Case Report

Integrating Foot Reflexology and Barefoot Walking in Type 2 Diabetes Mellitus Care: A Case Study

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ABSTRACT

Diabetes mellitus, a major global health challenge is characterised by persistent hyperglycaemia due to insulin dysfunction. Effective management often necessitates exploring adjunctive therapies alongside conventional treatments. This case study examines Acupuncture and Energy Medicine (AEM) for managing Type 2 Diabetes Mellitus (T2DM). A 60-year-old male, recently diagnosed with T2DM, presented with an HbA1c of 11% with the symptoms of giddiness and excessive sweating. These interventions aimed to evaluate foot reflexology, barefoot walking, and diet therapy on glycemic control and overall health. The patient participated in a twelve-month program incorporating these modalities. Reflexology sessions, targeting zones associated with the pancreas, liver, and kidneys, were conducted twice daily. Pre- and post-intervention assessments included Fasting Blood Glucose (FBS), Post Prandial Blood Glucose (PPBS), HbA1c, Height, Weight, Blood Pressure and Body Mass Index (BMI). Results revealed a substantial improvement in the glycaemic control. HbA1c decreased to 8%, FBS and PPBS levels showed marked reductions, and BMI was slightly reduced. The patient reported increased energy levels, reduced dizziness, and improved overall well-being. This case highlights the potential benefits of integrating holistic therapies such as foot reflexology and barefoot walking into diabetic care. These interventions may improve the metabolic parameters and address psychosocial aspects, facilitating a patient-centred approach to diabetes management. Larger prospective studies are warranted to substantiate these findings and establish standardized protocols.

Key words: Diabetes mellitus, foot reflexology, barefoot walking, HbA1c, Acupuncture and Energy Medicine

Diabetes Mellitus (DM) is a chronic metabolic disorder characterised by persistent hyperglycaemia resulting from dysfunction in the insulin secretion, action, or both. Insulin resistance, impaired insulin secretion, or a combination of both contributes to this condition, which can be categorised into two primary types: Type 1 Diabetes (T1DM) and Type 2 Diabetes (T2DM) [1]. T2DM is the more common form, accounting for approximately 90-95% of all diabetes cases globally. The long-term complications of DM include cardiovascular diseases, neuropathy, nephropathy, and retinopathy, all of which significantly affect the quality of life and lead to increased healthcare costs. These complications are primarily attributed to chronic hyperglycaemia and can lead to debilitating conditions such as amputations, blindness, and kidney failure [2, 3].

The global prevalence of diabetes has reached epidemic proportions, with over 460 million people affected worldwide, a number expected to rise to over 700 million by 2045, according to the International Diabetes Federation (IDF). The increasing incidence of this condition is likely attributable to a confluence of factors, including population ageing, sedentary lifestyles, unhealthy dietary habits, and rising obesity rates. Diabetes mellitus (DM) presents a significant public health challenge, imposing a substantial burden on both individuals and healthcare systems [3].

Conventional treatment strategies for T2DM primarily focus on pharmacological interventions to regulate blood glucose levels, and lifestyle modifications, including physical activity, and dietary changes. However, the complexity and multifactorial nature of T2DM has prompted increased interest in complementary and alternative therapies, such as Acupuncture and Energy Medicine (AEM) therapies aim to improve glycaemic control, promote overall well-being, and address the psychosocial aspects of living with a chronic condition like diabetes [4].

Among these complementary interventions, foot reflexology, barefoot walking, and fermented rice water intake have gained attention for their potential to improve metabolic health and the quality of life in individuals with T2DM. Foot reflexology is a non-invasive therapy based on stimulating

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reflex zones on the feet, which is believed to improve organ function and enhance metabolic processes. Barefoot walking, particularly on natural surfaces such as sand or grass, helps to improve proprioceptive feedback, circulation, and stress relief. Fermented rice water, a traditional beverage rich in probiotics, is recognised for its potential to improve gut microbiota, enhance digestion, and support metabolic health. These holistic therapies aim to complement conventional treatments by bolstering the body's inherent healing mechanisms and addressing the multifactorial nature of T2DM. Collectively, they offer a holistic, patient-centered approach to diabetes management, emphasising the interconnectedness of physical and mental well-being [5-9].

CASE PRESENTATION

A male patient aged 60 years old came to the Outpatient department (OPD), International Institute of Yoga and Naturopathy Medical Sciences, Chengalpattu, Tamil Nadu, India who was recently diagnosed with Type 2 Diabetes Mellitus with the HbA1C ranging up to 11% frequently presented with the giddiness and excessive sweating. A comprehensive evaluation was conducted at baseline and following the intervention to assess his health status and monitor changes over time. The assessment included the measurements of Height, Weight, Blood Pressure (BP), and Body Mass Index (BMI), along with the key diabetes-related parameters such as Fasting Blood Sugar (FBS), Post Prandial Blood Sugar (PPBS), and Glycated Haemoglobin (HbA1C). These evaluations aimed to track his condition and assess the effectiveness of interventions. The intervention protocol given to the patient is described in Table 1, and Figure

Table 1 - Intervention Protocol

AEM TREATMENTS	METHOD	FREQUENCY
Acupressure	Reflexology mat	Twice daily
Barefoot walking	Brisk walk for 5 Km in the sand	Once daily
Diet (Taste medicine)	Fermented rice water on an empty stomach	Daily (150ml)

AEM – Acupuncture and Energy Medicine (AEM)

Figure 1 & 2 illustrate the Foot reflexology therapy and Diet Therapy respectively.

Over 12 months, several health parameters showed noticeable improvements. Weight decreased from 62 kg to 58 kg, contributing to a slight reduction in BMI from 22.86 kg/m² to 22.08 kg/m². Blood pressure also improved slightly, with a decrease from 132/78 mmHg to 130/72 mmHg. Fasting blood sugar (FBS) decreased from 191 mg/dL to 163 mg/dL, and postprandial blood sugar (PPBS) improved significantly, dropping from 309 mg/dL to 215 mg/dL. The most significant change was in haemoglobin A1c (HbA1c), which reduced from 11.0% to 8.0%, indicating better long-term blood glucose control. These outcomes reflect the positive health outcome after 12 months of AEM intervention. These changes are described further in Table 2.

Table 2 – Pre- and Post-Intervention Clinical Parameters

PARAMETERS	PRE - DATA (0 DAY)	POST DATA (AFTER 12 MONTHS)
Height	162 cm	162 cm
Weight	62 Kg	58 Kg
BMI	22.86 Kg/m^2	22.08 Kg/m^2
BP	132/78 mmHg	130/72 mmHg
FBS	191 mg/dl	163mg/dl
PPBS	309 mg/dl	215mg/dl
HbA1c	11.0 %	8.0%

Note: **BMI –** Body Mass Index**, BP –** Blood Pressure**, FBS –** Fasting Blood Glucose**, PPBS –** Post Prandial Blood Sugar**, HbA1c –** Glycated Hemoglobin, cm – centimetres, Kg – Kilograms, mm – millimetres, dl – decilitre,

DISCUSSION

This case study investigates the potential benefits of integrating foot reflexology, barefoot walking, and fermented rice water as complementary therapies for the management of type 2 diabetes mellitus (T2DM). Each of these interventions operates through distinct mechanisms that, in combination, may enhance glycemic control, improve metabolic health, and support overall well-being.

Foot Reflexology is based on the principle that specific points on the feet correspond to organs and systems throughout the body. By applying pressure to these reflex points, reflexology is believed to stimulate healing and restore balance in the body's energy pathways. In the case of T2DM, reflexology can target the reflex areas linked to the pancreas, liver, and kidneys. The pancreas, essential for insulin production, may benefit from reflexology through enhanced insulin secretion and improved glucose metabolism. Stimulation of the liver and kidneys supports the detoxification process and helps to regulate blood sugar. Reflexology also impacts the autonomic nervous system, which controls the body's involuntary functions such as heart rate and digestion. By reducing stress and promoting relaxation, reflexology may help lower cortisol levels, associated with insulin resistance and elevated blood glucose levels [8]. Prior research has demonstrated that reflexology

can enhance circulation, reduce stress, and improve glycemic control, suggesting its potential as a valuable adjunct therapy in T2DM management [10, 11].

Barefoot Walking provides a simple and effective way to improve circulation, reduce inflammation, and promote physical activity—each crucial for managing T2DM. Walking barefoot, especially on natural surfaces such as sand, stimulates foot muscles and promotes better circulation, which is often impaired in people with diabetes. Improved circulation enhances oxygen and nutrient delivery to tissues, enhancing metabolic function and tissue repair. Additionally, barefoot walking has been linked to grounding, a process by which the body absorbs free electrons from the earth, neutralising free radicals and reducing oxidative stress. Chronic inflammation and oxidative stress are known to contribute to insulin resistance and other metabolic disturbances, making the anti-inflammatory effects of barefoot walking particularly beneficial [6]. Moreover, physical activity such as walking increases glucose uptake by muscle cells, reducing blood glucose levels. Studies have demonstrated that regular physical activity, including walking, improves insulin sensitivity and can help lower fasting blood glucose and postprandial blood glucose levels [12-15].

Fermented Rice Water, consumed on an empty stomach, has gained attention for its potential to support metabolic health through its rich content of probiotics, antioxidants, and other bioactive compounds. The fermentation process enriches the rice water with beneficial bacteria that restore the balance to the gut microbiome, a critical factor in glucose metabolism and insulin sensitivity. An imbalanced gut microbiome is linked to insulin resistance, which contributes to the progression of diabetes. Probiotics from fermented rice water can help restore this balance, potentially improving glucose metabolism and insulin sensitivity [7, 17]. Furthermore, fermented rice water contains antioxidants such as phenolic acids, which have anti-inflammatory properties that reduce oxidative stress—a major contributor of diabetic complications like neuropathy, cardiovascular disease, and kidney damage. By neutralising free radicals and reducing inflammation, fermented rice water supports better glucose regulation and mitigates the risk of complications associated with T2DM [9, 18]. Additionally, the bioactive compounds in fermented rice water may improve digestive health, promoting better nutrient absorption and reducing blood sugar spikes after every meal [7].

Together, these three AEM therapies—foot reflexology, barefoot walking, and fermented rice water—work synergistically to provide a holistic approach to managing T2DM. Reflexology may enhance insulin sensitivity and organ function, while barefoot walking may improve circulation, reduce inflammation, and promote physical activity. Fermented rice water may support gut health, reduce oxidative stress, and improve glucose metabolism. By addressing both the physiological and psychosocial aspects of diabetes, these interventions offer a comprehensive strategy for improving blood glucose control and overall health [17-20].

Although the findings of this case study are encouraging, further research involving larger sample sizes and extended follow-up periods is essential to validate these results. Future studies should aim to determine the optimal frequency and duration of each therapy and elucidate the specific mechanisms by which these interventions impact metabolic health in type 2 diabetes mellitus (T2DM). Furthermore, establishing standardised protocols for integrating these holistic approaches into routine diabetes care would be valuable for clinicians in developing comprehensive, individualised treatment plans.

CONCLUSION

In conclusion, the integration of acupuncture and energy medicine (AEM) therapies with barefoot walking, foot reflexology, and fermented rice water demonstrates promising potential for reducing glycemic levels and enhancing overall health in individuals with type 2 diabetes mellitus (T2DM). By targeting specific acupuncture points and energy pathways, AEM therapies help to regulate metabolic processes, enhance insulin sensitivity, and support glucose metabolism. Additionally, barefoot walking improves circulation, reduces inflammation, and promotes physical activity, while foot reflexology supports organ function and relaxation. Fermented rice water improves glucose control by promoting gut health and mitigating oxidative stress. Together, these therapies offer a holistic, patient-centred approach to diabetes management, complementing traditional treatments and potentially improving both short-term glycaemic control and long-term metabolic health. The integration of AEM therapies with these complementary interventions demonstrates significant potential as part of a comprehensive T2DM management strategy, although further research is warranted to establish the effectiveness fully.

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