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Young Fitness Leaders - peer-led exercise intervention for adolescents

Submission date
28/02/2023

Recruitment status
No longer recruiting

Registration date
06/03/2023

Overall study status
Completed

Last Edited
09/03/2026

Condition category
Other

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

Plain English summary of protocol

Background and study aims

The role of physical activity in maintaining good health is well established. The importance of its role in mental health is also emerging, both from a preventive and a treatment point of view; a recent position statement from the Faculty of Sport and Exercise Medicine UK and the Royal College of Psychiatrists acknowledges the role that physical activity can have in reducing depression and anxiety in children. Mental health problems in children and young people are increasing; one in ten children and young people have a clinically significant mental health illness, but only 25% of children who need help get it, and NHS expenditure on children and young people's mental health illness is around £700 million. Health-related quality of life (HRQoL) can be measured in under-s using a self-completed questionnaire, Kidscreen, which asks about parental support, peers, and school, with special regard to childhood concepts of health and wellbeing.

Higher levels of aerobic fitness are associated with reduced risk of future metabolic and cardiovascular disease, obesity and mortality, better mental health, and potentially higher levels of academic achievement. There is also accumulating evidence linking higher levels of muscular fitness with various physical and psychological health benefits in young people, some of which are independent of aerobic fitness. Despite the well-documented benefits of higher physical fitness in youth, evidence suggests that aerobic fitness in young people has declined over time. This public health problem is of particular concern in England, with data from some regions indicating that aerobic fitness performance specifically is declining by around 8% per decade - twice the rate observed in other developed nations. The issue is further complicated by a lack of contemporary datasets from different English regions, however. Indeed, there are only a few datasets available for healthy English children, and there are no published data on adolescents from the northeast of England, who have the highest obesity levels in the country and often reside in areas with high levels of deprivation. A lack of data in this region is particularly surprising considering recommendations from the UK's chief medical officer almost a decade ago for comprehensive fitness testing to be introduced in schools. There is also evidence that fitness decreases the most in those who are already low-fit, so creative ideas are needed.

High-intensity exercise in short bouts (also known as high-intensity interval training, or HIIT - characterized by brief, intermittent bursts of vigorous activity, interspersed by periods of rest /low-intensity exercise) in school has been recognised as effectively increasing physical fitness, health, and well-being in adolescents, but programmes are required that enable interventions to

be sustainable once the research team are no longer in the school. It has been suggested that HIIT could improve population-level adolescent health if it is: i) integrated into existing opportunities, (ii) designed to develop physical literacy, (iii) delivered in an engaging manner, and (iv) guided and supported by an implementation framework that addresses relevant barriers and facilitators. Additionally, peer-led programmes are also showing benefits to promote positive health behaviours such as increased physical activity among children and adolescents (e. g.,). The 'Young Fitness Leaders' study has been designed with these principles in mind.
This project aims to carry out a feasibility study into the use of HIIT to improve physical fitness and mental well-being in adolescents. The study will be peer-led, with older pupils (Year 12-13, 'Young Leaders') leading the younger pupils in the exercise. Students would be encouraged to actively participate in decision-making throughout the study to give them a sense of ownership over the programme. Young Leaders would pass on their knowledge to the next year's group before leaving school to ensure the sustainability of the intervention. A successful feasibility study would lead to an application for larger intervention development.

Who can participate?
School pupils aged 16-18 years (in English school year 12 or 13), and pupils in English school year 7 (aged 11-12 years)

What does the study involve?
Older pupils will be trained as 'Young Fitness Leaders' (or 'Young Leaders') who will lead short high-intensity interval exercise sessions for younger pupils 2-3 times a week for 8 weeks. Two Year 7 classes will participate, one in the Intervention group receiving the exercise sessions, and one to act as the Control group and not receive the exercise sessions. The Year 7 will complete physical fitness testing and accelerometry before and after the intervention period, as well as questionnaires on their sports participation and health-related quality of life. The Young Leaders will complete questionnaires on their sports participation, health-related quality of life and coaching self-efficacy.

What are the possible benefits and risks of participating?
The benefits of participating include improved leadership skills, confidence, and time management for the Young Leaders. Improved fitness and feeling of community for the younger pupils. The potential risks from participating in short bursts of strenuous exercise e.g. muscle soreness.

Where is the study run from?
The study is ran from Newcastle University (UK), with collaborators at Edinburgh Napier University (UK), University of South Australia: UniSA (Australia) and Murdoch University (Australia)

When is the study starting and how long is it expected to run for?
June 2022 to December 2023

Who is funding the study?
North of England Commissioning Support Unit (UK)

Who is the main contact?
Dr Laura Basterfield, laura.basterfield@ncl.ac.uk (UK)

Contact information

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Additional identifiers

Protocol serial number
Version November 2022

Study information

Scientific Title
Feasibility study into 16-18 year-olds leading younger adolescents in high intensity interval exercise.

Study objectives
Young people aged 16-18 years will be able to reliably lead high intensity interval exercise sessions for other pupils.

Ethics approval required
Old ethics approval format

Ethics approval(s)
Approved 27/2/2023 Newcastle University Faculty of Medical Sciences Research Ethics Committee (Cookson Building, Framlington Place, Newcastle upon Tyne, NE2 4HH, UK; +44 (0) 191 2086000; fmsethics@ncl.ac.uk), ref: 2451/27290

Study design
Feasibility intervention cluster randomized at school class level

Primary study design
Interventional

Study type(s)
Prevention

Health condition(s) or problem(s) studied
Improving physical fitness and mental wellbeing in adolescents

Interventions
Objectives
Initial focus groups and interviews were conducted with pupils and teachers at a secondary school in one of the 10% most deprived areas of the country (July 2022, Ethics approval for the focus groups: 2331/22078). Topics included acceptability of the proposed project (that older pupils would lead and mentor younger pupils in the exercises), acceptability of potential exercises (such as boxing, dancing, and running which have been included in previous HIIT studies conducted by members of the research team, the feasibility of carrying out this type of intervention within a school and with the proposed year groups, teachers' views on feasibility /sustainability. We also explored any potential barriers to carrying out the intervention, as well as practical implications such as how participation would be ensured, and that there were no interruptions to the programme. After analysing the focus group data, relevant themes were extracted that informed the design of the intervention and discussed with the pupils. The next stage is to conduct the feasibility study (this trial).

The HIIT intervention will take place over 8-12 weeks, depending on space availability. Pragmatic randomisation was used by the school based on class availability. The intervention Year 7 class will be split into smaller groups of 4-6 pupils and assigned a Young Leader. Timetables will be created in conjunction with the key school staff member and distributed to pupils and Young Leaders. The HIIT sessions will take place 2-3 times a week, for 10-15 mins a session (break lasts for 15 minutes). One session a week will take place at the beginning of a PE lesson and delivered by the PE teachers, the other sessions will be delivered by the Young Leaders. The PI and/or MSc student will be present at each of the sessions to record participation, to use the Children's OMNI-walk/run scale of perceived exertion with the pupils, and to assign heart rate monitors and collect after the session.

Example of how the HIIT session will look:
Warm-up: 2 min pulse-raising exercise
Exercises: 4 x 45-second bouts of maximal effort exercise e.g. sprints between cones 10m apart /side-to-side jumps/star jumps/energetic dance moves, interspersed with 90-second recovery. The time of each bout will increase by 5 seconds every two weeks up to and including week 8, and the recovery decrease by 5 seconds so the overall time stays the same. From week 9, an extra bout will be added to one of the sessions every two weeks.
Cool down: 1 min slow jogging/walking on the spot

During the exercise, participants will be verbally encouraged to provide "maximal efforts" and reach ≥90% of their maximal heart rate on each 45-second repetition. To encourage intensity compliance, we will check participants' heart rates during each HIIT session using the wrist-worn Polar heart rate monitors. Afterwards, we will derive the peak heart rate of each 45-second exercise repetition from each individual file using the Polar Flow software, which will be expressed and recorded as a percentage of the participant's maximal heart rate. Participants' maximal heart rates will be determined as the highest 5-second value recorded during the HIT sessions, or baseline 20 m shuttle run test (20mSRT). Participants will also be asked for their rating of perceived exertion using the Children's OMNI scale of perceived exertion which will help to quantify the intensity of the intervention.

Primary outcomes will be recruitment, retention, and acceptability of intervention and outcome measures. This includes the acceptability of different potential exercises, and different methods of checking that the exercises were working as intended (e.g. by using movement sensors, heart rate monitors etc). Additionally, we will test the acceptability of different physical fitness assessments and quality of life questionnaires. We would also assess the acceptability of health behaviour questionnaires (e.g. sport participation, diet) to both older and younger pupils.

The study would be followed by further focus groups for process evaluation purposes, to gain input from the pupils and teachers about what worked and what could be improved for future iterations of the intervention. The first part is to create the training materials and train the Young Leaders to safely and reliably lead high-intensity interval exercise (HIIT) sessions with younger pupils.

Intervention Type
Behavioural

Primary outcome(s)
Feasibility primary outcomes:
1. Recruitment (how many Y7 pupils opt-out/how many are available to participate, how many Y12/13 pupils consent to participate) measured using opt-out forms returned compared with forms given out at baseline
2. Retention (how many pupils are still involved at the end of the intervention, how many attend each session) measured using registers at baseline and week 8
3. Acceptability (do Y7 pupils and Young Leaders enjoy the sessions, did teachers find the timing /format acceptable, did they notice any changes in the pupils) measured using focus group discussions at week 9

Key secondary outcome(s))
1. Change in physical fitness measured using the 20 m shuttle run test, handgrip strength, standing long jump, and sit-and-reach test at baseline and week 9
2. Change in physical activity measured using data collected by the Actigraph accelerometer at

baseline and week 9
3. Change in body composition measured using a BMIz-score from height and weight at baseline and week 9

4. Changes in the Y7 questionnaire assessed at baseline and week 9:
4.1. Health-related quality of life measured using KIDSCREEN-27
4.2. Participation in sports clubs measured using the Youth Sports Survey
4.3. Self-efficacy measures using the self-efficacy for physical activity scale
4.4. Enjoyment measured using the physical activity enjoyment scale

5. Changes in Young Leaders measured using a questionnaire on health-related quality of life, sports participation, and an adapted version of the Coaching Efficacy Scale at baseline and week 9
6. Exercise intensity measured in approximately half the Y7 pupils using a wrist-worn heart rate monitor to check that the intensity of the exercise is high enough during the HIIT sessions
7. Perceived exertion measured using the children's OMNI scale during the HIIT sessions, again to check intensity

Completion date
31/12/2023

Eligibility

Key inclusion criteria
1. Young leaders: in English school year 12 or 13 (aged 16-18 years)
2. Other pupils: English Year 7 (age 11-12 years)

Participant type(s)
Healthy volunteer

Healthy volunteers allowed
No

Age group
Mixed

Lower age limit
11 years

Upper age limit
18 years

Sex
All

Total final enrolment
49

Key exclusion criteria

Conditions or injuries that stop the child taking part in high-intensity exercise:
1. Diabetes mellitus
2. Heart or vascular complaints
3. Early family history of sudden death
4. Pregnancy or likelihood of pregnancy

Date of first enrolment
27/03/2023

Date of final enrolment
01/05/2023

Locations

Countries of recruitment
United Kingdom

England

Study participating centre
Newcastle University, Population Health Sciences Institute
M1.151 William Leech Building
Medical School
Framlington Place
Newcastle upon Tyne
England
NE2 4HH

Sponsor information

Organisation
Newcastle University

ROR
https://ror.org/01kj2bm70

Funder(s)

Funder type
Government

Funder Name
North of England Commissioning Support Unit

Results and Publications

Individual participant data (IPD) sharing plan
The datasets generated during and/or analysed during the current study will be stored in a publicly available repository (https://data.ncl.ac.uk/).

Quantitative and qualitative data will be stored and will be available once study findings have been published. Assent will be obtained from younger participants (<16 years), and informed consent from older (16+ years) participants. Younger participants will have 'opt-out' consent, where parents/carers will state if they do not wish their child to participate. Participants will be given unique IDs for anonymisation. Ethics approval has been granted. No legal restrictions.

IPD sharing plan summary
Stored in publicly available repository

Study outputs

Output type	Details	Date created	Date added	Peer reviewed?	Patient-facing?
Results article		24/02/2026	09/03/2026	Yes	No
Other files			24/02/2026	No	No