp Clin Transplant 17: 138-146.
6. Emamalipour M, Seidi K, Jahanban Esfahlan A, Jahanban Esfahlan R (2019) Implications of resistin in type 2 diabetes mellitus and coronary artery disease: Impairing insulin function and inducing pro inflammatory cytokines. J Cell Physiol 234: 21758-21769.
7. National diabetes statistics report (2017).
8. Care D (2018) Economic Costs of Diabetes in the US in 2017. Diabetes Care 41: 917-928.
9. Tol A, Alhani F, Shojaeazadeh D, Sharifirad G, Moazam N (2015) An empowering approach to promote the quality of life and self-management among type 2 diabetic patients. J Educ Health Promot 4: 13.
10. Qian F, Korat AA, Malik V, Hu FB (2016) Metabolic effects of monounsaturated fatty acid–enriched diets compared with carbohydrate or polyunsaturated fatty acid-enriched diets in patients with type 2 diabetes: a systematic review and meta-analysis of randomized controlled trials. Diabetes Care 39: 1448-1457.
11. Maruthur NM, Tseng E, Hutfless S, Wilson LM, Suarez-Cuervo C, et al. (2016) Diabetes medications as monotherapy or metformin-based combination therapy for type 2 diabetes: a systematic review and meta-analysis. Ann Intern Med 164: 740-751.
12. Halban PA, Polonsky KS, Bowden DW, Hawkins MA, Ling C, et al. (2014) β-cell failure in type 2 diabetes: postulated mechanisms and prospects for prevention and treatment. J Clin Endocrinol Metab 99: 1983-1992.
13. Pickup JC, Reznik Y, Sutton AJ (2017) Glycemic control during continuous subcutaneous insulin infusion versus multiple daily insulin injections in type 2 diabetes: individual patient data meta-analysis and meta-regression of randomized controlled trials. Diabetes Care 40: 715-722.
14. Kashi Z, Akha O, Borzouei S, Bahar A (2013) Insulin therapy: Side effects and their management. Clinical Excellence 1: 1-16.
15. Peregoy JA CT, Jones LI, Stussman BJ, Nahin RL (2014) Regional variation in use of complementary health approaches by U.S. adults. NCHS Data Brief 146: 1-8.
16. Lee EJ, Frazier SK (2011) The efficacy of acupressure for symptom management: a systematic review. J Pain Symptom Manage 42: 589-603.
17. Lindquist R, Tracy MF, Snyder M (2018) Complementary and alternative therapies in nursing. New York: Springer Publishing Company.
18. Zarvasi A, Jaberi AA, Bonabi TN, Tashakori M (2018) Effect of self-acupressure on fasting blood sugar (FBS) and insulin level in type 2 diabetes patients: a randomized clinical trial. Electron Physician 10: 7155-7163.
19. Bay R, Bay F (2011) Combined therapy using acupressure therapy, hypnotherapy, and transcendental meditation versus placebo in type 2 diabetes. J Acupunct Meridian Stud 4: 183-186.
20. Fitrullah, Rousdy A (2017) Effectiveness of acupressure at the Zusanli (ST-36) acupoint as a comfortable treatment for diabetes mellitus: a pilot study in Indonesia. J Acupunct Meridian Stud 10: 96-103.
21. Moher D, Shamseer L, Clarke M, Ghersi D, Liberati A, et al. (2015) Preferred reporting items for systematic review and meta-analysis protocols (PRISMA-P) 2015 statement. Syst Rev 4: 1.

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