COVID-CNS

THE COVID-CLINICAL NEUROSCIENCE STUDY

INTRODUCTION

The COVID-19 Clinical Neuroscience Study (COVID-CNS) is a £2.3m UKRI study jointly led by researchers at the University of Liverpool and King's College London. The study is addressing the urgent need to understand the biological causes of brain complications in hospitalised COVID-19 patients.

Conditions we are researching:

- Stroke
- Brain infections and swelling of the brain
- Movement disorders
- Delirium
- Psychiatric disorders

NIHR | BioResource

UKRI Medical Research Council

King's College London

University of Liverpool

Encephalitis International
The brain inflammation non-profit

COVID-CNS

THE COVID-CLINICAL NEUROSCIENCE STUDY

Liverpool sites:
LUHFT & Walton Centre

London sites:
KCH, GSTT, SLAM
St George's & UCLH

Nottingham sites:
Notts Health & NUH

KEY STUDY INFORMATION:

Study dates: 23 October 2020 - 21 October 2022

17 NHS sites involved
818 participants recruited

PARTICIPANT STATISTICS:

Age: mean 54.7 (IQR 46-65)

Gender (identified): 61% Male, 38.1% Female

Ethnicity (simplified):
Asian 3.1%, Black 10.0%, Mixed 3.3%,
Other 7.9%, White 75.7%

"I was treated very professionally by staff. They were welcoming and relaxed which made it easier for me to relax as I didn't know what to expect from this research."

COVID-CNS

THE COVID-CLINICAL NEUROSCIENCE STUDY

RESEARCH ACCESSIBLE TO ALL:

Our key aim is to reach under-represented groups. The team have adapted access to fit participants' needs so they can be part of the study.

Different approaches include:

Access issues

- Aural consent form produced for visually impaired participants
- Evening sessions to fit around work schedules
- Arranging travel for participants unable to pay before attending their session
- Working alongside care-givers to ensure both parties' needs are met
- Giving anxious participants alternative ways to provide samples
- Phoning participants with no internet or computer access to support completing the online follow-up questionnaires.

Extra caring responsibilities

- Moving session times to fit around childcare needs
- Holding shorter sessions
- Providing a calm and suitable environment for participants caring for young children and adults with learning disabilities.

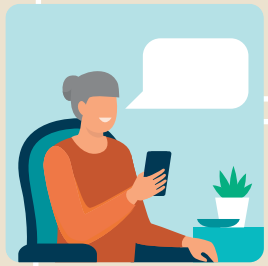
"I am visually impaired and the team created a consent form that I could hear rather than not knowing what I was signing."

COVID-CNS

THE COVID-CLINICAL NEUROSCIENCE STUDY

PATIENT JOURNEY

1. INVITED TO TAKE PART



"The team really took me and my needs into mind."

"I've been signposted to relevant services by the team."

2. CONSENT

3. IN PERSON SESSION

Take bloods, complete assessments, Cognitron, MRI brain scan

"The staff make you feel at ease, they keep you informed, let you know what to expect – even in the scanner they prepared me and said if you feel uncomfortable to press a button."

4. FOLLOW UP SESSIONS

Online or over the phone assessments including Cognitron

"I enjoyed the Cognitron experience – it feels like a game but you have to use your thinking skills – logic and problem solving – it didn't feel too clinical."

COVID-CNS

THE COVID-CLINICAL NEUROSCIENCE STUDY

WHAT HAVE WE LEARNT SO FAR?

BRAIN COMMUNICATIONS

Spectrum, risk factors and outcomes of neurological and psychiatric complications of COVID-19: a UK-wide cross-sectional surveillance study

This nationwide study of 267 cases of neurological and psychiatric manifestations of COVID-19 during the first wave identified older age and a higher pre-COVID-19 frailty score to be associated with poor outcome. The most common complication found was Cerebrovascular (blood flow to the brain) and affected young as opposed to older patients.

THE LANCET
Child & Adolescent Health

Neurological manifestations of Covid-19 infection in UK hospitalised children and adolescents: a prospective national cohort study

Overall, neurological and psychiatric manifestations appear to be four times more common in hospitalised children and adolescents than in hospitalised adults with COVID-19 in the UK.

PLOS ONE

Reliability of multi-modal MRI-derived brain phenotypes for multi-site assessment of neuropsychiatric complications of SARS-CoV-2 infection

Magnetic resonance imaging (MRI) of the brain is a key tool for understanding the neuropsychiatric complications of COVID-19. The COVID CNS Travelling Heads study assessed and optimised the reliability across sites of the different MRI methods used in COVID CNS, ensuring the consistency and quality of collected brain data.

Journal of
Neurology, Neurosurgery
& Psychiatry

Considerations for causality assessment of neurological and neuropsychiatric complications of SARS-CoV-2 vaccines: from cerebral venous sinus thrombosis to functional neurological disorder

We reviewed brain and central nervous system reactions to COVID-19 vaccination and concluded that such reactions are extraordinarily rare, but we might expect conditions like functional neurological disorder (which is wholly reversible), to arise in a small minority of recipients. We emphasised the importance of correctly and confidently identifying when the vaccine was and wasn't responsible for possible reactions, and provided clinicians with practical advice on how to do this.

COVID-CNS
THE COVID-CLINICAL NEUROSCIENCE STUDY

COVID-CNS

THE COVID-CLINICAL NEUROSCIENCE STUDY

"I hope you come up with answers to what has been a very worrying situation for the whole world."

BMJ Neurology Open

Guillain-Barré syndrome following SARS-CoV-2 vaccination in the UK: a prospective surveillance study

We studied the features of Guillain-Barré syndrome (GBS) following SARS-CoV-2 vaccines and looked for a causal link between the two. More cases were observed in those who received adenovirus-based vaccine as opposed to other vaccines. However, the overall prognosis was good and the estimated risk was low. We advised that clinicians should remain vigilant to the possibility of this rare adverse event.

BRAIN

Brain Injury in COVID-19 is associated with dysregulated innate and adaptive immune responses

We can assess illness by measuring proteins in blood called biomarkers. We investigated the biomarkers of brain injury in 175 patients admitted to hospital with COVID-19 and 45 with Influenza. Our results showed that the brain injury markers associated with changes to immune responses due to COVID-19 were high during hospitalisation and continued at this level up to 4 months later.

PLOS GENETICS

Proteome-wide Mendelian randomization identifies causal links between blood proteins and severe COVID-19

This study analysed over 3,000 blood proteins and found that certain proteins are linked with severe COVID-19 and hospitalisation. By targeting those proteins that decrease the risk of severity it could lead to new therapeutic methods being used.

The Journal of Neuropsychiatry and Clinical Neurosciences

Consensus Clinical Guidance for Diagnosis and Management of Adult COVID-19 Encephalopathy Patients

A practical guide to help clinicians with the assessment, investigation, and both acute and long-term management of encephalopathy, a common condition among patients hospitalized with COVID-19. This guidance has been reviewed and agreed by the Global Neuro Research Coalition.

COVID-CNS

THE COVID-CLINICAL NEUROSCIENCE STUDY

nature COMMUNICATIONS

Para-infectious brain injury in COVID-19 persists at follow-up despite attenuated cytokine and autoantibody responses

This scientific article is the result of a large collaboration of scientists and healthcare professionals across many centres. Biomarkers were measured in blood samples from patients with COVID-19-associated brain complications (including stroke and encephalitis) and compared to controls. Inflammatory proteins were found to be elevated at early timepoints following infection. Several brain injury markers were found to be elevated even after one year since infection. This study highlighted useful pathways and biomarkers to be used in future studies to investigate therapeutic strategies.

nature medicine

Posthospitalization COVID-19 cognitive deficits at 1 year are global and associated with elevated brain injury markers and gray matter volume reduction

Our study demonstrated that there was global cognitive impairment 1 year after hospitalisation with COVID-19 illness, especially in those who had a more severe COVID-19 infection, those with psychiatric symptoms post-hospitalisation, and those who experienced encephalopathy. We found that the cognitive deficits were associated with increased levels of serum brain injury biomarkers and a reduction in regional brain volume on MRI scan.

Cognitive deficits were found in both those with and without neurological complications associated with COVID-19 illness, and the impairment was not limited to one cognitive domain; when compared to controls, the deficits seen were equivalent in magnitude to aging cognitively by around 20 years.

COVID-CNS
THE COVID-CLINICAL NEUROSCIENCE STUDY

ClinMed
Clinical Medicine Journal

Addressing ethnic disparities in neurological research in the United Kingdom: An example from the prospective multicentre COVID-19 Clinical Neuroscience Study

We found that our study participants were a proportionate representation of all broad self-reported ethnicity categories, with individual centres largely mirroring the ethnicity categories in their catchment areas. Any barriers to recruitment were overcome by using various strategies as outlined under 'Research Accessible to All' in this booklet, ensuring that research findings were representative of the general population.

Awarded the NIHR Maudsley BRC Culture, Equality, Diversity, and Inclusion Impact Award:
www.maudsleybrc.nihr.ac.uk/about-us/equality-diversity/culture-equality-diversity-and-inclusion-cedi-impact-award

nature
SCIENTIFIC REPORTS

Patients with neurological or psychiatric complications of COVID-19 have worse long-term functional outcomes: COVID-CNS — A multicentre case–control study

We evaluated patient-centred functional outcomes after discharge from hospital and how this impacted their activity of daily living (ADL), employment, and mental health. Among the 651 patients, split between 362 cases and 289 controls, a higher proportion of cases had impairment in ADLs and reported symptoms impacting employment. For cases, there was an increased risk in female sex, aged over 50 years with hypertension. Whereas those on statins or ACE inhibitors had a better outcome. There was no significant difference between case and control groups in terms of depression or anxiety. Patients with neurological or psychiatric complications of COVID-19 had worse functional outcomes than those with respiratory COVID-19 alone in terms of ADLs and employment.

COVID-CNS
THE COVID-CLINICAL NEUROSCIENCE STUDY

BUT WE ARE NOT JUST STOPPING HERE!

Building on the work of COVID-CNS we want to establish a longitudinal study over 3-5 years. We want to find out who develops central nervous system complications at the time of having COVID-19, how does this occur, and crucially, what does this mean for brain recovery on the aging brain, and what are the potential treatments? So watch this space!

COVID-CNS
THE COVID-CLINICAL NEUROSCIENCE STUDY

To find out more about the study visit

www.covidcns.org

Making a difference for patients in COVID-19 research

COVID-CNS

THE COVID-CLINICAL NEUROSCIENCE STUDY

www.covidcns.org