NeuroSwipe: Crowdsourcing the Brain – Citizen Science in Neuroimaging Research

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Aims: Large-scale neuroimaging projects rely on automated pipelines to reconstruct white matter tracts from diffusion MRI (dMRI) data. However, these reconstructions are not always accurate and often require labour-intensive manual review to identify artefacts. To address this challenge and extend the reach of science engagement beyond traditionally accessible groups, we developed NeuroSwipe: a web-based platform designed to involve the public in evaluating the quality of dMRI data. This initiative also aimed to enhance participants' understanding of brain imaging techniques and the scientific process, fostering broader public involvement in research.
Methods: The initial concept was developed by a multidisciplinary team of computational neuroscientists, physicists, science engagement specialists, and clinical researchers. The NeuroSwipe prototype was created by students at the National Software Academy, Cardiff University, and co-designed with ten citizen scientists during a co-production workshop held at the Cardiff University Brain Research Imaging Centre (CUBRIC). The platform included a short interactive training module to guide participants. Users were tasked with approving or rejecting anonymised dMRI images based on their quality. To ensure diverse participation, we partnered with Diverse Cymru, a charity that facilitated engagement with BAME and traditionally harder-to-reach populations. User decisions were recorded and compared with expert classifications. A post-test questionnaire assessed usability, knowledge gains, and engagement.
Results: A total of 89 individuals, identified through community organisations, tested the NeuroSwipe platform over three months. Of these, 82 completed the training module before rating images. Classifications by citizen scientists showed high consistency with expert evaluations, with no significant differences observed. Post-test feedback indicated that 72% of participants found the platform 'easy' or 'very easy' to use, and 63% thought the training module provided 'about the right amount of information', although 9% felt it was insufficient. Importantly, 92% described the platform as 'engaging' or 'informative.' Free-text comments revealed increased understanding of brain imaging techniques and a sense of contribution to scientific research. The project was later publicised by BBC News and Wales Online, further amplifying its reach.
Conclusion: This project highlights the potential of engaging citizen scientists in neuroimaging research through a web-based platform like NeuroSwipe. The findings demonstrate that citizen scientists can meaningfully contribute to assessing dMRI data quality while enhancing their understanding of brain imaging research. Future developments could include scaling the platform to incorporate other imaging modalities and integrating more advanced training modules to further expand public participation in neuroimaging research.

Prevalence of Burnout Among Healthcare Workers During the COVID-19 Pandemic: A Systematic Literature Review

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Aims: Burnout among healthcare workers has been a significant issue exacerbated by the COVID-19 pandemic. This review aims to synthesise the existing literature on the prevalence, signs, symptoms, and risk factors of burnout among healthcare workers during the pandemic.
Methods: This systematic review follows the PRISMA guidelines. We searched the Web of Science and Scopus for relevant studies published between January 2020 and December 2022. Inclusion criteria were studies reporting burnout prevalence among healthcare workers during the COVID-19 pandemic. Data were extracted and analysed using a structured framework
Results: The review included 50 studies, with a total sample size of 30,000 healthcare workers. Prevalence of burnout varied significantly across regions, with the highest rates reported in Saudi Arabia (75%) and Kuwait (76.9%). Common symptoms included emotional exhaustion, depersonalisation, and reduced personal accomplishment. Key risk factors identified were high work demands, lack of personal protective equipment (PPE), and prolonged working hours.
Conclusion: The COVID-19 pandemic has significantly impacted the mental health of healthcare workers, leading to high burnout rates. Tailored interventions are needed to address this issue and support healthcare workers during global health emergencies.

Use of Transcranial Direct Current Stimulation via Flow FL-100 Within Community Mental Health Services (CMHT) for Patients with Depression

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Aims: The study evaluates the use of transcranial direct current stimulation (tDCS) via a portable device, called **Flow FL-100**, within Community Mental Health Services (CMHT) for patients with depression. This service targets individuals who either did not benefit from medication or sought alternatives to it.

Flow is a tDCS treatment for depression that patients can use at home. It is safe, well-tolerated, and free from the side effects commonly associated with antidepressants. Backed by over 30 years of research, tDCS has shown significant improvements in depressive symptoms, with high clinical response rates. Recent studies show remission rates of up to 45% with Flow. The treatment is CE-marked

for use in Europe, and a recent NICE briefing (2023) highlights its efficacy and safety. The evaluation also references positive results from randomised controlled trials (RCTs), showing Flow leads to better outcomes than placebo stimulation.
Methods: This service evaluation assessed the use of tDCS for treating depression in Community Mental Health Teams (CMHT) for patients who hadn't responded well to medication or wanted an alternative. After a clinical interview and assessment, eligible patients were offered the treatment. Outcome data was collected at baseline and again after 6 weeks, using the Montgomery– Åsberg Depression Rating Scale (MADRS). The treatment involved patients self-administering tDCS for 30 minutes, five times a week for three weeks, then three times a week for three more weeks, with option of continuing as needed. The "Flow" system also includes a lifestyle training app and symptom tracking, allowing patients and clinicians to monitor progress online.

The study used an open-label design without a control group, with 20 participants (12 males, 8 females), of whom 16 shared their progress on the online platform and were included in the analysis.
Results: We analysed 16 data sets, which showed the following **Results:** the average MADRS score at the initial assessment was 32. By week 6, 82% (12/16) of participants had improved on the MADRS scale, with 44% (7/16) demonstrating clinically significant improvement, marked by a reduction of more than 25% in their MADRS score.
Conclusion: These results indicate that tDCS portable device "Flow" treatment is a promising and valuable intervention for treating depression in adults in CMHT service.

Head Injuries and Serial Killers: Explore the Link Between Head Trauma and Criminal Behaviour

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Aims: This research aims to investigate whether there is a significant correlation between head injuries and the development of violent, repetitive criminal behaviours, particularly serial killers. Examining the neurological and psychological factors associated with head injuries. This study seeks to understand better their influence on criminal tendencies and patterns of behaviour.
Methods: 1. Neuroimaging: This showed reduced amygdala and frontal cortex interconnection.

2. Documented cases of serial killers with a history of head injuries.

3. Nature and timing of head injury; behavioural changes post-injury.

4. Statistics from findings out of 11 serial killers that were studied.
Results: 1. Neuroimaging showed reduced amygdala and frontal cortex interconnection and decreased grey matter.

2. High-profile serial killers who had documented head injuries: Richard Ramirez, Glen Edward Rogers, and John Wayne Gacy. Arthur Shawcross, Fred West.

3. Nature: Richard Ramirez, aged 2; a dresser fell on him and aged 5 was knocked out by a swing in the park; both of these caused him to have epileptic seizures throughout his childhood (temporal lobe epilepsy). Glen Edward Rogers, aged 1–2, would rock back and forth, continually banging his forehead against hard surfaces; Arthur Shawcross, aged 16, was hit in the head with a sports discus; and Arthur Shawcross, aged 19, fell off a ladder, concussing himself. Fred West, aged 17, had a motorcycle accident, and aged 19, was punched in the face, which led him to fall two floors, causing him to black out and frequently suffer from violent rages. Brain injuries before the age of 5 permanently disrupt the development of key foundational brain structures, whereas brain injuries in teenage years disrupt ongoing development, altering existing behaviour. Behavioural changes post-injury: emotional instability, social withdrawal, impulsiveness, and poor decision-making.

4. 80% of the most high-profile serial killers have had significant brain injuries.
Conclusion: The findings suggest that head injuries, especially those affecting specific brain regions, can lead to problems with impulse control, emotional regulation, and decision-making. Findings also suggest that timing plays a key role too. Early-life brain injuries, particularly during critical developmental stages, disrupt emotional and social development, whereas brain injuries during adolescence often impair impulse control and judgment. For example, the parts of Richard Ramirez's brain that were damaged were his prefrontal cortex and temporal lobe. These injuries link to his crime as his crimes escalated in brutality, his sadistic behaviour, and also his opportunistic and impulsive nature. Arthur Shawcross similarly, although his injuries were in adolescence, led to sexual deviance and compulsions leading to abnormal sexual behaviour.

Nature-Based Learning and Autism: A Systematic Review of Autistic Children's Emotional Health and Behavioural Outcomes

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Aims: Autism Spectrum Disorder (ASD) is a complex neuro-developmental condition that affects social interaction, communication, and behaviour. Many children with ASD experience emotional dysregulation, heightened anxiety, and challenges in mainstream educational settings. Nature-based learning (NBL), including forest schools and outdoor education, has been proposed as an alternative approach that may support the emotional well-being and behavioural outcomes of autistic children. This systematic review examines the impact of NBL on children with ASD, focusing on emotional health, behavioural changes, and educational engagement.
Methods: A systematic search was conducted across four databases (PsycINFO, CINAHL, PubMed, and Embase) to identify primary studies examining the effects of NBL on autistic children. Additional sources, including grey literature and reference lists, were screened. Studies were included if they assessed behavioural, emotional, and educational outcomes in children under 18 years old diagnosed with ASD. Data were extracted and synthesized narratively to identify common themes.
Results: Eight studies met the inclusion criteria, comprising qualitative, quantitative, and mixed-methods research. Findings indicated that participation in NBL was associated with