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# Fatigue and brain function in young people after brain injury

**Submission date**
16/04/2026

**Recruitment status**
Not yet recruiting

**Registration date**
27/04/2026

**Overall study status**
Ongoing

**Last Edited**
27/04/2026

**Condition category**
Injury, Occupational Diseases, Poisoning

[X] Prospectively registered
[_] Protocol
[_] Statistical analysis plan
[_] Results
[_] Individual participant data
[X] Record updated in last year

## Plain English summary of protocol

Background and study aims
Many children and young people who have had a serious brain injury often experience long-lasting fatigue. This could be physical or cognitive fatigue. Fatigue in these young people is complex and often linked to difficulties with attention or memory and issues with sleep. It makes everyday life, such as schoolwork, friendships, and activities, much harder. Although fatigue is common and disabling, we still don't fully understand the different types it can take or what causes it in the brain. This means that effective treatments are currently limited. This study aims to examine the different types of fatigue young people experience and how they relate to sleep and cognitive skills. It will also examine how these patterns relate to brain structure and activity.

Who can participate?
Children young people aged 10 to 18 years with and without brain injuries

What does the study involve?
Each participant will complete computer-based tests of memory, attention or emotion processing. They will also complete questionnaires about sleep, fatigue, and quality of life. This will allow us to better understand the complex relationships between fatigue, sleep and cognitive skills. In addition, we will collect detailed brain scans, including measures of the brain function of the brain while resting. We will compare results between the two groups and look for changes in brain structure
and function related to fatigue. By understanding how these areas relate, the study aims to identify brain markers that could guide future treatments and help assess whether new therapies are working.

What are the possible benefits and risks of participating?
Not provided at time of registration

Where is the study run from?
University of Birmingham (UK)

When is the study starting and how long is it expected to run for?
May 2026 to March 2029

Who is funding the study?
Wellcome Trust (UK)

Who is the main contact?
Prof. Davinia Fernández Espejo, d.fernandez-espejo@bham.ac.uk

# Contact information

### Type(s)
Public, Scientific, Principal investigator

### Contact name
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# Additional identifiers

### Central Portfolio Management System (CPMS)
72564

### Integrated Research Application System (IRAS)
360624

# Study information

### Scientific Title
Characterising fatigue phenotypes and their neural underpinnings in children and young people with acquired brain injury

### Acronym
FatigueBraIn

### Study objectives
1. To characterise fatigue phenotypes in relationship with cognitive and sleep variables
2. To explore neural underpinnings of these phenotypes

### Ethics approval required

Ethics approval required

## Ethics approval(s)
approved 03/03/2026, Essex Research Ethics Committee (Redman Place, London, EC20 1 JQ, United Kingdom; +44 (0)207 1048106; Essex.REC@hra.nhs.uk), ref: 26/EE/0026

## Study design
Observational case-control study

## Primary study design
Observational

## Study type(s)
Treatment

## Health condition(s) or problem(s) studied
Cognitive fatigue in children and young people (CYP) with acquired brain injury (ABI)

## Interventions
Experimental design:
We will recruit a convenience sample of 40 children and young people (CYP) with acquired brain injury (ABI). Prior to enrolment in the study, members of their direct care team will identify potential participants and confirm eligibility against inclusion/exclusion criteria, which will include confirmation of the medical safety of the procedures for MRI. After getting the informed consent and assent, the recruited CYP with ABI will be seen for the following procedures:
1. MRI session including structural and functional sequences (at rest)
2. Demographics and medical history interview: collect relevant demographics and medical history and clinical findings.
3. Clinical assessment:
3.1. Paediatric Quality of Life Multi-dimensional Fatigue Scale (PedsQL-MFS), completed by both parents/carer (about the child) and participant (self-reported)
3.2. Sleep Disturbance Scale for Children
3.3. Cognitive assessment platform: Participants will complete the Cognitron battery

We will also recruit a small convenience sample of 20 typically developing CYP (control group) who will undergo the same assessments described above for the CYP with ABI except for clinical assessment.

Data analyses:
Group differences: Analysis will be conducted according to group allocation. The baseline characteristics of the participants will be summarised using descriptive statistics by groups, n (%) for binary and categorical variables and mean (SD)/median (QIR) for continuous variables. We will run case-control comparisons to confirm differences between the groups in our variables of interest, and correlations and mediation analyses to understand the relationship between cognitive, fatigue and sleep variables across the groups. We will also do clustering analysis to explore whether different phenotypes can be identified.
Neural correlates: With the MRI data, the research team will compute measures of functional and structural connectivity, global and regional volume/atrophy and thickness, and identification /quantification of focal injuries. These will be compared with the control group. We will also

relate these indices to cognitive and clinical variables to study the relationship between patient-specific structural and functional neural architectures and functional profiles, as well as any identified phenotypes.

### Intervention Type
Other

### Primary outcome(s)
1. Fatigue phenotypes measured using Cognitron, PEDsQoL, and Sleep questionnaire at week 2

2. Neural underpinnings of fatigue phenotypes measured using MRI at week 2

### Key secondary outcome(s))

### Completion date
01/03/2029

## Eligibility

### Key inclusion criteria
Children and young people (CYP) with ABI:
1. Fatigue problems (self-reported, parent-reported or clinical findings) due to moderate to severe ABI
2. Receiving follow-up care at Birmingham Children's Hospital (BCH), with a consensus clinical diagnosis of ABI from any aetiology (i.e. traumatic or non-traumatic injury or oncology)

Control participants:
1. Typical developmental history
2. No known history of neurological conditions
3. Free from any medical conditions that required medical or surgical intervention within the last 6 months

Both groups:
1. Aged between 10 and 18 years
2. Ability to communicate verbally or non-verbally with their parents and researchers if they don’ t feel comfortable or report any problems while undergoing MRI
3. Commitment to engage in the assessments
4. CYP with neurodiversity (e.g., autism, attention deficit hyperactive disorder) diagnosis will be considered if parents feel that they can undergo the assessments

### Healthy volunteers allowed
Yes

### Age group
Mixed

### Lower age limit
10 years

### Upper age limit
18 years

### Sex
All

### Total final enrolment
0

### Key exclusion criteria
Control participants:
1. History of neurological conditions
2. History of neurodevelopmental conditions

Both groups:
1. Suspected or confirmed alcohol/recreational substance use
2. Suspected or confirmed pregnancy
3. Parents who lack the capacity to consent
4. MRI incompatible: metal plates incompatible with MRI scanners, pacemakers, inability to lay flat for prolonged periods, aneurysm clips, neurostimulators, brain/subdural electrodes, etc

### Date of first enrolment
01/05/2026

### Date of final enrolment
01/03/2029

## Locations

### Countries of recruitment
United Kingdom

England

### Study participating centre
**Birmingham Childrens Hospital**
Steelhouse Lane
Birmingham
England
B4 6NH

## Sponsor information

### Organisation
University of Birmingham

### ROR

https://ror.org/03angcq70

# Funder(s)

**Funder type**
Government

**Funder Name**
Wellcome Trust

**Alternative Name(s)**
Wellcome, WT

**Funding Body Type**
Private sector organisation

**Funding Body Subtype**
Trusts, charities, foundations (both public and private)

**Location**
United Kingdom

# Results and Publications

**Individual participant data (IPD) sharing plan**

**IPD sharing plan summary**
Data sharing statement to be made available at a later date