

ABSTRACT

BACKGROUND

T2DM, Type 2 Diabetes Mellitus is a chronic metabolic disorder with significant morbidity, mortality, and healthcare spending. Prediabetes is a pre-stage risk factor for the development of T2DM. yoga is a mind-body medicine shown to have several health benefits. There is a lack of evidence for the efficacy of yoga in improving Prediabetes and reducing diabetes incidence. Hence the effect of yoga base Lifestyle (YBL) in prediabetes study is imperative. Stress plays an essential role in the manifestation of several chronic conditions such as Diabetes. Stress-related factors such as stressful workplace or traumatic life events and mental health problems underlie the development of Diabetes. In the present study, we study the association between stress and "prediabetes," the precursor and preventable stage of Diabetes, which needs attention.

yoga is an ancient skill set that could aid in attaining optimal physical and mental health and aid in the prevention and combating of several lifestyle disorders and diseases. The study was to understand the perception of people in all zones of India about yoga (not only *Āsana* or *Prāṇāyāma*) and knowledge-practice of yoga

We hypothesized stress as one of the reasons for the progression of people with Prediabetes into T2DM. The present study report on associations between perceived stress and blood glucose markers stratified by T2DM status.

The nationwide survey was to understand the benefits and barriers encountered by the community members to accept yoga into the workplace and routine practice. Even though

yoga helps prevent obesity, Diabetes, and hypertension, not practiced universally. This study explores motivators and barriers to practice by estimating how these elements can help develop and incorporate yoga as a workplace activity and profession.

AIMS & OBJECTIVES

Aims

- To study the effect of yoga-based Lifestyle Modification in Prediabetes.
- To study the effect of yoga-based Lifestyle Modification of stress on prediabetes, Diabetes
- To reduce and control the growing curve of Diabetes in India

Objective

- Trial to test the potency of yoga-based lifestyle intervention on prediabetes risk reduction in a large community setting.

METHODS

A national-level survey was part of a study conducted in rural and urban areas in all zones of India, screening 2,40,000 population in 60 districts selected randomly in all states. Participants (age 20-70 years) were individuals with prediabetes A1C (range, 5.7–6.4%) and Indian Diabetes Risk Score (IDRS) ≥ 60 . The intervention included practicing yoga-based lifestyle modification protocol (YBL) for nine consecutive days, followed by daily home and weekly supervised practices for three months. Standard care advice was for the control cluster for diabetes prevention.

Participants

The study's first phase included a survey across all the identified regions (Urban and rural). The participants with consent are recruit to the study. This phase included 1,62,330 participants to recruit for the NMB program with a three-page item questionnaire.

Design

In this nationwide sampling survey, Phase one was to estimate the Prevalence of Diabetes and Prediabetes. Phase two was to assess the efficacy of the structured intervention to prevent the progression of Prediabetes to Diabetes.

Assessment 1. Demography (Semi-structured schedule), 2. Anthropometrics 3. Biochemical Blood Test.

Intervention

yoga group: The intervention group received the specially prepared standardized yoga-based lifestyle change protocol and standard T2DM management education for three months. YVDM (yoga Volunteer Trained for T2DM Protocol) trained participants for a 9-day camp (2 h daily) activity. Followed by daily (individual or group) practice using DVDs and included 2-h weekly YVDM-supervised follow-up classes. Standard care advice was for the control cluster for diabetes prevention. Sample size calculated 5320 in Intervention and Control Group. Total 10,640 for two groups.

RESULTS

In the YBL Group, the conversion rate from Prediabetes to normoglycemia (52.80% in intervention vs. 37.80% in the control group, $P = 0.005$) over three months. The conversion to normoglycemia after YBL was significantly better in the younger age group (≤ 40 years) than those above 40yrs, with $OR=2.20$ (95% CI 1.57-3.08) and $OR=1.02$ (95% CI 0.82-1.26), respectively). In the study, conversion to normoglycemia was found to be equally effective in both genders.

Significant reduction in FBS 12.33%, PPBS 14.08%, Triglyceride >200 35% reduction, HDL <45 19.46% increase, stress 7.3% reduction. The association between perceived stress scores (PSS) was tested in a large-scale population of 16,368 individuals with Prediabetes and T2DM, aged 47.8 ± 12.5 years. Individuals were recruited from different geographical zones of India under the National Multicentric Diabetes Control Program. Results reported that individuals with Prediabetes had higher perceived stress and depression, may indicate the relevant role of stress underlying the progression towards Diabetes.

Interestingly, people with Prediabetes had significantly higher depression scores (patient health questionnaire-9 scores) 6.9 vs. 6.1 than people with T2DM. This draws to the relevance of stress management approaches, including mind-body interventions and yoga, may affect the progression of T2DM. Respondent's survey revealed that 11.8% practice yoga, the north zone has the highest [4,567/112,735], and the east zone has the lowest [971/112,735]. Out of 101,643 respondents, 94,135 believed that yoga improved their lifestyle (92.6%), and 90,102/98,518 (91.4%) believed that yoga prevented T2DM, revealing an immense knowledge-practice gap. General acceptability with knowledge-practice yoga gap has a scope of integration with modern medicine to change conventional healthcare.

A standard validated questionnaire perceived stress scale (PSS-10) was used in individuals with Prediabetes (n=649) and T2DM (n=485) and then segregated them into three categories (minimum, moderate, and severe stress levels). Blood glucose markers (Fasting Blood Glucose - FBS, Postprandial Blood Glucose- PPBS, and Glycolate Hemoglobin- HbA1c) were evaluated to report their association with the PSS-10.

The study revealed a significantly higher HbA1c level in people with Prediabetes, who had higher perceived stress than other categories. T2DM who had high FBS levels had severe perceived stress.

In the yoga intervention group in the nationwide multi-centered prospective randomized control study, questionnaires for barriers and benefits of yoga practice were asked. Most Participants perceived yoga as a tool to improve physical fitness, relax mind and body, and enhance stamina in all age groups. Barriers reported were urban /rural Lifestyle, Family commitments, Physical exertion. Other reasons across the country came as No Encouragement of family, Occupational commitments, and few places to do yoga.

Conclusion

The substantial influence of the yoga-based lifestyle intervention was observed against Prediabetes risk reduction on Indian Population. This change was significantly better in the younger age group of less than 40 years. Prediabetes had higher perceived stress and depression, this draws to the relevance of stress management approaches, including mind-body interventions and yoga, which may affect the progression of T2DM with integration with modern medicine to change conventional healthcare.

People believe in yoga in India, but People Practicing yoga is far less. The reason for barrier in urban and rural yoga Practice is urban /rural Lifestyle, Family commitments, Occupational Commitments, few Place to practice yoga. Tackling barriers and improving yoga based Lifestyle participation would be an effective strategy to combat the epidemic of diabetes from both preventative and treatment perspectives.

Keywords: Type 2 Diabetes mellitus T2DM, Prediabetes, yoga, Stress, Depression, yoga-based Lifestyle.