

# The Effects of Thermal Dry Cupping Therapy in Type II Diabetes Mellitus in Omani Patients

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## Abstract

**Introduction:** Type 2 Diabetes Mellitus (T2DM) is a group of metabolic disorders characterized by insulin resistance. It's a multifactorial chronic disease and if not managed properly, it can lead to complications in both short-term and long-term incidences. These complications involve intensified blood cholesterol due to high incidence of blood glucose, which can lead to several complications. The gold standard treatment for T2DM is metformin, however other approaches have been studied in conjunction with the standard treatment, which can lead to improvement of cholesterol and blood sugar levels in diabetic patients in order to prevent further complications

**Method:** Thermal Dry Cupping Therapy was done using traditional glass cups on 30 T2DM patients, who have been diagnosed with diabetes for more than three years and are still using metformin. This method was repeated once a week for 4 weeks. Then fasting blood samples were obtained to measure the levels of blood glucose and lipid profile for total cholesterol levels, low density lipoprotein (LDL) and high density lipoprotein (HDL). Whereas the % of HAb1c was determined by ELISA method.

**Result:** Post cupping measurements showed a significant decrease in fasting blood glucose measurements of  $8.15 \pm 1.09$ , % HAb1c of  $45.71 \pm 5.89$ , and a significant decrease in total cholesterol levels of  $186.65 \pm 27.83$  and low density lipoprotein (LDL) of  $135.73 \pm 15.2$ , however an increase in high density lipoprotein (HDL) of  $45.71 \pm 5.89$  was observed.

**Conclusion:** The data suggest that several sessions of Thermal Dry Cupping therapy can decrease values of total cholesterol, low density lipoprotein, fasting blood glucose and percent of glycated haemoglobin. Hence, it might play a role in the improvement of impaired glucose metabolism, which can be beneficial as a complementary treatment for T2DM in Omani patients besides the standard treatment.

**Keywords:** Thermal Dry Cupping Therapy; Type 2 Diabetes Mellitus; Fasting blood glucose; Lipid profile; Glycated Haemoglobin and Glucose metabolism.

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## Introduction

Type 2 Diabetes Mellitus (T2DM) is known as adult-onset diabetes and comprises approximately 90% of people with diabetes. T2DM usually includes a component of insulin resistance and over time results in  $\beta$ -cell failure. It is hard to target a single risk factor for T2DM as it is a combination of genetics, environment, and poor lifestyle, which lead to insulin resistance, obesity, and other diabetes related complications. These complications include; macrovascular disease, neuropathy, nephropathy and retinopathy. T2DM can be managed by alterations in lifestyle and diet, but over time the majority of people progress to needing oral and injectable diabetes therapies.

Since early times, complementary and alternative medicine has

played an important role in human health and welfare. Many therapeutic approaches in healthcare outside the margins of conventional medicine persist in various parts of the world [1].

Thermal dry cupping therapy (TDCT) is a traditional healing technique that has been employed in various cultures for centuries. It involves the use of heated cups placed on the skin to create a vacuum, which in turn, draws the skin and underlying tissues into the cup. The therapy is believed to offer a wide range of benefits, both physical and psychological. This literature review explores the benefits of heat cupping therapy, citing relevant research to support each claim. One of the most commonly reported benefits of heat cupping therapy is pain relief. Research by [2], found that heat cupping therapy was effective in reducing musculoskeletal pain, including lower back pain and neck pain.

The application of heat helps to relax muscles and increase blood flow, which can alleviate discomfort and promote healing [3].

TDCT has been shown to enhance blood circulation. A study conducted by [4], demonstrated that cupping therapy increased microcirculation in the treated areas. Improved blood flow can aid in the delivery of oxygen and nutrients to tissues, which is essential for healing and recovery.

Cupping therapy, including heat cupping, is known to have a relaxing effect on the body. It can help reduce stress and anxiety levels [5]. Reported that cupping therapy induced a calming effect and reduced the participants' perception of stress. Some supporters of heat cupping therapy suggest that it helps the body detoxify by drawing out toxins through the skin. While more research is needed in this area, a study by Kim et al. (2019) did find that cupping therapy resulted in increased excretion of certain waste products through urine. Therefore, we hypothesize that TDCT in conjunction with T2DM treatment can improve fasting blood glucose levels, % of Glycated Haemoglobin, and lipid profile in T2DM patients

## Subjects

Subjects: 30 subjects were enrolled in the study. Twenty Omani Type 2 diabetic patients on (all were male subjects, mean age  $56.11 \pm 1.48$  years). Informed consent was obtained for all study participants. All diabetic patients were previously diagnosed cases and are on metformin drug; the mean duration of T2DM for more than 3 years. It was recommended that patient should not eat at least 2-4 hours before cupping.

## Methods

### Methods of cupping

Traditional glass of cups made was used on 30 diabetic Omani patients and was repeated twice a week for a period of 4 months. The Glass cups used in this study are heated with an open flame (Figure 1). Soaked cotton ball or a candle was used as a heat source in the study.

Massage oil or lotion was used to lubricate the skin and create a seal for the cups to adhere to. A Cotton balls or a small towel was used for extinguishing the flame and creating a vacuum inside the glass cups (Figure 1).

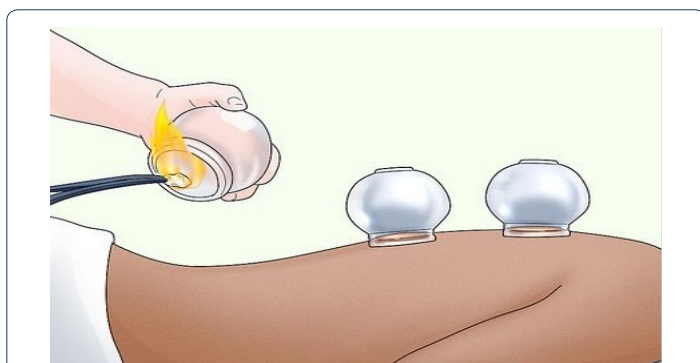


Figure 1 Traditional Thermal Cupping Therapy.

### Random fasting blood glucose

Measurements were taken daily by obtaining a blood sample from the fasting patients over night or for at least 8 hours then using the glucometer to determine the values of blood sugar, each measurement was repeated thrice for accuracy.

**HbA1c:** The levels of HbA1c were determined by ELISA method. Samples were centrifuged for 15 minutes. Sample was removed and assay was performed immediately by using a human HBA1c kit. 50  $\mu$ L of each standard, control and sample were added into a 96 well pre coated microplate. Then 50  $\mu$ L of Detection Reagent A was added to each well, sealed then incubated for 1 hr at 37 °C. Plate was washed 3X with 1X wash buffer. Then 100  $\mu$ L of Detection Reagent B was added into each well, sealed and incubated at 37°C for 30 min. washing was repeated as previously but for 5X. 90  $\mu$ L of TMB Substrate was added to each well, sealed then incubated at 37°C for 10-20 min, avoiding exposure to light. 50  $\mu$ L of stop solution was added to each well then the plate was read at 450 nm immediately. There is an inverse correlation between HbA1c concentration in the sample and the absorbance measured, the HbA1c concentration of the samples was interpolated from the standard curve.

**Lipid Profile:** Patients were asked to fast overnight or for at least eight hours, a blood sample was drawn for a fasting lipid profile. The test provides a measurement of the serum concentrations of total cholesterol, triglyceride, HDL-C, and calculated LDL-C. Standard lipid analysis includes measurements of serum or plasma total cholesterol, triglycerides, and high density lipoprotein cholesterol (HDL-C) after an overnight fast. Low density lipoprotein cholesterol (LDL-C) is then calculated using Friedewald formula.

### Data Handling and Statistical Methods

The statistical software package (SPSS version 20.0) was used for data management and analysis. The data were subjected to the Kolmogorov- Smirnov test to determine the distribution and method of analysis. As most of the data was normally distributed continuous variables student's t test was used. The data were analyzed by one-way ANOVA and Pearson correlation coefficient. All the results are expressed as mean  $\pm$  standard error of the mean (SEM), and with the level of significance set at  $P < 0.05$ .

## Results

Characteristics of subjects investigated are present in Table (1). The mean and  $\pm$  SD values of the age for the diabetic male subjects mean age  $56.11 \pm 1.48$  years

Table (2) demonstrates mean and  $\pm$  SD values of fasting blood glucose (FBG) and HbA1c, total cholesterol, low density lipoprotein (LDL) and high density lipoprotein (HDL), of investigated subjects. Fasting blood glucose (FBG) levels were  $(10.75 \pm 1.31$  mmol/L) in the pre cupping diabetic patients compared post cupping treatments the levels were  $(8.15 \pm 1.09$  mmol/L). The data showed that there is a significant decrease in fasting blood glucose ( $p < 0.05$ )

Graph (1) demonstrates fasting blood glucose levels and Glycated haemoglobin (HbA1c) % pre and post cupping. HbA1c levels were

( $8.5 \pm 0.46\%$ ) in the pre-cupping diabetic patients compared to the HbA1c levels of post-cupping ( $6.8 \pm 0.35\%$ ). The data showed that there is a significant decrease in HbA1c % of the subjects ( $p < 0.05$ ).

Graph (2) shows total cholesterol, LDL and HDL pre and post cupping. The pre cupping total cholesterol levels were  $290.99 \pm 19.88$  mg/dl. Post cupping the total cholesterol levels decreased to  $186.65 \pm 27.83$  mg/dl. The data showed that there is a significant decrease in total cholesterol levels ( $p < 0.05$ ).

Results of pre cupping low density lipoprotein (LDL) were  $179.26 \pm 23.2$  mg/dL and post cupping values were  $135.73 \pm 15.2$  mg/dL. The data showed that there is a significant decrease in LDL of the subjects ( $p < 0.05$ ).

Results of pre cupping high density lipoprotein (HDL) were  $34.41 \pm 3.8$  mg/dL and post cupping values were  $45.71 \pm 5.89$  mg/dL. The data showed that there is significant increase in HDL of the subjects ( $p < 0.05$ ) (Tables 1-2) (Graphs 1-2).

## Discussion

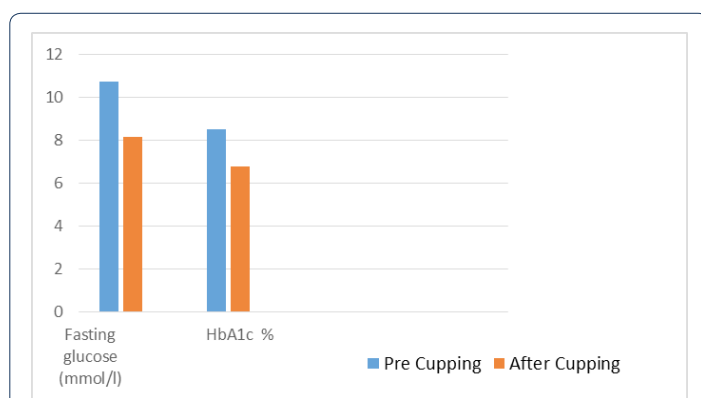
The review of literature has shown the increased interest in ascertaining the relationship between diabetes mellitus and

**Table 1:** Characteristics of the studied subjects.

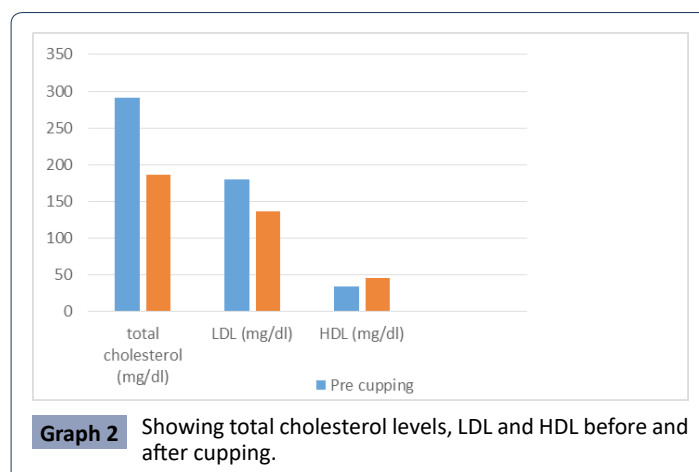
Characteristics of Subjects	Subjects with diabetes
Gender	
Male	30
Age (years)	$56.11 \pm 1.48$

**Table 2:** Blood parameters of studied subjects pre and post cupping.

Parameters	Subjects with diabetes pre-cupping therapy (Mean $\pm$ SD)	Subjects with diabetes post cupping therapy (Mean $\pm$ SD)
Fasting glucose (mmol/L)	$10.75 \pm 1.31$	$8.15 \pm 1.09$
HbA1c (%)	$8.5 \pm 0.46$	$6.8 \pm 0.35$
Total Cholesterol (mg/dL)	$290.99 \pm 19.88$	$186.65 \pm 27.83$
LDL (mg/dL)	$179.26 \pm 23.2$	$135.73 \pm 15.2$
HDL (mg/dL)	$34.41 \pm 3.8$	$45.71 \pm 5.89$



**Graph 1** Demonstrates Fasting blood glucose levels and Glycated haemoglobin (HbA1c%) before and after cupping.



**Graph 2** Showing total cholesterol levels, LDL and HDL before and after cupping.

cupping heat therapy in different medical conditions,. Constantly increasing research tries to discover the exact role of cupping heat therapy in improvement of glucose metabolism.

In our study our results showed a decrease in the levels of fasting blood glucose (FBG) ( $10.75 \pm 1.31$  mmol/L) in the subjects pre cupping compared to post cupping treatments the levels were ( $8.15 \pm 1.09$  mmol/L). The data showed that there is significant decrease in fasting blood glucose ( $p < 0.05$ ). Also, HbA1c levels were ( $8.5 \pm 0.46\%$ ) in the subjects pre-cupping compared to the HbA1c levels post-cupping ( $6.8 \pm 0.35\%$ ). The data showed that there is significant decrease in HbA1c % of the subjects ( $p < 0.05$ ). These results indicated that there was a positive correlation between cupping heat therapy and glucose metabolism disorder.

These results were in agreement with a study by [6], investigated the immediate effects of heat cupping on blood glucose levels in a small group of individuals with type 2 diabetes. The researchers found a statistically significant decrease in blood glucose levels immediately after a single session of heat cupping therapy. This reduction in glucose levels was attributed to improved circulation and enhanced insulin sensitivity.

[7], claimed that the effect of cupping might be due to stimulating blood circulation and supplying nutrients to beta cells in the pancreas. In addition to controlling insulin production levels.

Lipid profile values were detected in blood samples of the subjects which included total cholesterol, LDL and HDL pre cupping and post cupping therapy. The total cholesterol levels pre cupping was  $290.99 \pm 19.88$  mg/dl. Post cupping the total cholesterol levels decreased to  $186.65 \pm 27.83$  mg/dl. The data showed that there is significant decrease in fasting glucose ( $p < 0.05$ ).

Results of low density lipoprotein (LDL)  $179.26 \pm 23.2$  mg/dl pre cupping and  $135.73 \pm 15.2$  mg/dl post cupping. The data showed that there is significant decrease in LDL of the subjects ( $p < 0.05$ ).

Results of High-density lipoprotein (HDL)  $34.41 \pm 3.8$  mg/dl pre cupping and  $45.71 \pm 5.89$  mg/dl post cupping. The data showed that there is significant increase in HDL of the subjects ( $p < 0.05$ ). Impaired glucose metabolism can cause changes in the lipid profile,  $\beta$  cell dysfunction and insulin resistance can be induced by elevated levels of triglycerides, which lead to elevated levels of free fatty acids [8]. The exact mechanism is partially understood,

where disruption of the cascade linking insulin receptors with glucose transporter can be caused by elevated free fatty acids [9]. Dyslipidemia which is characterized by elevated triglycerides, low HDL-C and the predominance of small-dense LDL particles is seen in 60-70% of type 2 diabetes patients. An increased catabolism of HDL and a shift to LDL can be as a result of increased levels of triglycerides in the blood leading to hypertriglyceridemia. Additionally, inflammation can be modulated by free fatty acids, so hypertriglyceridemia can cause inflammation which leads to insulin resistance and  $\beta$  cell dysfunction, therefore improvements in blood glucose levels can improve lipid profile levels [10-12]. A Study have shown that HDL may directly affect glucose metabolism, as less hyperglycaemia was associated with higher concentrations of HDL. This is achieved by the anti-inflammatory properties of HDL and alteration of lipid environment by induction of reverse cholesterol transport. Additionally, many studies have shown that the goal is to decrease LDL levels to <100 mg/

dL in diabetic patients, if statins therapy can't achieve this then combination therapy is recommended [13, 14].

These findings of this study agreed with results of [15-24], which recommended cupping as a prophylactic and/or complementary treatment for hyperglycaemia and hyperlipidaemia and confirmed the short-term health benefits of cupping therapy.

## Conclusions

In conclusion, while there is some preliminary evidence to suggest that heat cupping therapy may have a positive impact on fasting blood glucose levels and subsequent effects of diabetes mellitus on the lipid profile. Further research is needed to confirm these findings and understand the underlying mechanisms. Heat cupping therapy should not replace standard pharmacological diabetes mellitus treatment but maybe prophylactic and/or complementary to diabetes treatment.

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