

# Community-Based Yoga and Lifestyle Intervention for Prevention and Management of Type 2 Diabetes Mellitus in an Urban-Periurban Indian Population: Study Protocol for a Prospective Single-Arm Cohort with Long-Term Follow-Up

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**Abstract:** *Background:* Type 2 diabetes mellitus (T2DM) is a leading non-communicable disease in India, with an estimated 101 million adults affected and a further 136 million at the prediabetes stage. Pharmacological management addresses hyperglycaemia but does not modify the lifestyle drivers of the disease. Yoga-based lifestyle interventions have shown efficacy on glycaemic and lipid endpoints in trial settings, but their feasibility and durability in real-world urban-periurban community settings, particularly with intensive residential camps followed by extended community follow-up, remain inadequately characterised.

*Aim:* To describe a prospective single-arm cohort protocol that combines a 10-day intensive yoga-based lifestyle camp with quarterly community follow-up for a total of 24 months, designed to evaluate feasibility, glycaemic outcomes, medication trajectories, and quality of life in adults with prediabetes or T2DM in the Mumbai-Kalyan region of Maharashtra, India.

*Methods:* This is a prospective, single-arm, pre-post observational cohort with long-term follow-up. Adults aged  $\geq 20$  years with either an Indian Diabetes Risk Score (IDRS)  $\geq 60$  or a confirmed diagnosis of T2DM (per WHO criteria,  $\geq 1$  year duration, on stable pharmacotherapy) will be invited to participate. The intervention comprises a 10-day intensive residential camp (two daily sessions of asana, pranayama, meditation, and supervised low-carbohydrate diet) followed by quarterly half-day reinforcement sessions for 24 months. Primary outcomes are fasting blood glucose (FBG), postprandial blood glucose (PPBG), and glycated haemoglobin (HbA1c). Secondary outcomes include lipid profile, anthropometry, blood pressure, oral hypoglycaemic medication score, IDRS, and quality of life (WHOQOL-BREF). The protocol is aligned with the SPIRIT 2013 recommendations for clinical trial protocols.

*Discussion:* This protocol contributes to the evidence base for community-based yoga interventions in two ways. First, by combining an intensive camp model with prolonged follow-up, it addresses the dose-response and durability gap in the existing literature. Second, by recruiting from a periurban setting and including prediabetic individuals, it tests the feasibility of yoga as a prevention strategy and not solely a management strategy. Methodological limitations of the single-arm design and the absence of a randomised control are explicitly acknowledged, and recommendations for follow-on randomised trials are outlined.

*Trial registration:* To be prospectively registered with the Clinical Trials Registry-India (CTRI) prior to participant enrolment; registration number will be inserted in the final manuscript.

**Keywords:** type 2 diabetes mellitus; prediabetes; yoga; pranayama; community-based intervention; study protocol; India; SPIRIT

