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Longitudinal assessment of cardio-respiratory fitness among Indian patients with type 2 diabetes mellitus

Abstract: Type 2 Diabetes Mellitus (T2DM) is associated with many complications, including cardiovascular and autonomic dysfunctions. Cardiorespiratory fitness as estimated by maximal oxygen uptake (VO2 max) is a very powerful predictor of cardiovascular health. Therefore, it is of interest to measure the cardiorespiratory parameters in T2DM patients for diagnosing autonomic dysfunction and to follow the changes over time. Baseline and follow-up cardiorespiratory fitness parameters among patients of Central India suffering from T2DM and its effectiveness to lifestyle modifications for these parameters are done. This hospital-based longitudinal study was conducted on 600 patients between the age group of 30 and 65 years diagnosed with T2DM. Patients were recruited from the Sports Physiology Laboratory, Department of Physiology, Mahatma Gandhi Institute of Medical Sciences, Sevagram, Maharashtra. Baseline measurements of VO2 max, HRV, and other cardiorespiratory variables were taken with a motorized treadmill using Lab Chart. Then, lifestyle counselling was undertaken for the participants and the same parameters were reassessed one year later.

Statistical package SPSS version 23 was used during data analysis. After one year of interventions, the improvements at the end of one year include those of VO2 max and HRV. The mean VO2 max improved from 25.4 ± 5.2 to 30.1 ± 4.8 ml/kg/min while the probability was less than 0.001. The main indices of HRV showed improved autonomic balance along with enhanced parasympathetic activity. Combining lifestyle interventions with regular monitoring of cardiorespiratory fitness and HRV can, indeed significantly improve cardiovascular health in T2DM patients. This study calls for the inclusion of fitness assessments in everyday clinical care for diabetes.

Keywords: Diabetes mellitus; autonomic dysfunction; cardiorespiratory; longitudinal study; sports physiology.