Short Communication

Effect of bilateral needling with acupuncture point at SP-6 (Sanyinjiao) on random blood glucose levels in type 2 diabetes mellitus: A Pilot study

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ABSTRACT

Introduction: Diabetes mellitus (DM) is a metabolic disease, involves improper elevated blood glucose levels. Acupuncture is one of the traditional systems of medicine used in management of diabetes and its complications worldwide. **Objective:** This pilot study presents the effect of acupuncture at spleen-6 (SP-6) on Random Blood Glucose levels (RBG) in patients with diabetes mellitus. **Methods:** Ten Type 2 Diabetes mellitus patients [T2DM] had undergone acupuncture at SP-6 (*Sanyinjiao)* bilaterally for duration of 30 minutes without any interruption. Assessments were recorded before and after the intervention. **Results:** The results showed that acupuncture at SP-6 for 30 min duration reduces RBG level significantly in patients with T2DM when compared with baseline assessment. **Conclusion:** Thus acupuncture at SP-6 could be used to reduce blood sugar level in T2 DM.

Keywords: *Diabetes mellitus, Acupuncture, Spleen-6, Sanyinjiao, Traditional Chinese Medicine, T2DM.*

Diabetes mellitus (DM) is a chronic metabolic disorder characterized by consistent hyperglycemia. It may be due to a reduction in insulin secretion, resistance to the peripheral actions of insulin, or both [1]. Global diabetes prevalence is expected to be 9.3% (463 million people) in 2019, rising to 10.2% (578 million) by 2030 and 10.9% (700 million) by 2045 [2]. According to the World Health Organization (WHO), Diabetes accounts for 1.6 million deaths, making it the ninth leading cause of death worldwide and in India, the incidence of diabetes increased from 7.1% in 2009 to 8.9% in 2019. It is anticipated that 25.2 million adults already have impaired glucose tolerance (IGT), and that number will rise to 35.7 million by the year 2045. In the world's diabetes epidemic, India is in second place to China with 77 million diabetics [3].

Diabetes chronic complications are broadly classified as microvascular or macrovascular, with the former having a much higher prevalence than the latter. Microvascular complications include neuropathy, nephropathy, and retinopathy, whereas macro vascular complications include cardiovascular disease, stroke, and peripheral artery disease [4]. Biguanides, sulfonylureas, meglitinide, thiazolidinedione (TZD), dipeptidyl peptidase 4 (DPP-4) inhibitors, sodium-glucose cotransporter (SGLT2) inhibitors, and -glucosidase inhibitors are the most common oral anti-diabetic medications [5]. Metformin is widely used to treat diabetes, but it causes lactic acidosis, B-12 deficiency and folic acid deficiency and other gastrointestinal problems in 30% of patients [6]. Most complementary medicine like acupuncture believes that the goal of therapeutic intervention is to restore balance and facilitate the body's own healing responses rather than to target individual disease processes or stop troubling symptoms, which could include lifestyle changes, dietary changes, and exercise, as well as a specific treatment [7]. Acupuncture, one of the primary methods of treatment in traditional Oriental medicine, is based on a meridians system [8].

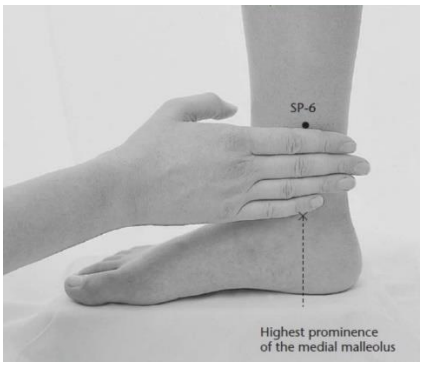
There are several studies showed that acupuncture at SP-6 along with some acupuncture points for shorter or longer duration reduces blood sugar levels [9, 10]. However, no studies have been reported the immediate effect of acupuncture at single point SP-6 on random blood glucose levels in patients with T2DM. Thus, this study aims to evaluate the effectiveness of acupuncture at SP-6 bilaterally on RBS in patients with type 2 DM.

METHOD

Study design: A single group pre –post study design was adopted for this study. Ten diabetic participants were recruited and included for the intervention. Pre and post assessments were taken before and immediately after the intervention.

Participants: Ten type-2 diabetic Participants who were on regular anti- diabetic medication aged with the range of 45-62 years were recruited from outpatient department of Govt. yoga and naturopathy medical college, Arumbakkam, Chennai-106. Both male and female participants with regular anti- diabetic medication aged between 35-65 years and willing to participate were included in the study. Participants with type -1 diabetes mellitus and participants with complications of type-2 DM were excluded from the study. The details of intervention procedure were explained and written informed consent obtained from each participant before starting intervention.

Intervention: Participants received single session of acupuncture at SP-6 bilaterally which is located 3-tsun proximal to the tip of the medial malleolus [11]. The participants underwent acupuncture for 30 mins duration in sitting position without any interruption.0.25x25 cm sterile silver filiform needles were used for intervention.



Primary outcome: Random blood glucose level

RBG was assessed by using portable glucometer (gluco one; BG-03, Morepen laboratory ltd, Himachal Pradesh) through capillary blood flow, by pricking drop of blood in finger with a lancet and the blood kept on the disposable strip which connected with glucometer.

Secondary outcome: Blood pressure assessment

Blood pressure was assessed by a digital blood pressure monitor (HEM-8712, omron health care co. ltd, Kyoto). While assessing the blood pressure the patient was in sitting position.

Statistical Analysis: Statistical analysis was performed using paired samples t-test with the use of SPSS.A p value <0.05 was considered as significant.

RESULTS

The results of this study showed that acupuncture bilaterally at SP-6 for 30 minutes reduces RBG significantly ($p<0.05$) when compared with pre assessment (Table 1). There is no significant change in Systolic Blood Pressure (SBP) and Diastolic Blood Pressure (DBP) after intervention when compared with baseline assessment.

Table 1: Results

Variables	Mean	SD	p Value
Pre-post RBG	15.900	21.7	**0.046***
Pre-post SBP	.200	4.104	0.962
Pre-post DBP	-2.00	2.978	0.519

Note: * = $p < 0.05$

DISCUSSION

Type 2 DM is characterized by relative insulin deficiency due to pancreatic beta cell dysfunction and insulin resistance in target organs [12]. The global burden of diabetes is increasing, particularly in India, where approximately 77 million people are affected in 2019 [3]. Drug dependence, drug resistance it's cost and untoward effects of drugs are the challenging factors in conventional management of diabetes mellitus [13]. Acupuncture treatments are widely used to treat diseases associated with insulin resistance [IR], and several studies show that acupuncture can improve insulin sensitivity [14]. Acupuncture therapy controls protein expression, neuronal excitation, and signaling pathways, which improves insulin sensitivity. SP-6 is an acupuncture point traditionally used in management of diabetes mellitus and studies reported that acupuncture at sp-6 may enhance insulin sensitivity along with group of acu points [15].

Results of this study showed that acupuncture at SP-6 for 30 mins duartion may reduce RBG significantly (p<

(0.005) when compared with baseline assessment and blood pressure has no significant change after acupuncture session when compared with baseline assessment. According to traditional Chinese medicine concepts, diabetes mellitus is due to deficiency of yin and excess of dry heat [16]. SP-6 is used to nourish yin and blood, tonifies spleen and stomach [11]. Animal studies showed that acupuncture stimulation at SP-6 can improve insulin resistance and upregulate the expression of IRS-1, IRS-2 and GLUT-4 in T2 DM rats [17]. Acupuncture at SP-6 can increase the NO levels and permeability of blood vessels thus helps in reduction of blood glucose level through increasing utilization of glucose.

Chronic Glucocorticoid [GR] exposure has diabetogenic effect through enhanced gluconeogenesis, impaired glucose uptake in muscle, increase of fatty acid level in circulation which results in insulin resistance [18]. Adrenal GR production is regulated by Hypothalamo- pituitary- adrenal-axis [HPAA] function [19]. Acupuncture SP-6 can modulate HPAA function and regulates circulatory GR levels. Thus SP-6 may reduce IR and reduces blood sugar level [20]. Thus acupuncture at SP-6 may reduce blood sugar level through upregulation of IRS-1, IRS-2 and GLUT-4 in muscular tissues or through enhancing insulin sensitivity or through increased NO levels and vascular permeability or through regulation of HPAA function.

SP-6 is used to nourish blood and qi and to enhance yin and to reduce yang [21]. Previous study showed that sp-6 may reduce the blood pressure in essential hypertensive patients [22]. which result is controversial to our study results. This may be due to inclusion of non -hypertensive patients in this study and smaller study population.

CONCLUSION

The findings of this study suggests that acupuncture at SP-6 for 30 mins duration could be used as a supportive measure in reduction of blood glucose level in T2 DM and larger sample size experimental studies are required to strengthen our findings. Inclusion of participants with hypertension may provide clear insight about the blood pressure regulatory action of SP-6 in future studies.

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