

# Using activity tracking and just-in-time messaging to improve adaptive pacing in people with long COVID: a pragmatic randomised control trial

<b>Submission date</b> 16/07/2021	<b>Recruitment status</b> No longer recruiting	<input checked="" type="checkbox"/> Prospectively registered <input checked="" type="checkbox"/> Protocol
<b>Registration date</b> 08/11/2021	<b>Overall study status</b> Completed	<input checked="" type="checkbox"/> Statistical analysis plan <input checked="" type="checkbox"/> Results
<b>Last Edited</b> 09/02/2026	<b>Condition category</b> Infections and Infestations	<input checked="" type="checkbox"/> Individual participant data

## Plain English summary of protocol

### Background and study aims

Long-COVID symptoms often get much worse after activity. Adaptive pacing (AP) is a way for people coping with long-COVID to manage their day-to-day activity so that they don't make their symptoms worse. AP means patients must balance what they plan to do with how much energy they feel they have. This is not always easy because the amount of activity that will cause symptoms to worsen is different for everyone. Also, individuals must keep track of their activity (perhaps for several days) which can also be challenging, particularly if poor memory is a symptom.

With help from people with long-COVID, we have developed an approach to make AP easier. We will track activity remotely and send alerts if they risk doing too much. This way, people managing with long-COVID might avoid over-exertion and prevent periods where symptoms worsen.

### Who can participate?

Adults reporting persistent symptoms which have lasted for at least 8-weeks after initial infection with COVID-19 and which interfere with day-to-day activity and who have access to a smartphone.

### What does the study involve?

We will ask a group with long-COVID to wear a Fitbit activity monitor and download a mobile phone app designed by us. We will use the information from the Fitbit to keep track of each participants activity level. We will then send alert messages if it looks like they might do too much. This way, each person will have their own AP plan. The activity and messaging support will last for 6-months. After this, we will see if our approach was effective by comparing how often symptoms worsened compared to a control group who only received standard AP advice. If this

approach works, we will see if the tracking and messages can be improved and offer an updated version to the control group so they can also benefit. We will also look for ways to scale up the process to help more people.

What are the possible benefits and risks of participating?

The researchers cannot guarantee any benefits from participating in this study. However, it is possible that participants will better manage their symptoms and avoid periods where their symptoms get worse. Participants will better understand how activities affect their heart rate. There are no anticipated risks. Messages to participants will suggest they take breaks and will not request participants do anything they would not normally do.

Where is the study run from?

University of the West of Scotland (UK)

When is the study starting and how long is it expected to run for?

July 2021 to February 2024

Who is funding the study?

National Institute for Health Research (NIHR) (UK).

Who is the main contact?

Prof. Nicholas Sculthorpe, [nicholas.sculthorpe@uws.ac.uk](mailto:nicholas.sculthorpe@uws.ac.uk)

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## Contact information

**Type(s)**

Public

**Contact name**

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**Additional identifiers**

**Protocol serial number**

COV-LT2-0010

**Study information**

**Scientific Title**

A randomised controlled trial of activity tracking and JITAI managed adaptive pacing for symptoms of post-exertional malaise in people with long-COVID

**Acronym**

ATJ-PEM

**Study objectives**

An activity tracking and personalised just-in-time adaptive intervention (JITAI) will reduce symptoms of post-exertional malaise (PEM) in people with long-COVID compared to usual care six months after randomisation.

**Ethics approval required**

Old ethics approval format

**Ethics approval(s)**

Approved 12/08/2021, University of the West of Scotland Health and Life Sciences Ethics Committee (Stephenson Place Hamilton International Technology Park Blantyre, Glasgow G72 0LH; no telephone contact provided ; gary.boyd@uws.ac.uk), ref:16638

**Study design**

Pragmatic single centre randomized controlled trial

**Primary study design**

Interventional

## **Study type(s)**

Quality of life

## **Health condition(s) or problem(s) studied**

Reducing frequency and severity of post-exertional malaise in people with long COVID.

## **Interventions**

250 participants with long COVID will be randomised into intervention and control groups using a secure, independent online trial allocation service. Allocation will be stratified for age and sex.

125 Participants in the control group will receive standard advice on pacing and managing energy levels. Participants in the intervention group will receive an activity tracker and a bespoke mobile phone 'App'. Each day, using their activity tracking data intervention participants will receive individualised alert messages when they spend time above a specific HR determined activity threshold (eg. time above 130 bpm) and if they have not spent sufficient time at rest.

## **Intervention Type**

Behavioural

## **Primary outcome(s)**

Current primary outcome measure as of 13/02/2025:

Post-exertional malaise using the DSQ-PEM at baseline and 6 months

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Previous primary outcome measure as of 05/04/2024:

Post-exertional malaise using the PEM questionnaire at baseline and 6 months

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Previous primary outcome measure as of 07/03/2023:

Physical functioning assessed via the SF-36 at baseline and 6 months

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Previous primary outcome measure:

Post-exertional malaise using the PEM questionnaire at baseline and 6 months

## **Key secondary outcome(s)**

Current secondary outcome measures as of 05/04/2024:

1. PEM trend using PEM questionnaire assessed monthly
2. Depression trend using PHQ-9 monthly
3. Depression change using PHQ-9 assessed at baseline and 6 months
4. Fatigue trend using FSS monthly
5. Fatigue change using FSS at baseline and 6 months

6. Quality of life trend using SF12 monthly
7. Quality of life change using SF12 at baseline and 6 months
8. Self-efficacy trend using Self Efficacy Scale monthly
9. Cognitive function using a variation of the symbol digit modalities test monthly
10. Cognitive function using a variation of the symbol digit modalities test at baseline and 6 months.
11. Pain using Pain VAS assessed at baseline and 6 months
12. Pain trend using Pain VAS assessed monthly between months 0-6
13. Resting heart rate assessed daily using the activity tracker

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Previous secondary outcome measures:

1. PEM trend using PEM questionnaire assessed monthly
2. Depression trend using PHQ-9 monthly
3. Depression change using PHQ-9 assessed at baseline and 6 months
4. Fatigue trend using FSS monthly
5. Fatigue change using FSS at baseline and 6 months
6. Quality of life trend using SF36 monthly
7. Quality of life change using SF36 at baseline and 6 months
8. Self-efficacy trend using Self Efficacy Scale monthly
9. Cognitive function using a variation of the symbol digit modalities test monthly
10. Cognitive function using a variation of the symbol digit modalities test at baseline and 6 months.
11. Pain using Pain VAS assessed at baseline and 6 months
12. Pain trend using Pain VAS assessed monthly between months 0-6
13. Resting heart rate assessed daily using the activity tracker

**Completion date**

28/02/2024

## **Eligibility**

**Key inclusion criteria**

1. Adults reporting persistent symptoms which have lasted for at least 8 weeks after initial infection with COVID-19 and which interfere with day-to-day activity.
2. Participants should be recovering at home and have access to an Android (SDK16 or higher) or iPhone (iOS version 10 or higher) mobile phone.

**Participant type(s)**

Patient

**Healthy volunteers allowed**

No

**Age group**

Adult

**Sex**

All

**Total final enrolment**

250

**Key exclusion criteria**

1. Currently receiving ongoing care for LC via primary or secondary care services.
2. Prior diagnosis with a comorbidity with similar symptoms (e.g. ME/CFS).
3. Currently receiving a therapy known to cause exacerbations.
4. Currently participating in another LC focussed intervention.
5. Impaired cognitive function which compromises comprehension of study information or messaging.
6. Insufficient English language for messaging to be effective.
7. No mobile phone access

**Date of first enrolment**

01/12/2021

**Date of final enrolment**

15/02/2023

**Locations****Countries of recruitment**

United Kingdom

Scotland

**Study participating centre****University of the West of Scotland**

Stephenson Place

Hamilton International Technology Park

Blantyre

Glasgow

Scotland

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**Sponsor information****Organisation**

University of the West of Scotland

**ROR**

<https://ror.org/04w3d2v20>

# Funder(s)

## Funder type

Government

## Funder Name

National Institute for Health Research

## Alternative Name(s)

National Institute for Health Research, NIHR Research, NIHRresearch, NIHR - National Institute for Health Research, NIHR (The National Institute for Health and Care Research), NIHR

## Funding Body Type

Government organisation

## Funding Body Subtype

National government

## Location

United Kingdom

# 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 Prof Nicholas Sculthorpe (nicholas.sculthorpe@uws.ac.uk). Type of data: Pre and Post PEM data, Pre and Post cognitive function, Fatigue, and depression data and Interview transcripts. The researchers will be using the data to inform future studies, so envisage that it would be two years after the end of the study before they would be willing to share the data, and it will be available for four years thereafter. Only researchers who are undertaking intervention development studies using Just-In-Time adaptive interventions (JITAIs) and who wish to investigate appropriate adaptations for intervention acceptability by undertaking secondary analysis may access the data on request to the principal investigator. Consent will request participants agree to the statement "information about me may be used in other research, but the information will not use my name." All transcripts will be anonymised with any identifying information removed. Participants will be able to agree to participate but opt out of data sharing. Data for those participants will not be available.

## IPD sharing plan summary

Available on request

## Study outputs

Output type	Details	Date created	Date added	Peer reviewed?	Patient-facing?
<a href="#">Results article</a>		02/02/2026	09/02/2026	Yes	No
<a href="#">Dataset</a>	Excel file		05/09/2025	No	No
<a href="#">Preprint results</a>		09/04/2025	22/09/2025	No	No

<a href="#">Protocol file</a>		22/09/2025	No	No
<a href="#">Statistical Analysis Plan</a>	16/07/2021	22/09/2025	No	No