

ABSTRACT

BACKGROUND

Management of diabetes and its complications are laying a huge burden in the economy of developing nations like India, with the annual expenditure for the management of diabetes accounting to US\$ 727 billion, of which major portion is spent on the direct and indirect costs related to the ‘complications’ of diabetes. There is growing interest in alternative and holistic model of care which is evidence-based. Yoga is a mind/body practise which is increasingly used in the management of many modern non-communicable diseases (NCDs) including type 2 diabetes and its complications. Glycemic variability is an emerging target for diabetes management, along with HbA1C and plasma glucose levels. Glycemic variability is known to induce excessive oxidative stress and is an independent risk factor for the complications of diabetes and increased risk of mortality.

AIM AND OBJECTIVES

To study the effect of yoga on glycemic variability and mean daily glucose levels in patients with type 2 diabetes in comparison to the active control group (walking). The objectives were to study the effect of (i) Intraday variability (ii) Inter-day variability and (iii) mean daily glucose levels.

METHODS

Participants

A total of 60 participants with diagnosed type 2 diabetes with HbA1C between 7% - 8.5% were recruited for the study from a private diabetes specialty hospital in Chennai.

Design

Participants were randomly assigned either to the intervention group or the active control group of walking using a computer generated block randomisation, with six participants per block. Allocation concealment was carried out using sequentially numbered opaque sealed envelope (SNOSE), maintained by a person who was not directly involved in the project.

Assessments

Continuous glucose monitoring (CGM) was carried out using flash glucose monitoring system, Freestyle Libre Pro (Abbott Diabetes Care Ltd., Oxon, UK), applied on the non-dominant backside upper arm of the participants, which measures glucose levels every 15 minutes for a period of 14 days continuously. Of which, the first 7 days were utilised for establishing baseline in the glycemic variability, while in the following 7 days, the participants underwent either yoga sessions or the control sessions. Data was extracted using the EasyGV software to calculate various measures of glycemic variability.

Intervention

During the experimental yoga sessions, a validated yoga module was taught for duration of one hour including breathing practices, relaxation, *asanas*, *pranayama* and meditation. Control group went for walking for a similar duration of one hour everyday as well. Log book was maintained to know the adherence rate.

Data Analysis

Data analysis was done using statistical package for social sciences (SPSS)- version 24.0. Earlier glycemic variability was calculated using the EasyGV software (version 9.0) (www.phc.ox.ac.uk).

RESULTS AND DISCUSSIONS

Of the 60 participants included in the study, 57 participants completed the study, with three drop outs. After seven days of intervention, the mean daily glucose levels reduced by 23.99 mg/dL ($p < 0.001$) when compared to 8.69 mg/dL ($p < 0.05$) in the control group, with statistically insignificant difference between groups ($p > 0.05$). However, glycemic variability between groups was statistically significant in the measures of intraday glycaemic variability, inter-day glycemic variability and also overall glycemic variability.

CONCLUSION

Glycemic variability strongly correlates with β -cell dysfunction and yoga thus might be helpful in better management of in β -cell dysfunction T2DM. The need for an effective and cost-efficient treatment strategy in the secondary prevention of T2DM is increasing. Future implications of yoga in the management of T2DM and preventing complications of T2DM are very promising, with lesser risk of hypoglycaemia and glycemic variability.