UNIVERSITY OF MALAYA

October 19, 2019

Manuscript title: **Acute effects of High Intensity Interval Training (HIIT) and Steady State Moderate Intensity Training (SSMIT) on Intraocular Pressure among Sedentary Individuals**.

I am pleased to submit the manuscript entitled ***'Acute effects of High Intensity Interval Training (HIIT) and Steady State Moderate Intensity Training (SSMIT) on Intraocular Pressure among Sedentary Individuals.'***

Intraocular pressure (IOP) remains the main treatable risk factor for glaucoma, which causes blindness in 4.5 million people worldwide, accounting for slightly more than 12% of all global blindness. Thus, treatment of glaucoma has traditionally been aimed at reducing the IOP, medically or surgically. Exercise is one of the factors that has been proven to influence IOP.

Our study investigated the effects of both forms of aerobic exercise on IOP in sedentary individuals. We believe that our findings would contribute valuable information for the use of exercise in the management of intraocular pressure. In addition, our study also provides useful information for future research on the effect of exercise in glaucoma management.

Sincerely,

DR KIRAN KANDIAH
Email: drkirankandiah@gmail.com

Department of Sports Medicine, University Malaya Medical Centre
Level 5A, South Building, 59100 Kuala Lumpur, Malaysia.
Contact Number: +60379498122 / 79498165

RESEARCH PROTOCOL

Title of research: Acute effects of High Intensity Interval Training (HIIT) and Steady State Moderate Intensity Training (SSMIT) on Intraocular Pressure among Sedentary Individuals.

Overall the study can be divided into 3 phases :

Phase 1 : Recruitment Phase

Phase 2 : Baseline Assesment Phase

Phase 3 : Exercise Protocol Phase

Phase 1 : Recruitment Phase

1. Application to join the study will be open to all staff of University Malaya Medical Center.
2. 40 participants will be chosen based on the inclusion and exclusion criteria through a randomized method.
3. Consent, Patient Information Sheet and Global Physical Activity Questionnaire will be given and taken.

Inclusion criteria:
1. Healthy volunteers or patients able to undergo different intensity of exercise based on their VO2max
2. Able to sign informed consent
3. Patients having medical problems to be well-controlled

Exclusion criteria
1.Previous ocular trauma
2.Previous surgery in the eligible eye
3.Known case of glaucoma/glaucoma suspect (IOP > 21mmHg)
4.History of glaucoma laser procedure/surgery within prior 6 months in eligible eye
5.Unable to undergo IOP measurements

6.Unable to give informed consent
7.Undiagnosed visual conditions
8.Uncontrolled medical condition such as:
-end stage renal failure
-uncontrolled diabetes
-uncontrolled hypertension

Phase 2: Baseline Assessment Phase

Participants will do the assessment in the Sports Medicine Performance Lab

Baseline assessment parameters:

- Blood pressure
- Resting HR
- HRmax
- Body Impedance Analysis (BIA)
- Waist Circumference, Hip Circumference, Height
- VO2max: 6 minute Astrand Rhyming cycle ergometer test
- Baseline IOP

*For intraocular pressure assessment, all subjects will be measured at 10am (±1hour) to avoid diurnal variation.

*Subjects are required to avoid any liquid/caffeinated drinks 1 hour prior to IOP measurement.

Phase 3 : Exercise Protocol Phase

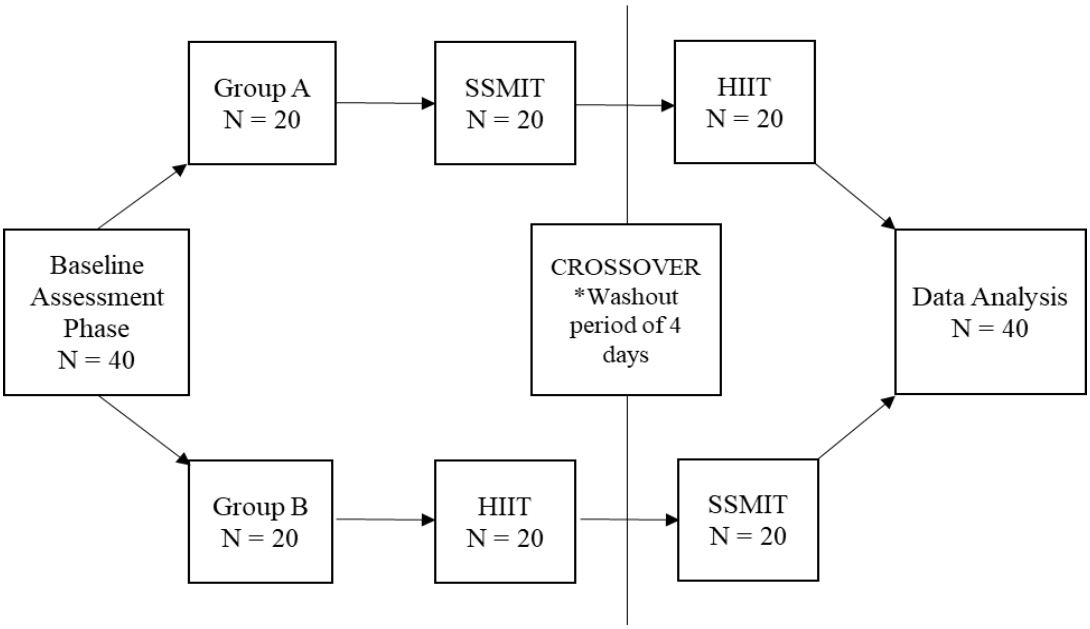
1. The exercise sessions will be conducted in controlled room temperature (20-23C) between 8.00am to 11.00am using a Monarch 939E Bicycle Ergometer.
2. Participants are not allowed to drink water 2 hours prior until 30 minutes after the exercise session.
3. Each participant will perform both sessions (SSMIT & HIIT) based on the group they were assigned to with a 4 day wash out period between protocols.
4. Each protocol will have the participant cycle for 30 minutes at a speed of 60 rpm.
5. The SSMIT protocol: participants cycle at a moderate intensity of 50% of their VO2R.

6. The HIIT protocol: consists of 10, 3-minute cycles (1 minute high intensity of 75% VO2R and 2 minutes low intensity 35% VO2R).
7. Participants HR will be monitored during the protocols using a HR monitor (Polar Heart Rate Monitor T31-Coded).
8. Before each session, the participants IOP of the right eye will be measured using an iCare rebound tonometer TA01i and repeated IOP measurements will be taken immediately after (0min), 5, 10, 15, 20 & 30 minutes after the exercise session.
9. Each IOP measurement will be taken on the participants right eye with them seated and contralateral eye focused on a distant object.
10. The examiner is blinded to which protocol the participant performed.

Schedule for phase 3:

Week 1: Group A (HIIT) & Group B (SSMIT) : 10 participants/day

Week 2: Group A (CME) & Group B (SSMIT) : 10 participants/day



Statistical Analysis

Data analysis will be conducted using Statistical Package for Social Studies (SPSS) software version 23.

Values for continuous variables are presented as means and standard deviation.

Prior to data analysis normality of continuous variable will be tested using skewness and kurtosis.

A two-way repeated measure ANOVA will be conducted to evaluate the effect of exercise on IOP and interaction between groups and time followed by using Bonferroni post-hoc test for pairwise comparison.

A paired sample T test will be conducted to assess the difference of IOP levels between interventions. A value of $p<0.05$ is considered as significant.