

Exercise for stress relief in adolescents with attention deficit hyperactivity disorder

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Registration date 18/07/2025	Overall study status Completed	<input type="checkbox"/> Protocol
Last Edited 23/10/2025	Condition category Mental and Behavioural Disorders	<input type="checkbox"/> Statistical analysis plan
		<input checked="" type="checkbox"/> Results
		<input type="checkbox"/> Individual participant data

Plain English summary of protocol

Background and study aims

Many young people with attention 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 12–17 years 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 3 weeks

2 sessions a week, each lasting 90 minutes

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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Principal investigator

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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

Study design

Randomized controlled trial

Primary study design

Interventional

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 (To), 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; venue was the Chinese University of Hong Kong gymnasium.
- Follow up: Outcome assessments immediately post intervention (T₁) and 3 months later (T₂).
- 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 three weeks.
- Same outcome assessments at baseline (T₀), immediately after PE intervention (T₁), three months later (T₂).

Intervention Type

Behavioural

Primary outcome(s)

Salivary cortisol concentration measured with a high sensitivity Salimetrics® ELISA (µg/dL) at baseline (T₀), immediately post-intervention (T₁) and 3 months post-intervention (T₂)

Key secondary outcome(s)

The secondary outcome measures are assessed at T₀, T₁, and T₂:

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

Private sector organisation

Funding Body Subtype

Universities (academic only)

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