ISRCTN21855728 https://doi.org/10.1186/ISRCTN21855728

The effect of a one hour bout of games-based activity on adolescent cardiovascular health

Submission date
04/09/2017

Recruitment status
No longer recruiting

Registration date
08/09/2017

Overall study status
Completed

Last Edited
22/11/2019

Condition category
Circulatory System

[_] Prospectively registered
[_] Protocol
[_] Statistical analysis plan
[X] Results
[_] Individual participant data

Plain English summary of protocol

Background and study aims
Children in the United Kingdom are becoming increasingly inactive, with less than 50 % meeting the recommended guidelines for physical activity (60 min a day). With this behaviour children are presenting with risk factors linked to cardiovascular disease and type 2 diabetes, which may lead to the early-onset of such conditions. To prevent the development of risk factors in children it is important successful interventions be determined. Inflammation is one of the main risk factors associated with cardiovascular disease. A one hour bout of exercise has been suggested to cause an anti-inflammatory response that may reduce inflammation; however, this response is yet to be investigated in children. In addition, it is important when assessing the effect of exercise for health, that the type of exercise be attractive to the audience so that the decline in physical activity levels in young people is reversed. Previously, endurance based exercise has been investigated however this is not deemed attractive to children. Therefore, games-based activity is a key interest of our research
group as this is replicative of the type of activity they naturally undertake and is deemed to be fun and attractive. Thus, the aim of the present study was to investigate the effect of one hour games-based exercise (basketball) on inflammation in children and examine the impact of exercise on blood sugar levels.

Who can participate?
Children aged 10 to 12

What does the study involve?
All children complete two trials, one included the one hour of basketball and the other was a rested control trial. Participants arrive to school rested and fasted and had a baseline fingertip blood sample taken. Participants then either rest or complete one hour of games-based activity. Further fingertip blood samples are taken immediately post-exercise and 1, 2 and 3 hours post-exercise. A final fingertip blood sample is taken the next morning. Blood samples are taken at the same time points during the rested trial for direct comparisons. These are analyzed for inflammatory markers. As an additional outcome of the study, all children consume a packed lunch (chicken sandwich, baked crisps and an apple) and blood sugar and insulin responses to this meal are observed in each trial to determine the effect of exercise.

What are the possible benefits and risks of participating?
Participants may benefit from exercise. There are no direct risks however participant's may experience discomfort when providing blood samples.

Where is the study run from?
The Chellaston School (UK)

When is the study starting and how long is it expected to run for?
January 2015 to August 2017

Who is funding the study?
Nottingham Trent University (UK)

Who is the main contact?
Miss Karah Dring
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Contact information

Type(s)
Public

Contact name
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Additional identifiers

Protocol serial number
417

Study information

Scientific Title
Inflammatory, glycaemic and insulinaemic response to an acute bout of high intensity, intermittent games-based activity in adolescents

Study objectives
The aim of this study is to test the hypothesis that an acute bout of high intensity intermittent games-based activity stimulates an anti-inflammatory response for up to 24 h post-exercise, and that the glycaemic and insulinaemic response to a standardised meal is attenuated post-exercise.

Ethics approval required

Old ethics approval format

Ethics approval(s)
The Nottingham Trent University Human Ethical Review Committee, 12/04/2015, ref: 417

Primary study design
Interventional

Study design
A randomised, order balanced, crossover design, which was not blinded due to the completion of exercise in one of the trials.

Study type(s)
Prevention

Health condition(s) or problem(s) studied
Cardio-metabolic health

Interventions
The intervention assesses the effect of an acute bout of 60-min of games-based activity (basketball) on the inflammatory, glycaemic and insulinaemic responses in adolescents when compared against a randomised control trial.

Participants are randomised using a order balanced (block sequence ABBA allocation), cross over design. Participants arrived to school at 8.30 am after resting for 24 hour prior and fasted from 9 pm the previous evening with only water allowed ad libitum. Heart rate monitors are fitted to the children upon arrival. A baseline capillary blood sample is taken and then a standardised breakfast is consumed (1.5 g carbohydrate per kilogram body mass in the form of cornflakes, toast and butter).

During the exercise trial a 60-min basketball session is delivered by an experienced coach 45-min post breakfast. Heart rate is monitored throughout the session. Capillary blood samples are subsequently taken immediately, 1 hour, 2 hour and 3 hours post-exercise. In addition, to assess glycaemic and insulinaemic responses post-exercise a standardised lunch (1.5 g carbohydrate per kilogram body mass in the form of chicken sandwiches, baked crisps and an apple) was consumed 1 h post-exercise. Further capillary blood samples are taken at 30 minute, 60 minute (2 h post-exercise) and 120 minute (3 h post-exercise) following lunch. Participants are instructed to rest for the remainder of the day as a final capillary blood sample was to be taken the following morning to assess inflammation and insulin sensitivity. The children arrive to school the next morning fasted from 9 pm the previous evening, had a capillary blood sample taken and were then fed a breakfast buffet before returning to lessons.

During the rested control trial participants complete the same experimental protocol as outlined above but without the 60-minute of games-based activity. The children are taught sports science related topics throughout the day to ensure they are remained seated during this trial, as this is replicative of a standard school day within the UK. Heart rate is monitored to ensure the children were consistently rested throughout the day.

Intervention Type
Behavioural

Primary outcome(s)
Inflammatory cytokines are measured acutely using a flow cytometer (Beckman Coulter Gallios™) specific multiplex bead assay (AimPlex™ multiplex assay, YSL Bioprocess Development Company, Pomona, USA) at baseline, immediately, 1 h, 2h and 3 h post-exercise. A final measurement was taken the following morning 24 h post-exercise to assess inflammatory mediators.

Key secondary outcome(s)
1. Blood glucose concentration is measured using a commercially available assay (GOD/PAP method, GL364, Randox, Ireland) at baseline, immediately and 1 h post-exercise (30 min following this participants consumed of a standardised lunch), then 30 min, 60 min and 120 min post lunch. A final blood sample was taken the following morning 24 h post-exercise to assess blood glucose.
2. Plasma insulin is measured using a commercially available ELISA (Mercodia Ltd, Sweden) at baseline, immediately and 1 h post-exercise (30 min following this participants consumed of a standardised lunch), then 30 min, 60 min and 120 min post lunch. A final blood sample was taken the following morning 24 h post-exercise to assess plasma insulin.

Completion date
17/08/2017

Eligibility

Key inclusion criteria
1. Male and female participants
2. Aged 10-12 years
3. Healthy and free of non-communicable diseases.

Participant type(s)
Healthy volunteer

Healthy volunteers allowed
No

Age group
Child

Lower age limit
10 Years

Upper age limit
12 Years

Sex
All

Total final enrolment
39

Key exclusion criteria

Non-communicable diseases that may alter rested inflammatory cytokines.

Date of first enrolment
01/09/2015

Date of final enrolment
30/11/2016

Locations

Countries of recruitment
United Kingdom

England

Study participating centre
The Chellaston School
Derby
United Kingdom
DE73 5UB

Sponsor information

Organisation
Nottingham Trent University

ROR
https://ror.org/04xyxjd90

Funder(s)

Funder type
University/education

Funder Name
Nottingham Trent University

Results and Publications

Individual participant data (IPD) sharing plan

The datasets generated during and/or analysed during the current study are/will be available upon request from Miss Karah Dring, Karah.dring@ntu.ac.uk

IPD sharing plan summary

Available on request

Study outputs

Output type	Details	Date created	Date added	Peer reviewed?	Patient-facing?
Results article	results	01/04/2019	22/11/2019	Yes	No