HIIT to Health: Exploring Low-Duration Interval Training for Type 2 Diabetes Management in Primary Care

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BACKGROUND

While the health benefits of exercise have been established for decades, most adults still do not meet the recommended physical activity guidelines set by the CDCP, CSEP, the ACSM, and the AHA (1). Practical solutions are required to address barriers to achieving regular exercise, as generic advice from health professionals often fails to motivate behavior change. Low-duration interval-based training has emerged as an effective alternative, with studies showing that it offers several advantages over moderate-intensity continuous training (MICT) (2). This form of exercise, which varies in intensity based on perceived exertion, allows for natural progression and adaptation. Additionally, self-directed exercise programs have shown promising results in managing type 2 diabetes (3). Considering this, a HIIT-based self-directed physical activity program is proposed for diabetic and prediabetic patients in Family Health Teams (FHT) to explore its potential for improving health outcomes.

OBJECTIVES

The primary objective of this study is to evaluate the feasibility of prescribing low-duration, interval-based training (HIIT) through primary care for diabetic patients at the East Elgin Family Health Team (EEFHT) in Aylmer, ON. The study aims to determine whether this approach leads to greater improvements in hemoglobin A1C (HbA1C) levels and weight compared to the general guideline of 150 minutes of physical activity (PA) weekly. Considering the barrier of lack of time, this study explores whether low-duration HIIT could be a more accessible option for chronic disease prevention and management. The insights gained from the pilot informed the development of the randomized controlled trial (RCT) to evaluate the practical application of "prescribing" HIIT versus general physical activity advice in a primary care setting, with a focus on its effectiveness in improving chronic disease markers.

METHODS

Study Design and Participants

A randomized controlled trial (RCT) was conducted at EEFHT. Adults (>18 years) with a diagnosis of type 2 diabetes (as per the 2018 Diabetes Canada Clinical Practice Guidelines (4)), non-pregnant, capable of consenting, deemed safe to exercise by their primary care provider (PCP), and without a history of myocardial infarction in the past three months were eligible for inclusion. Recruitment occurred during routine diabetes follow-up appointments.

Randomization and Interventions

Participants who provided informed consent were randomized 1:1 using computer-generated randomization software (www.randomization.com) into either the control group (standard PA advice) or the intervention group (HIIT). The control group received a CSEP handout with standard PA recommendations, while the HIIT group received a detailed handout with their HIIT PA protocol (*see figure 1*). Both interventions were self-directed, and participants tracked their PA using logbooks provided.

Data Collection

Data were collected at baseline (T1), 3 months (T2), and 6 months (T3). Key data included:

- **Weight:** Measured using a Health-O-Meter scale or patients' home scales.
- **Physical Activity (PA) Minutes:** Self-reported using study-specific log books.
- **HbA1C:** Measured at Life Labs or from recent measurements within 30 days.
- **Medications:** Blood glucose and blood pressure-related medications were recorded.

Data were entered into the patient's electronic medical record and transferred to a secure Excel database for analysis.

METHODS (cont.)

Study Procedures

PCPs identified eligible patients during diabetes follow-up visits, provided information on the study, and referred interested patients to the study co-investigator. Informed consent was obtained in person or via a secure email portal (OCEAN).

Participants received study materials through OCEAN, in person, or via Canada Post.

Statistical Analysis

The primary analysis compared within-group and between-group changes in HbA1C, weight, blood pressure, and PA minutes using paired and independent t-tests. This study aims to assess the feasibility of HIIT implementation in primary care and inform larger multi-centre RCTs.

Figure 1

CONCLUSIONS

In conclusion, ongoing efforts are focused on recruiting additional patients to evaluate the feasibility of low-duration interval training as a self-directed physical activity intervention for type 2 diabetes management in primary care. Further research is needed to validate these findings and assess the effectiveness of this approach in larger, multi-center trials.

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