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Exercise for stress relief in adolescents with attention deficit hyperactivity disorder

Submission date
14/07/2025

Recruitment status
No longer recruiting

Registration date
18/07/2025

Overall study status
Completed

Last Edited
23/10/2025

Condition category
Mental and Behavioural Disorders

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

Plain English summary of protocol

Background and study aims
Many young people withattention deficit/hyperactivity disorder (ADHD) struggle with stress, anxiety and other mental health problems.Medicines can help but often cause side effects, so families and doctors are looking for safe, non-drug alternatives.This study wants to find out whether a short, fun and mentally stimulating exercise programme can lower feelings of stress and improve stress-related biomarker (cortisol) in adolescents who have ADHD.

Who can participate?
Young people aged 12–17years who are clinically diagnosed with ADHD (with or without autism comorbidity) and have an IQ of 70 or above

What does the study involve?
• Volunteers are randomly placed into either an exercise group or a control group (no new exercise).
• Exercise programme:
Runs for 3weeks
2 sessions a week, each lasting 90minutes
Activities include circuit training (planks, squats, reaction light drills) and game-based exercises such as “Bingo Fitness” and “Tic Tac Toe Fitness”.
Sessions are kept at a moderate to vigorous level (monitored with heart rate straps) and led by a qualified instructor experienced in working with ADHD.
• Measurements:
Saliva samples taken (to measure cortisol) at the start, straight after the programme and again three months later.
Short questionnaires on stress, anxiety and depression filled in at the same three timepoints.

What are the possible benefits and risks of participating?
Benefits
Taking part in a structured, enjoyable exercise programme may reduce stress and improve overall well-being.
Helping researchers design better, drug-free treatments for other adolescents with ADHD.

Risks/inconveniences
Temporary muscle soreness, tiredness linked to physical activity.
Mild discomfort from providing saliva samples.
Travel time to the university gym.
All sessions are supervised and safety checks (warm up, cool down, heart rate monitoring) are in place to keep risks low.

Where is the study run from?
Chinese University of HongKong (CUHK) gymnasium, HongKong SAR, China.

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

Who is funding the study?
This study was funded by the General Research Fund (GRF) from the Research Grants Council of Hong Kong and the United College Endowment Fund Research Grant.

Who is the main contact?
Sima Dastamooz, simadastmaooz@link.cuhk.edu.hk

Contact information

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Public, Scientific

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Additional identifiers

Protocol serial number
Research Grants Council of Hong Kong (#14619720)

Study information

Scientific Title
Efficacy of short-term physical exercise intervention on stress biomarkers and mental health in adolescents with ADHD: a randomized controlled trial

Study objectives
1. To assess the effectiveness of a PE intervention on self-reported stress, depression, and anxiety in adolescents with ADHD.
2. To measure salivary cortisol levels as stress biomarkers in adolescents with ADHD.

Ethics approval required
Ethics approval required

Ethics approval(s)
Approved 11/08/2022, Joint Chinese University of Hong Kong - New Territories East Cluster Clinical Research Ethics Committee (8/F, Lui Che Woo Clinical Sciences Building, Prince of Wales Hospital, Shatin, 999077, Hong Kong; +(852)35053935; crec@cuhk.edu.hk), ref: 2022.317

Primary study design
Interventional

Study design
Randomized controlled trial

Study type(s)
Efficacy

Health condition(s) or problem(s) studied
Mental health in adolescents with ADHD

Interventions
Physical Exercise (PE) group – cognitively engaging physical exercise programme
Enrolment and randomisation: After parents and participants consent and baseline measures (T_0), participants were randomised 1:1 to Physical Exercise or Control groups.

Content:
• Six 90 min sessions (total=540min) over 3weeks (2×week) delivered in a university gym.
• Circuit block (≈35min): planks, curl-ups, squats, balance ball tasks, speed ladder and BlazePod reaction light drills.

• Game-based block (≈35min): “Bingo Fitness” and “Tic Tac Toe Fitness,” requiring strategy, sequencing and teamwork.
• 10 min structured warm-up and 10 min cool down each session.
• Dose/intensity: ≥50% of each session at moderate to vigorous intensity (60 80% HRmax) verified by PolarM430 monitors.
• Providers & setting: Certified fitness instructor (ratio 1:10) assisted by research staff; venuewasthe Chinese University of HongKong gymnasium.
• Follow up: Outcome assessments immediately post intervention (T_1) and 3months later (T_2).
• Adherence strategies: Attendance certificate and HK$150 sports equipment coupon.

Control group:
• Continued usual routines; asked not to engage in any new organised PE programme for threeweeks.
• Same outcome assessments at baseline(T_0),immediately after PE intervention (T_1), three months later(T_2).

Intervention Type
Behavioural

Primary outcome(s)
Salivary cortisol concentration measured with a high sensitivity Salimetrics® ELISA (μg/dL) at baseline (T_0), immediately post-intervention (T_1) and 3months post-intervention (T_2)

Key secondary outcome(s)
The secondary outcome measures are assessed at T_0,T_1,and T_2:
1. Self-reported stress score measured with the Chinese version of the Depression Anxiety Stress Scale 21 (DASS 21)
2. Self-reported anxiety score measured with the Chinese version of the Depression Anxiety Stress Scale 21 (DASS 21)
3. Self-reported depression score measured with the Chinese version of the Depression Anxiety Stress Scale 21 (DASS 21)

Completion date
30/09/2023

Eligibility

Key inclusion criteria
1. Clinically diagnosed with attention deficit hyperactivity disorder
2. With or without autism comorbidity
3. An IQ of 70 or above

Participant type(s)
Patient

Healthy volunteers allowed
No

Age group
Child

Lower age limit
12 Years

Upper age limit
17 Years

Sex
All

Total final enrolment
82

Key exclusion criteria
Neurological and intellectual impairments

Date of first enrolment
11/09/2022

Date of final enrolment
15/05/2023

Locations

Countries of recruitment
Hong Kong

Study participating centre
secondary mainstream schools in Hong Kong
Hong Kong
Hong Kong
Hong Kong
999077

Sponsor information

Organisation
University Grants Committee

ROR
https://ror.org/00djwmt25

Funder(s)

Funder type
Research council

Funder Name
University Grants Committee

Alternative Name(s)
, The University Grants Committee, , UGC

Funding Body Type
Government organisation

Funding Body Subtype
National government

Location
Hong Kong

Results and Publications

Individual participant data (IPD) sharing plan
The datasets generated during and/or analysed during the current study will be available upon request from the Principal Investigator, Prof. Cindy Sit (sithp@cuhk.edu.hk), with a valid reason.

Will individual participant data be available (including data dictionaries)?
Yes

What data in particular will be shared?
All de identified participant-level data collected during the trial (age, sex, BMI, raw salivary cortisol values, DASS 21 item scores) plus the accompanying data dictionary.

What other documents will be available?
Study protocol, statistical analysis plan, informed consent form

When will the data be available (start and end dates)?
Beginning 9months after publication of the primary results paper and ending 5years thereafter.

With whom?
Researchers who submit a methodologically sound proposal that is approved by the Principal Investigator (ProfCindySit).

For what types of analyses?
Any scientifically valid purpose that is compatible with the original ethics approval.

By what mechanism will the data be made available?
Interested investigators should email ProfSit (sithp@cuhk.edu.hk). Once a proposal is approved, requestors must sign a data use agreement. No data will be placed in an open public repository.

IPD sharing plan summary

Available on request

Study outputs

Output type	Details	Date created	Date added	Peer reviewed?	Patient-facing?
Results article		11/09/2025	23/10/2025	Yes	No