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Uncovering the Hidden Toll of Autoimmune Encephalitis

by

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Thesis for the degree of Doctorate in Clinical Psychology

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Abstract

Autoimmune encephalitis is a neurological disorder caused by an autoimmune response in which antibodies target neural proteins in the brain. This can lead to a variety of symptoms which affect various aspects of functioning and can result in critical illness. Advances in the detection of different subtypes of encephalitis and development of treatments mean it is highly treatable, however numerous studies highlight that earlier treatment is associated with better long-term outcomes. Therefore prompt intervention is crucial.

Much of the existing literature examining long-term outcomes in autoimmune encephalitis seems to focus on cognitive and physical outcomes, with limited attention to psychosocial functioning. To address this, a systematic review and narrative synthesis were conducted to examine potential long-term implications for psychosocial functioning. Despite the limited research available, the review found evidence to suggest long-term psychosocial impacts. Furthermore, it highlighted the lack of standardised approaches and validated measures for the assessment of psychosocial functioning in this population. Key targets for intervention were identified, including enhancing employment opportunities, promoting social reintegration and supporting daily living skills; which could improve emotional wellbeing, whilst alleviating caregiver burden, and financial strain.

One subtype of autoimmune encephalitis is anti-N-methyl-D-aspartate receptor (anti-NMDAR) encephalitis, which is particularly notable for its psychiatric presentation. These psychiatric symptoms often lead to misdiagnosis, with many individuals initially admitted to psychiatric hospitals before an accurate diagnosis of encephalitis is made. Many individuals with anti-NMDAR encephalitis become critically ill and require admission to intensive care units. To date, and to the author's knowledge, there have been no qualitative studies into the impact of anti-NMDAR encephalitis on caregivers. Therefore, the empirical study aimed to use semi-structured interviews and Interpretive Phenomenological Analysis (IPA) to capture caregiver's experiences of initial symptoms, diagnostic process, treatment, and recovery journey. The analysis identified four themes; 'The Fight for Diagnosis', 'Everything Changed after Diagnosis', 'The Caring Role Takes it's Toll' and 'Reflecting on the Experience Now- I'm Just Glad They're Still Here'. The study highlighted the need for increased awareness of encephalitis, the importance of communication between healthcare providers and caregivers, along with the need for improved support systems for caregivers.

The findings from both chapters are discussed with reference to current literature, clinical implications and recommendations for future research.

Keywords: Autoimmune encephalitis, anti-NMDAR encephalitis, psychosocial, caregivers

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Research Thesis: Declaration of Authorship

Print name: Hayley Grantham

Title of thesis: Uncovering the Hidden Toll of Autoimmune Encephalitis

I declare that this thesis and the work presented in it are my own and has been generated by me as the result of my own original research.

I confirm that:

1. This work was done wholly or mainly while in candidature for a research degree at this University;
2. Where any part of this thesis has previously been submitted for a degree or any other qualification at this University or any other institution, this has been clearly stated;
3. Where I have consulted the published work of others, this is always clearly attributed;
4. Where I have quoted from the work of others, the source is always given. With the exception of such quotations, this thesis is entirely my own work;
5. I have acknowledged all main sources of help;
6. Where the thesis is based on work done by myself jointly with others, I have made clear exactly what was done by others and what I have contributed myself;
7. None of this work has been published before submission

Signature:

Date: 17/05/2025

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My girls- I know life has been busy and stressful the last few years, but I cannot wait to have more time together now. Mummy loves you so much- this is for you!

Definitions and Abbreviations

PPI..... Patient and Public involvement is the participation of people with lived experience in the research process. In this case they supported with the design of the interview schedule/topic guide.

Uncovering the Hidden Toll of Autoimmune Encephalitis

Bridging Chapter

Aims and Rationale for Research

I have always had a particular interest in neuropsychology, and knew as soon as I started my training that I would want my research to focus on a subject within this field. My fascination with the brain began when my younger cousin was born with an arachnoid cyst so large it had displaced his brain, occupying nearly a third of his skull. Due to its size and location, surgical removal was deemed too dangerous, and he was given a limited life expectancy with uncertainty about his future functioning. However, to everyone's surprise, he actually became somewhat of a mathematical genius with an extraordinary memory. In fact, at a young age he was featured in the local news because of his remarkable memory for numbers. I remember seeing a picture of his brain scan and wondering how he was even functioning with day-to-day activities, let alone at this superior level. From this point on, I had an intense interest in the brain, particularly in neuroplasticity, and how the brain can adapt and reorganise itself following injury (Demarin & Morović, 2014).

Then many years later, I came across the famous case of journalist Susannah Cahalan, who in 2009, just two years after the discovery of the disease, was one of the first 300 patients to be diagnosed with anti-N-methyl-D-aspartate (anti-NMDAR) encephalitis (Costello, 2024). Susannah Cahalan experienced changes in personality, low mood, paranoia and agitation which were considered a psychiatric illness, despite the onset of seizures which suggest neurological illness. The real cause of her symptoms was only discovered after her Neurologist performed the 'clock drawing task'. They noted that Susannah had drawn all of the numbers 1 to 12 on the right side of the clock, leading to the conclusion that the right side of her brain was inflamed. This resulted in further testing which revealed Susannah had anti-NMDAR encephalitis (Das & Kulkarni., 2021). Susannah has since written a book about her experience named 'Brain on Fire' which was also made into a film. I remember watching this film and being fascinated by the breadth of symptoms and the speed of deterioration, and then the disappointment at the misdiagnosis she encountered. I was amazed to learn Susannah made a full recovery once she received the correct diagnosis and treatment- again highlighting the brain's amazing capabilities.

Furthermore, I recall thinking about how awful this experience must have been for not just Susannah, but also for her family. To watch your loved one experience such distressing symptoms, deteriorating further as time passes and not knowing why or what is going to happen

to them. So when I was asked what area of neuropsychology I would like to explore I knew this was something I wanted to learn more about.

After searching the literature, it became very apparent to me that there was a considerable lack of research into caregivers of individuals with anti-NMDAR encephalitis. This was expected due to it being a relatively newly identified condition (Dalmau et al., 2007), however given the severity of symptoms, diagnostic uncertainty, lengthy hospital stays and high levels of ICU admissions (Dalmau et al., 2011; Ellul et al., 2020), it felt really important to capture the caregivers experiences of this. I also wondered what support services would be available, given it is a relatively unknown disease (Encephalitis International, 2023). Therefore, I decided I would explore this for my empirical paper and did so using a qualitative approach to create the best possible opportunity to gather rich, meaningful data from their experiences.

Many individuals with autoimmune encephalitis become critically ill and have prolonged hospital stays (Ellul et al., 2020) and this left me wondering what impact this must have on psychosocial functioning, particularly as the disease mostly effects young individuals of working age (Sarkis et al., 2014). For example, if someone is out of work for a substantial amount of time, how do they reintegrate back into working life? Are they left with impairments which mean this is not at all possible? What impact does autoimmune encephalitis have on their social life, relationships, and community activities? Are the majority of individuals able to return to driving and if not, how does this impact all of the above? These thoughts are what influenced the development of my systematic review question and while the review offered some insight into these areas, it also highlighted that the research is limited and that gaps remain in this field.

Autoimmune Encephalitis: Symptoms, Aetiology, Diagnosis and Treatment:

Autoimmune encephalitis refers to a group of diseases in which the body's immune system mistakenly targets neuronal cell surface receptors with specific antibodies, leading to brain inflammation. This can result in a variety of symptoms which progress over a number of weeks or months (Gole & Anand., 2023). The antibodies have been found to bind to their targets and interfere with functioning, but not necessarily cause permanent damage. Therefore, symptoms of autoimmune encephalitis have a high potential for reversibility if diagnosed and treated at an early stage. (Nissen et al., 2020).

Typically there are distinguishing features and disease progression based on the antibody target and thus particular subtypes of autoimmune encephalitis (Nissen et al., 2020).

The most well-known subtype is N-methyl D-aspartate receptor (NMDAR) encephalitis, which mostly effects young females (median age 21 years). Symptoms tend to occur in stages, with the prodromal symptoms including fever, inability to concentrate, headache, vomiting and diarrhoea, often mistaken for viral infections or influenza. This is followed by psychiatric symptoms such as behavioural disturbances, psychosis and a decrease in cognitive skills, language problems, and seizures. This can progress to dysfunction of autonomic regulation which can result in severe health complications (Hermetter et al., 2018), with approximately 70% of patients being admitted to intensive care units (Dalmau et al., 2019).

The presence of psychiatric symptoms often result in a high rate of misdiagnosis of psychiatric conditions (Lejuste et al., 2016) and research has suggested up to 60% of individuals are initially admitted to psychiatric units (Gibson et al., 2018). It is well documented that early access to treatment and no intensive care unit admission is associated with better long-term outcomes (Titulaer et al., 2013). Therefore, misdiagnosis and inappropriate admission to psychiatric units could have serious long-term consequences.

Diagnosis of anti-NMDAR encephalitis involves screening for antibodies against the NMDA receptor in cerebrospinal fluid or serum, brain magnetic resonance imaging, and electroencephalograms (Barry et al., 2018). Two known causes of anti-NMDAR encephalitis are herpes simplex encephalitis and tumours (predominantly ovarian teratomas) (Dalmau et al., 2019). Research has suggested that up to 58% of female patients have an ovarian teratoma (Nissen et al., 2020). Therefore, tumour screening is an essential part of diagnostic testing (Hermetter et al., 2018).

Once diagnosis is confirmed, treatment typically involves the removal of any identified teratoma along with commencing immunotherapy. First-line immunotherapy is usually in the form of a combination of high-dose steroids, immunoglobins, and plasma exchange. If this is unsuccessful, second-line immunotherapy usually rituximab is the next treatment option. Other immunotherapies might be considered should there be no response to this treatment (Nguyen & Wang, 2023). Autoimmune encephalitis incurs substantial costs for healthcare services, due to long hospital stays, high rate of ICU admissions and treatment cost (Cohen et al., 2019).

A large amount of research has suggested individuals with anti-NMDAR encephalitis have good outcomes, which is usually defined as a modified Rankin Scale (mRS) of ≤ 2 (Gong et al., 2021; Titulaer et al., 2014). However, recent studies have reported ongoing cognitive and behavioural impairments years after anti-NMDAR encephalitis (Blum et al., 2020), and some

studies have found conflicting outcomes when using the mRS and more impairment specific measures. For example, McKeon et al., (2016) found that although the majority of patients scored ≤ 2 on the mRS, which would suggest a good outcome, most of their participants reported significant ongoing impairments. It has been argued that the mRS; which was designed to assess outcomes for stroke populations, does not accurately measure impairments associated with encephalitis (Brenner et al., 2024; Morgan et al., 2024). Therefore, it is possible the true extent of this patient population's difficulties are not being accurately reported. The use of the mRS has been discussed further in the systematic review discussion section.

During the literature search, a study protocol for an upcoming study into the long-term psychosocial outcomes in anti-NMDAR encephalitis was identified. This protocol states that this will be a European multi-centre, observational study examining the long-term impact on cognitive, psychiatric, psychological and social functioning. This will involve qualitative interviews and focus groups with patients and caregivers, standardised questionnaires, neuropsychological examinations, and patient reported outcome measures (Boeken et al., 2024). This is incredibly exciting as it could contribute valuable information to the currently limited body of literature and has the potential to support the development of more encephalitis-specific measures.

Charity Support Service (https://www.encephalitis.info)

Encephalitis International is a non-profit charity which offers advice and support to individuals affected by encephalitis. The website contains a large amount of information about encephalitis such as the different types, diagnostic process, effects and recovery, and stories from others impacted by encephalitis. They provide a range of support services including a helpline, peer forums, and a peer connection scheme that enables individuals to connect with each other through email or telephone. Encephalitis International also work with professionals offering resources and free webinars and training sessions. There is a section on their website which advertises current research opportunities and their patient and public involvement research team work with researchers to help identify and connect their members to eligible research.

The patient and public involvement research team were vital in helping me find eligible participants for the present research. They advertised on their website and social media

platforms, along with identifying those who met the eligibility criteria and then sending targeted emails to these subscribers.

Research Context and Overall Thesis Reflections:

I went on maternity leave part way through my research, which did create some challenges. This leave created a significant break in my work, which meant that, when I returned I had to re-establish connections and revisit the project after a year-long absence. This involved a period of readjustment, transitioning back into work mode. This was daunting as I felt I was starting from scratch after such a long absence. I also had reduced research time due to the need to take accrued annual leave, and balancing these time constraints with work needed for the research felt challenging at times.

Recruitment was also challenging as initially I found it difficult to recruit enough participants, which delayed the progress of the project. Because of this, I had to broaden the inclusion criteria. Originally, I had chosen to focus solely on partners of individuals with anti-NMDAR encephalitis, but given the recruitment difficulties, this was amended to include other family members.

For my empirical research I interviewed four participants who each shared deeply personal and traumatic experiences. Listening to their stories was at times incredibly difficult, as they described their emotional distress and belief that their loved ones were going to die. At times, it felt really difficult to balance my role as researcher and the want to switch into a therapist role. I felt honoured that they were willing to share their stories with me. I have a great admiration for their strength and resilience, as well as their commitment to helping others who are going through similar struggles. They all expressed a desire to raise awareness and assist others in preventing them from going through what they experienced. I really enjoyed conducting the interviews and the qualitative approach to analysis as this enabled the human aspect to remain at the forefront of the research. It helped me keep in mind the real individuals involved, rather than just statistics. I am grateful to have provided an opportunity for them to share their experiences, particularly given they had previously felt so unheard.

Journal Guidelines

This thesis has been prepared for the Journal of Clinical and Experimental Neuropsychology. Guidelines for submission can be viewed in Appendix A or on this webpage:

https://www.tandfonline.com/action/authorSubmission?show=instructions&journalCode=ncen20

References

Barry, H., Byrne, S., Barrett, E., Murphy, K. C., & Cotter, D. R. (2015). Anti-N-methyl-d-aspartate receptor encephalitis: review of clinical presentation, diagnosis and treatment. *BJPsych Bulletin*, *39*(1), 19–23. doi:10.1192/pb.bp.113.045518

Boeken, O. J., Heine, J., Duda-Sikula, M., Patricio, V., Picard, G., Buttard, C., ... & Finke, C. (2024). Assessment of long-term psychosocial outcomes in N-methyl-D-aspartate receptor encephalitis–the SAPIENCE study protocol. *BMC neurology*, *24*(1), 322.

Brenner, J., Ruhe, C. J., Kulderij, I., Bastiaansen, A. E., Crijnen, Y. S., Kret, C. N., ... & Titulaer, M. J. (2024). Long-Term Cognitive, Functional, and Patient-Reported Outcomes in Patients With Anti-NMDAR Encephalitis. *Neurology*, *103*(12), e210109.

Cohen, J., Sotoca, J., Gandhi, S., Yeshokumar, A. K., Gordon-Lipkin, E., Geocadin, R. G., ... & Venkatesan, A. (2019). Autoimmune encephalitis: a costly condition. *Neurology*, *92*(9), e964-e972.

Costello, P. (2014, October 20). *My rendezvous with insanity A conversation with Susannah Cahalan*. Standford Medicine Magazine. https://stanmed.stanford.edu/my-rendezvous-with-insanity/#:~:text=When%20I%20was%20finished%2C%20Dr,memory%20deficits%20and%20behavioral%20changes

Dalmau, J., Tüzün, E., Wu, H. Y., Masjuan, J., Rossi, J. E., Voloschin, A., ... & Lynch, D. R. (2007). Paraneoplastic anti–N-methyl-D-aspartate receptor encephalitis associated with ovarian teratoma. *Annals of neurology*, *61*(1), 25-36.

Dalmau, J., Lancaster, E., Martinez-Hernandez, E., Rosenfeld, M. R., & Balice-Gordon, R. (2011). Clinical experience and laboratory investigations in patients with anti-NMDAR encephalitis. *Lancet Neurol*, *10*(1), 63-74.

Dalmau, J., Armangué, T., Planagumà, J., Radosevic, M., Mannara, F., Leypoldt, F., ... & Graus, F. (2019). An update on anti-NMDA receptor encephalitis for neurologists and psychiatrists: mechanisms and models. *The Lancet Neurology*, *18*(11), 1045-1057.

Demarin, V., & Morović, S. (2014). Neuroplasticity. *Periodicum biologorum*, *116*(2), 209-211.

Das, S., & Kulkarni, K. (2021). 'Brain on Fire': an extraordinary cinematic depiction of the phenomenon of diagnostic overshadowing. *General Psychiatry*, *34*(4), e100504.

Ellul, M. A., Wood, G., Van Den Tooren, H., Easton, A., Babu, A., & Michael, B. D. (2020). Update on the diagnosis and management of autoimmune encephalitis. *Clinical Medicine*, *20*(4), 389-392.

Encephalitis International. (2023, October 3). *What is encephalitis?* https://www.encephalitis.info/

Gibson, L. L., Pollak, T. A., Blackman, G., Thornton, M., Moran, N., & David, A. S. (2019). The psychiatric phenotype of anti-NMDA receptor encephalitis. *The Journal of neuropsychiatry and clinical neurosciences*, *31*(1), 70-79.

Gole S, Anand A. Autoimmune Encephalitis. [Updated 2023 Jan 2]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2025 Jan-. Available from: https://www.ncbi.nlm.nih.gov/books/NBK578203/

Gong, X., Chen, C., Liu, X., Lin, J., Li, A., Guo, K., ... & Hong, Z. (2021). Long-term functional outcomes and relapse of anti-NMDA receptor encephalitis: a cohort study in Western China. *Neurology: Neuroimmunology & Neuroinflammation*, *8*(2), e958.

Hermetter, C., Fazekas, F., & Hochmeister, S. (2018). Systematic review: syndromes, early diagnosis, and treatment in autoimmune encephalitis. *Frontiers in neurology*, *9*, 706.

Lejuste, F., Thomas, L., Picard, G., Desestret, V., Ducray, F., Rogemond, V., ... & Honnorat, J. (2016). Neuroleptic intolerance in patients with anti-NMDAR encephalitis. *Neurology: Neuroimmunology & Neuroinflammation*, *3*(5), e280.

McKeon, G. L., Scott, J. G., Spooner, D. M., Ryan, A. E., Blum, S., Gillis, D., ... & Robinson, G. A. (2016). Cognitive and social functioning deficits after anti-N-methyl-D-aspartate receptor encephalitis: an exploratory case series. *Journal of the International Neuropsychological Society*, *22*(8), 828-838.

Morgan, A., Li, Y., Thompson, N. R., Milinovich, A., Abbatemarco, J. R., Cohen, J. A., ... & Kunchok, A. (2024). Longitudinal disability, cognitive impairment, and mood symptoms in patients with anti-NMDA receptor encephalitis. *Neurology*, *102*(4), e208019.

Nguyen, L., & Wang, C. (2023). Anti-NMDA Receptor Autoimmune Encephalitis: Diagnosis and Management Strategies. *International Journal of General Medicine*, *16*(null), 7-21.

Sarkis, R. A., Nehme, R., & Chemali, Z. N. (2014). Neuropsychiatric and seizure outcomes in nonparaneoplastic autoimmune limbic encephalitis. *Epilepsy & Behavior*, *39*, 21-25.

Titulaer, M. J., McCracken, L., Gabilondo, I., Armangué, T., Glaser, C., Iizuka, T., Honig, L. S., Benseler, S. M., Kawachi, I., Martinez-Hernandez, E., Aguilar, E., Gresa-Arribas, N., Ryan-Florance, N., Torrents, A., Saiz, A., Rosenfeld, M. R., Balice-Gordon, R., Graus, F., & Dalmau, J. (2013). Treatment and prognostic factors for long-term outcome in patients with anti-NMDA receptor encephalitis: an observational cohort study. *Lancet Neurol*, *12*(2), 157-165.

The Long-Term Impact of Autoimmune Encephalitis on Psychosocial Functioning: A Systematic Review and Narrative Synthesis

Chapter 1 Systematic Review

The Long-Term Impact of Autoimmune Encephalitis on Psychosocial Functioning: A Systematic Review and Narrative Synthesis

Word count: 5157 (including abstract, excluding tables, figures and references)

Abstract

Introduction: Long-term outcomes for individuals with autoimmune encephalitis have been explored, but existing research has primarily focused on cognitive or physical recovery, with little emphasis on psychosocial outcomes. This gap is particularly important given that autoimmune encephalitis often affects individuals of working age, where difficulties with independence, employment, and social functioning could have significant psychological, financial, and systemic implications. Therefore, this review aimed to examine the long-term effects of autoimmune encephalitis on psychosocial functioning, to inform the assessment of impairments and identify key targets for intervention and support.

Method: The review identified 13 papers that met inclusion criteria. A narrative synthesis was used to examine the study findings.

Results: The review identified long-term psychosocial impacts on employment, quality of life, social functioning, daily living skills, and general functioning. The most frequently reported areas were employment and quality of life. Many individuals were unable to return to work, or did so in reduced roles. Studies reported reduced quality of life, often in connection to impaired social functioning. Reported social difficulties included withdrawal, disinhibition, and reduced self-awareness. Although data on daily living skills was limited, findings suggested ongoing challenges in areas such as managing finances and appointments, and independent travel in the community.

Conclusions: The review identified long-term impairments in areas of psychosocial functioning, despite previous research indicating generally favourable outcomes. It also highlighted the lack of standardised approaches and validated measures for assessing psychosocial outcomes, along with the limitations of the modified Rankin Scale; the most commonly used tool for evaluating long-term outcomes. Therefore, it is important to consider whether the true extent of long-term impairments is being accurately captured. Importantly, this review identified key targets for intervention, including enhancing employment opportunities, promoting social reintegration and supporting daily living skills; which could improve emotional wellbeing, whilst alleviating caregiver burden, and financial strain.

Introduction

Autoimmune encephalitis is a neurological disorder in which inflammation of the brain is caused by an autoimmune response resulting in antibodies targeting neuronal proteins (Hébert et al., 2022). Research has identified tumours and viral infections as some of the triggers for this autoimmune response (Dalmau & Graus, 2022). There are numerous types of autoimmune encephalitis which tend to be categorised as those with or without tumours, and whether neuronal autoantibodies are detectable (Gold et al., 2019).

Prevalence data for autoimmune encephalitis is currently limited due to research still progressing in this area. However, one study in America reported prevalence rates of 13.7 people per 100,000, with African-American individuals having a higher prevalence (38.3/100,00) compared to white American individuals (13.7/100,000) (Dubey et al., 2018). There appears to be a sex predominance depending on the type of autoimmune encephalitis, with anti-N-methyl-D-aspartate receptor (anti-NMDAR) encephalitis having a female predominance (female to male ratio 3.6:1) and anti-leucine-rich glioma-inhibited 1-(LGI1) a slight male predominance (male to female ratio 1.6-1.9:1). For contactin-associated protein-2 (CASPR2) encephalitis, there appears to be an even more significant male predominance (male to female ratio 9:1) (Gold et al., 2019).

Individuals with autoimmune encephalitis present with a variety of symptoms including psychiatric, behavioural and cognitive changes, movement disorders, seizures, dysautonomia and pain (Uy et al., 2021). Research has identified psychiatric symptoms as the most common initial clinical symptom (Herken & Prüss, 2017; Lejuste et al., 2016), with a large proportion of individuals being admitted to psychiatric wards due to initial misdiagnosis of psychiatric conditions (Gole & Anand, 2025; Herken & Prüss, 2017). This can cause delays to treatment which can be detrimental given earlier treatment initiation is associated with better recovery outcomes (Sanvito et al., 2024; M. J. Titulaer et al., 2013). Other prognostic indicators include the need for intensive care admission, lack of clinical improvement within four weeks of commencing treatment, presence of a movement disorder, central hypoventilation, elevated CSF white blood cell count, and abnormal MRI findings (Balu et al., 2019).

Recent advances in the identification of the different types of autoimmune encephalitis, diagnosis, and treatment, have significantly increased survival rates (Al-Ansari & Robertson, 2019), and research has suggested overall good outcomes for individuals with autoimmune encephalitis who have received appropriate treatment. Titulaer et al., (2013) reported 81% of 252 individuals with anti-NMDAR encephalitis had a favourable outcome at 24 months follow-up as measured by a score of ≤ 2 on the modified Rankin Scale (mRS). Furthermore, they found symptoms continued to

improve for up to 18 months following the initial onset of symptoms. Thakolwiboon et al., (2025) reported similar findings with 80% of 138 individuals with autoimmune encephalitis achieving good recovery outcomes (mRS score≤ 2), however they also identified several long term persistent symptoms at ≥24 post symptom onset, including cognitive deficits (53%).

Heine et al., (2021) assessed cognitive functioning for 43 individuals with anti-NMDAR encephalitis at 2.3 years and 4.9 years (median) after symptom onset. They found more than 80% of individuals had moderate or severe impairments at 2.3 years. Although significant improvement in cognitive functioning was observed at 4.9 years, two thirds of individuals continued to have moderate to severe impairments despite scores on the mRS suggesting favourable outcomes (median mRS score of 1). Furthermore, a systematic review identified persistent deficits in cognitive functioning, in particular impairments with memory and attention across numerous studies (Kvam et al., 2024).

Whilst a large amount of the research has focused on cognitive functioning, other persistent symptoms identified include seizures, sleep disorders, brain stem/cerebellar symptoms, other movement disorders and autonomic symptoms (Thakolwiboon et al., 2025). High rates of psychiatric comorbid conditions have also been identified at follow-up (Patel et al., 2025). Guasp et al., (2022) found 86% of individuals displayed psychiatric and behavioural disturbance at first follow-up (mean 4 months from disease onset). Although there was improvement by the second follow-up (mean 16 months), 44% of individuals continued to report these difficulties. Research has identified significant levels of depression and/or anxiety (Wang et al., 2016), along with self-reported symptoms consistent with panic disorder and posttraumatic stress disorder (Butler et al., 2024).

Research has also revealed long-term psychosocial impacts. Blum et al., (2020) found individuals had high agreement with statements such as “Worry about my health interferes with my life”, “I feel isolated from others” and “I worry about the future”. Additionally, only 68.9% of participants had returned to work or school, and 13.3% had not resumed driving following their illness. Similarly Yokota et al., (2023) reported that only 71% of participants returned to prior work/school activities and 48% had social quality of life under normal limits five years after symptom onset.

Some studies have used the Adaptive Behaviour Assessment System (ABAS-3) to assess adaptive functioning following encephalitis. This is a standardised neurobehavioural assessment which includes questions used to examine various areas of psychosocial functioning (Harrison & Oakland, 2015). One study found overall adaptive functioning was intact for adults, but below average for children (Gordon-Lipkin et al., 2017). Another study found 52% of participants scored

below average across all three adaptive domains (conceptual, social, and practical) (Yeshokumar et al., 2017). However, research into long-term psychosocial functioning is still relatively limited and findings across studies are variable.

Aim of the review

To the best of the authors' knowledge, no systematic review has been conducted examining psychosocial functioning in adults who have been discharged into the community following autoimmune encephalitis. This is important to consider given autoimmune encephalitis often affects individuals of working/parental age (Ferreira et al., 2024). Therefore, if impairments persist and impact ability to remain independent, work and socially integrate, this could have huge psychological and financial implications for the individual, their families, and wider systems.

For the purpose of this systematic review psychosocial functioning has been defined using a model developed by Zhang et al., (2022). They define psychosocial functioning as "the ability of an individual to create relationships with others and society in a mutually pleasing manner, and the ability to achieve a healthy life independently". They add that this involves four dimensions which were used to inform this review:

1. Psychological cognitive functioning (e.g. self-evaluation, self-control, beliefs, expectations)
2. Subjective well-being (e.g. life satisfaction, the balance of positive and negative emotions)
3. Social functioning (e.g. work performance, relationships, social participation)
4. Basic functioning (e.g. physical activity, self-care, health imposed restrictions in physical functioning)

The present systematic review will help identify the impact of autoimmune encephalitis on psychosocial functioning to inform how services assess individuals for impairments, along with highlighting targets for appropriate intervention and support for individuals and their families.

Methods

A scoping search was conducted to assess whether the topic was appropriate for review. The systematic review was registered on PROSPERO in January 2025 (CRD42025630386).

Inclusion/Exclusion Criteria

The inclusion/exclusion criteria are outlined in Table 1 below.

Table 1

Inclusion/Exclusion Criteria

Inclusion Criteria	Exclusion Criteria
• Sample includes people who have or have had a previous diagnosis of an autoimmune encephalitis • Participants have been discharged into the community • Studies can include both adult and child data, but only adult (18+) data will be examined and included in the review	• Sample includes only individuals with a form of encephalitis which is not autoimmune • Sample includes pregnant/post-partum participants • Sample includes individuals with other neurological conditions such as dementia or pre-existing epilepsy • Sample includes only child data or child/adult data cannot be distinguished • Animal studies
• Psychosocial functioning has been defined based on the Zhang et al., (2022) definition (as noted above). using the definition by Zhang et al., (2022). Studies will be included if they contain data relating to this definition. This may be in the form of standardised or non-standardised measures, or qualitative data.	• Studies validating new measures • Comorbid medical condition being examined • The focus is on medical findings with no report of psychosocial factors. • Drug studies • Medical studies using psychosocial measures to compare treatments or physiological presentations e.g. serum levels
• All study designs will be included providing they include specific data relating to psychosocial factors • Quantitative and qualitative studies will be included	• Reviews/ Systematic reviews • Books/ Book chapters • Conference/meeting abstracts • Study is not available in English

Search Strategy

A full search was conducted in January 2025 using PsycINFO, MEDLINE, EMBASE and CINAHL databases. Handsearching was also conducted through backward reference searching to identify additional relevant studies. Search terms and use of Boolean operators and truncation are presented in Appendix B.

Identification and Screening of Papers

The initial search identified 690 papers, with 494 remaining after duplicates were removed. The titles and abstracts of these remaining potential papers were screened by reviewer 1 (HG) against the inclusion/exclusion criteria (Table 1) using the Rayyan Systematic Review Management Software (Ouzzani et al., 2016), which resulted in the removal of 450 papers. A second reviewer (SC) also screened titles and abstracts for 10% of the identified papers. Inter-rater reliability was calculated using Cohen's kappa (*k*) and found a fair level of agreement (*k*=0.40). A third reviewer (WD) was consulted to help resolve five screening discrepancies between the first and second raters. These discrepancies arose from uncertainty about whether the encephalitis described met criteria for autoimmune encephalitis (*n*=3), whether child and adult data were reported separately (*n*=1), and a misclassification of one paper as a completed study rather than a study protocol (*n*=1). Following discussion, the study protocol was excluded and the remaining four papers were retained for full-text screening.

Full texts were retrieved for 44 articles that matched the inclusion/exclusion criteria or if eligibility was not clear from the title or abstract. Full texts were then screened, with the second reviewer (SC) again screening 10%. There were no screening discrepancies at this stage. Although inter-rater agreement was perfect (*k*=1.0), the results should be interpreted with caution due to the small sample size (*n*=4). Authors were contacted for papers which did not provide separate adult and child data, however either the authors did not respond, or data were no longer available due to the time elapsed since the studies concluded. A total of 13 paper were included in the review once full text screening and hand searches of reference lists had been completed. The screening and review process can be viewed in the PRISMA flow diagram (Figure 1).

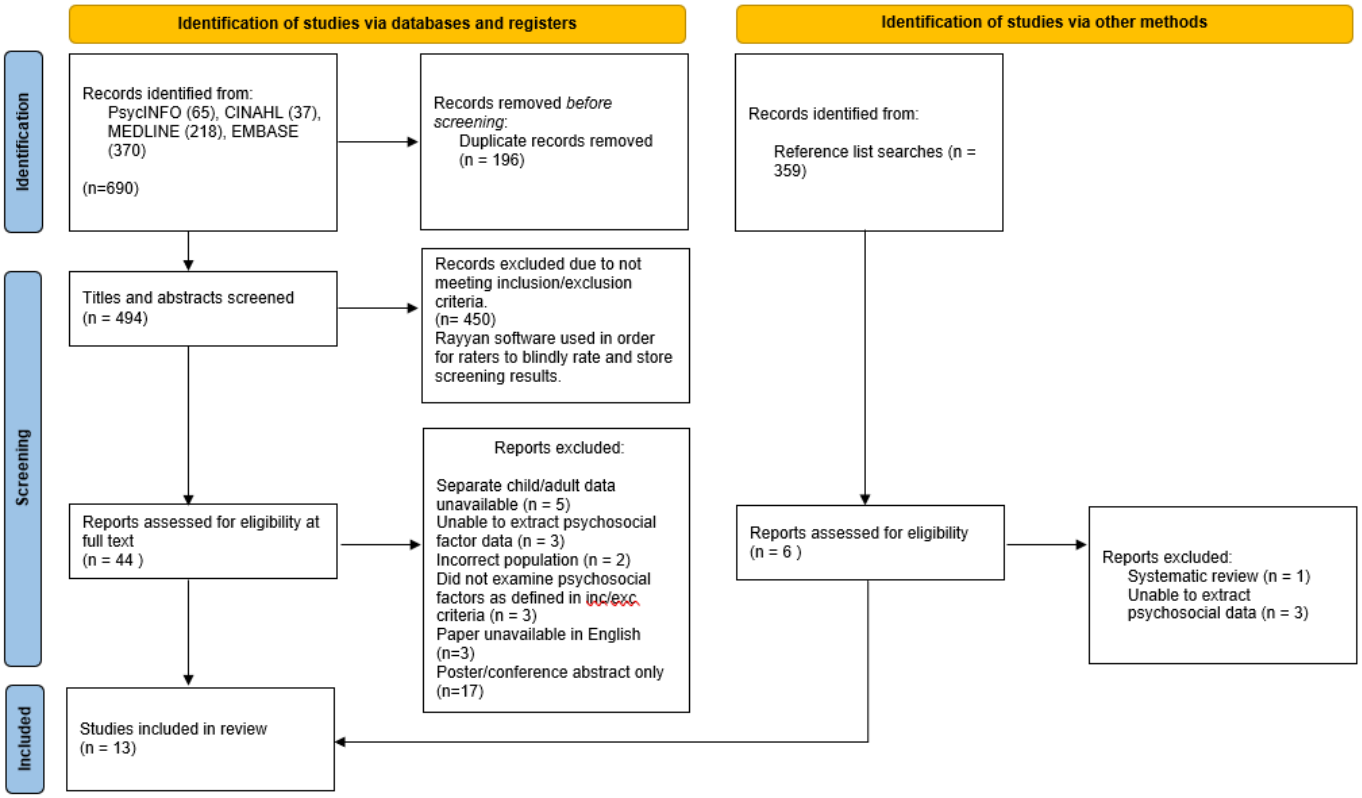


Figure 1

PRISMA Flow Diagram for Study Selection

Quality Assessment

The quality of the articles included in the review was assessed using the 14-item measure 'Quality Assessment Tool for Observational, Cohort and Cross-sectional studies' (National Heart, Lung and Blood Institute, 2019). Reviewers select 'Yes', 'No' or 'Not Reported/Not Applicable' and then used these ratings to decide whether the study's overall quality was 'Good', 'Fair' or 'Poor'. A second reviewer also rated 10% of the chosen studies. A third reviewer (WD) was to be consulted if there were any discrepancies between the first and second reviewer ratings, however there were no discrepancies (100% agreement). Due to the small number of items (*n*=2), no statistical measure of inter-rate reliability was computed.

Data Extraction

The following information was extracted from each article included in the review: study location, sample size, available sample characteristics (type of encephalitis, participant age, gender, ethnicity), study design, psychosocial factors explored, and relevant findings.

Data Analysis

A narrative synthesis was conducted to examine the study findings and to identify patterns and relationships across the data. This approach was selected a priori based on the review question and the anticipated heterogeneity of the studies, which were expected to be too diverse for meta-analysis (CRD, 2009, p. 45). This decision was confirmed during the review process, as the included studies demonstrated substantial variability in methodology, outcome measures and the psychosocial domains examined. A narrative synthesis involves a textual approach to understanding the topic, identifying potential factors that may have influenced the findings, which would have important clinical implications.

The synthesis followed the four stage framework proposed by Popay et al., (2006), which includes the development of a theory, development of preliminary synthesis, exploration of relationships, and assessing the robustness of the synthesis.

For the preliminary synthesis, study characteristics and findings were organised into a data extraction table (see Table 2). Relationships were then explored by looking for similarities and variations in the data, along with considering other factors which could have influenced results e.g. sample size, encephalitis subtype. The included studies were quality assessed and the review process critically evaluated as part of assessing the robustness of the synthesis.

Table 2

Data Extraction Table

Author/Study Focus	Country	Sample size	Sample Characteristics	Study Design	Psychosocial Measures	Summary of Findings
Ariño et al., (2020)- Sleep disorders in anti-NMDAR encephalitis	Spain	18	anti-NMDAR encephalitis 89% female, median age 26 years at disease onset (range 10-56 years)[1] 2 Asian, 1 black, 15 white First study visit= Median 85 days after hospital discharge (IQR 48-139) and 183 (IQR 110-242) days after disease onset)	Observational	Patient and family interview: Sleep disorder assessment The Global Assessment of Functioning (GAF)	Participant 1- required naps due to sleep disorder which disrupted work time. GAF: Severe =12/14 Mild-moderate=1/14 Absent/minimal=1/14
Bach (2014)- Long term rehabilitation management and outcome of anti-NMDA receptor encephalitis	UK	3[2]	anti-NMDAR encephalitis 100% female, median age 24 years (range 23-28 years) Months since symptom onset not reported	Observational	Community integration: (BICRO-39) Quality of life: (QOLIBRI-OS) Mood: (HADS)	RM: Anxious in crowds, unable to go out of the home independently, reduced social network, loss of job due to cognitive and physical difficulties, reduced quality of life. Independent in personal care but dependent for arranging appointments, managing money, and writing letters. OA: Executive impairments which could impact future education and employment. Loss of confidence, fears of relapse, Low mood and occasional social withdrawal. Did not go out independently. Marked reduction in her

Author/Study Focus	Country	Sample size	Sample Characteristics	Study Design	Psychosocial Measures	Summary of Findings
						satisfaction with her level of quality of life.
Benoit et al., (2023) Early-Stage Contactin-Associated Protein-like 2 Limbic Encephalitis	France	48	CASPR2-encephalitis 97% male, median age 64 years[3] (range 53-82) CASPR2 Median follow-up 64 months after disease onset (range 15-189.2)	Cross-sectional	Long-term functional independence: Functional Activity Questionnaire (FAQ) mRS Quality of life: 36-Item Short-Form Survey (SF36)	At the last visit, 28/35 patients (80%) had recovered functional independence 7 patients (20%) were dependent in 3 or more activities (FAQ score≥9) Quality of life similar to those of normative population except for moderate reduction of vitality sub-score. At the last visit, functional outcomes were good in most patients 73%–89% (mRS ≤2)
Binks et al., (2024) Fatigue predicts quality of life after leucine-rich glioma-inactivated 1-antibody encephalitis	UK	60	LGI1 encephalitis Median 70 years (44-92) 33% female[4] Median 41 months (range 4-179) after symptom onset	Cross- sectional	EQ5D5L EQ5D5L-VAS; 0%–100%) to record health status Life Satisfaction Questionnaire (LSQ) mRS	QOL was reduced in 51% across all domains and significantly reduced when comparing pre-morbid to current. Employed at a reduced role: 12/58 Medically retired due to encephalitis: 11/58 Retired at onset or other cause: 31/58 4/27 of those in employment at diagnosis returned to their premorbid role. The median age of those medically retired or transitioning to a less demanding role was 56 years mRS mean 1.6 range 0-4 mRS >2 11/59 19%

Author/Study Focus	Country	Sample size	Sample Characteristics	Study Design	Psychosocial Measures	Summary of Findings
Brenner et al., (2024) Long-term Cognitive, functional, and patient reported outcomes in anti-NMDAR encephalitis	Netherlands	92	anti-NMDAR encephalitis (at disease on set) geometric mean= 29 77% female Follow-up time, geometric mean= 51 months	Cross-sectional	Functional outcomes: mRS and return-to-work/-education Physical functioning-FSS, physical domains SF-36-II and WHO-DAS-II Daily activities and participation- WHODAS-II Emotional well-being- BDI, HADS, emotional well-being domains SF-36-II Quality of Life- EQ-5D5L and WHO-5	Self-reported complaints remained in emotional well-being, physical problems and difficulties with daily activities in the first months after diagnosis resolved. Sequelae remained in social functioning, energy levels, emotional well-being and quality of life beyond 36 months. Returned to work: 73% 91% had favourable outcomes on the mRS (≤2) (at 36 months), but 30% did not resume occupational activities, an additional 18% did resume occupational activities at a lower level or with adjustments.
Gordon-Lipkin et al., (2017) Comparative outcomes in children and adults with anti-NMDAR encephalitis	USA	12[5]	Anti-NMDAR encephalitis 6 adults, 100% female, median age 31.9, (IQR 26.2-53.3) Median duration since diagnosis = 3.6 years, interquartile range 2.1-5.5	Cross-sectional	ABAS-3 mRS	Overall adaptive function intact. At latest follow-up, all subjects had a good mRS score. However, 3/6 (50%) of surviving adults had some degree of persistent disability (mRS ≥1)
Guo et al., (2023)	China	5	Autoimmune encephalitis with mGluR5 antibodies	Observational	mRS	mRS score at peak of disease: median 3 (range 2-5), Last follow-up: median 1 (range 0-6)

Author/Study Focus	Country	Sample size	Sample Characteristics	Study Design	Psychosocial Measures	Summary of Findings
Autoimmune encephalitis with mGluR5 antibodies			40% female, median age 35 years (range 32-59 years) Last follow-up from onset 18 months (range 6-42 months)			
Hirose et al., (2023) Long-term effects of anti-N-MDAR encephalitis on quality of life	Japan	22	Anti-NMDAR encephalitis Median age 28 years (range 19-57) 19 female 86.4% Disease onset median 77.5 months (range 26-162 months)	Cross-sectional	mRS, Return to previous work/school, Reports of presence of disability affecting daily life at home, NeuroQOL	mRS median 0 (0-5) 16 (73%) returned to prior work/school activities 17 (77%) functioned independently at home. Neuro QOL- Sig worse QOL than controls for satisfaction with social roles and activities, and ability to participate in social roles and activities. No sig diff for remaining domains or global QOL.
McKeon et al., (2016) Cognitive and social functioning deficits after Anti-NMDAR encephalitis	Australia	7[6]	Anti-NMDAR encephalitis 5 female (71.43%) Median age 29 years (range 19-37 years) Duration since immunotherapy initiation = median 25 months (range 12-41)	Cross- sectional	mRS	mRS median 1.5, range 1-3. Most described changes in social functioning= withdrawal, disinhibition, failing to recognise own indiscretions.

Author/Study Focus	Country	Sample size	Sample Characteristics	Study Design	Psychosocial Measures	Summary of Findings
Morgan et al., (2024) Longitudinal disability, cognitive impairment, and mood symptoms in patients with anti-NMDAR encephalitis	USA	38	anti-NMDAR encephalitis 76% female, median age onset 28 years (IQR 22-36, range 1-75 Short-term follow-up= median 10 weeks (IQR = 6-17) Long-term follow-up= median 70 weeks, IQR= 51-174	observational	mRS Clinical Assessment Scale in Autoimmune Encephalitis (CASE)	Long-term follow-up: mRSs= median 2 9 patients returned to premorbid function
Sarkis et al., (2014) Neuropsychiatric and seizure outcomes in non-paraneoplastic autoimmune limbic encephalitis	USA	16	Non-paraneoplastic autoimmune limbic encephalitis 10 female (62.5%) median age at onset 43.5 years (range 22-82 years) Mean follow-up duration= mean 36 months (range 6-168)	Cross-sectional	Functional status change= pre and post-employment	6/13 43% of previously employed lost employment All below retirement age
Seifert-Held et al.,(2021) Functional recovery in autoimmune encephalitis	11 centres in Austria, 1 in Slovenia	71	Anti-NMDAR encephalitis (n=10) anti-LGI1/CASPR2-Ab (n=23) other antibodies (n=11) 30 women (42.25%),	Observational	mRS	(median mRS) Anti-NMDAR 3 months: 2.5 6 months:1.5 12 months: 1 anti-LGI1/CASPR2-Ab 3 months= 1

Author/Study Focus	Country	Sample size	Sample Characteristics	Study Design	Psychosocial Measures	Summary of Findings
			Mean age 53.5 years (range 18-81), 97.2% White participants. 3, 6 and 12 month follow-up. First clinical symptoms ≤ 6 months before study inclusion.			6 months= 1 12 months= 1 other antibodies 3 months= 2 6 months= 1.5 12 months= 1
Yeshokumar et al., (2017) Neurobehavioural outcomes in autoimmune encephalitis	USA	44	Autoimmune encephalitis 53.5% female, age at diagnosis mean= 42.9 years 29 White, 6 Black, 3 Asian, 3 Hispanic, 3 Other Follow up duration= 4.4 years	Cross-sectional	Employment status and functional independence ABAS and mRS[7]	Data for over ≥18 years: 11/22 of previously employed prior to onset now employed. 13 (50%) travel independently in the community (walking, public transport, bicycle or car). 77% take medication independently. 46% manage finances independently.

[1]Sample included 18 patients and 21 controls. Control participants characteristic: 81% female, median age 23 years (range 14-42)
[2]Only two of the patients were included in the current analysis as one patient did not meet inclusion criteria (residing in a care home)
[3] based on all 48 participants including those who did not participate in the interviews (8 deceased, 2 refused interview, 3 lost to follow-up). 35 participants took part in the interviews.
[4] Taken from their previous study Binks et al., (2021)
[5]1 patient died during admission. Only data from adult participants included in the current analysis as per inclusion criteria.
[6]Only data from adult participants included in the current analysis as per inclusion criteria.
[7]Separate ABAS and mRS data unavailable

Results

Quality Appraisal

During the study quality appraisal, the majority of studies were rated as having good methodological quality (*n*=10), while three studies were rated as fair according to the quality assessment tool used. Several common methodological limitations were identified across the included studies. Notably, all 13 studies did not report a sample size justification or power calculation, raising concerns about the generalisability of the findings. Additionally, five studies administered outcome measures at only a single time point, limiting the ability to assess change over time. Furthermore, two studies were identified as having a lack of valid and reliable outcome measures which could lead to uncertainty in the interpretation of the results. These limitations highlight the need for more rigorously designed studies in this area to strengthen the evidence base and support more clinically applicable conclusions. Further quality appraisal of individual studies will be discussed below.

Participant and Study Characteristics

Seven of the studies (53.85%) examined individuals with anti-NMDAR encephalitis, one examined CASPR2 encephalitis (7.69%), one LGI1 encephalitis (7.69%), one autoimmune encephalitis with metabotropic glutamate receptor 5 (mGluR5) antibodies (7.69%), two studies included individuals with a variety of autoimmune encephalitis (15.38%), and one defined their sample as individuals with non-paraneoplastic autoimmune limbic encephalitis (7.69%).

Studies were conducted in the USA (*n* = 4), the UK (*n* = 2), China (*n* = 1), Australia (*n* = 1), Spain (*n* = 1), France (*n* = 1), the Netherlands (*n* = 1), and a multicentre study across Austria and Slovenia (*n* = 1).

Sample sizes across studies varied considerably ranging from 3-92 participants (*M* = 32.54, Median = 22, *SD* = 27.74), with a total of 423 participants across the 13 studies. Such variation in sample size can be problematic for synthesis, as smaller studies could over-represent individual experiences, whereas larger samples could conceal variability in individual experiences, but provide more generalisable findings. The reporting of participant age was inconsistent across studies, with some specifying age at symptom onset, some reporting age at time of assessment and others did not specify at all. Additionally, ages were reported in various formats including mean, median, range, geometric mean, making comparison across studies difficult and limits the ability to explore any potential age-related differences. Similarly, the measurement of participants' recovery status at the time of assessment varied considerably across studies, with different time points used such as, months since hospital discharge, symptom onset, diagnosis, treatment initiation, or study follow-up. This inconsistency makes it difficult to compare participants at equivalent stages of recovery and

limits opportunities to explore potentially valuable insights, such as the progression of psychosocial impacts over time. This data along with age can be viewed in the Data Extraction Table (Table 2).

Nine of the studies had a majority female sample (52.27% - 100% female). Only three of the studies reported sample ethnicity, all of which had a predominantly White sample; 65.9%, (Yeshokumar et al., 2017) 83.33% (Ariño et al., 2020) and 97.2% (Seifert-Held et al., 2021), 5.56% (Yeshokumar et al., 2017) and 14% (Ariño et al., 2020) Black participants, 6.82% (Yeshokumar et al., 2017) and 11.11% (Ariño et al., 2020) Asian participants. Yeshokumar et al., (2017) also included Hispanic (6.82%) and participants who reported their ethnicity as 'other' (6.82%). The underreporting of demographics data such as ethnicity is a limitation as it does not allow for examination of how psychosocial factors might vary by cultural background. It also highlights potential issues of equity and inclusivity in research.

For the majority of studies, psychosocial functioning was not explicitly measured as the primary focus of the study. Therefore, for those studies data was collected regarding any information which felt addressed the definition provided by Zhang et al., (2022), as discussed earlier in this paper.

The analysis identified 16 different measures which provided information regarding participants psychosocial functioning. This highlights the vast amount of measures used across the studies and the lack of a consistent approach. This diversity in measurement tools, along with varying time points for follow-up, makes drawing robust conclusions challenging. The data used in this review also included qualitative data, largely collected as a biproduct of measures that were not specifically designed to assess psychosocial functioning. The measures and frequency of use across the studies can be viewed in rank order in Table 3.

Table 3

Measures and Frequency Used Across Studies

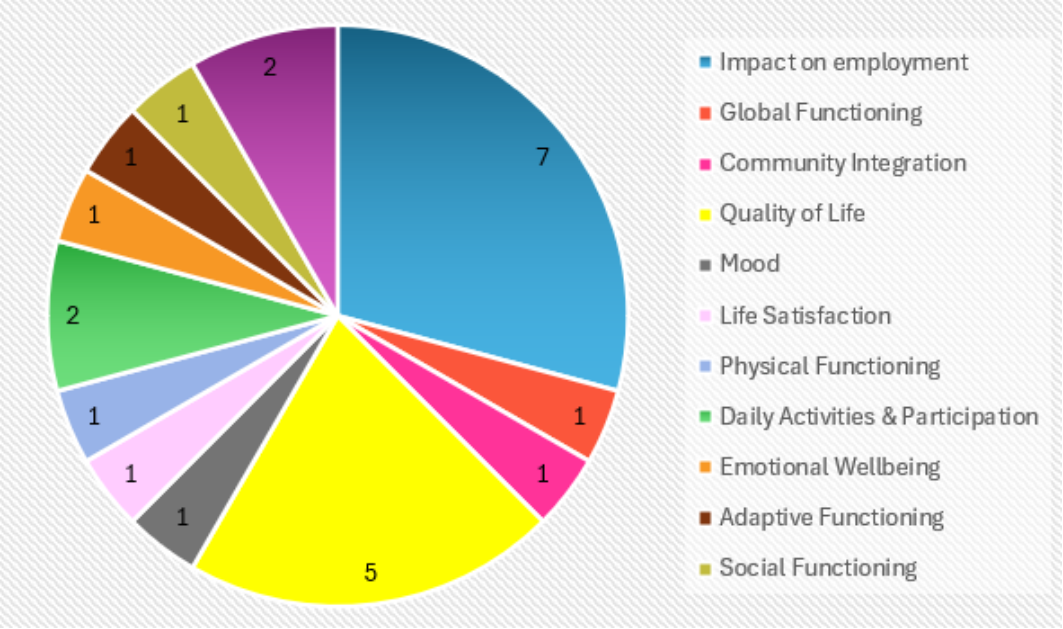
Measure	Frequency of use
Mofified Rankin Scale (mRS)	10
Adaptive Behavior Assessment System (ABAS)	2
Hospital Anxiety and Depression Scale (HADS)	2
Short Form 36 Health Survey Questionnaire (SF36)	2
EuroQol 5-Dimensions 5-Levels (EQ5D5L)	2
Functional Activities Questionnaire (FAQ)	1
Global Assessment of Functioning scale (GAF)	1

Brain Injury Community Rehabilitation Outcome Scale (BICRO-39)	1
Quality of Life after Brain Injury (QOLIBRI-OS)	1
Life Satisfaction Questionnaire (LSQ)	1
Fatigue Severity Scale (FSS)	1
World Health Organization Disability Assessment Schedule II (WHO DAS II)	1
Beck Depression Inventory (BDI)	1
World Health Organization Well-Being Index (WHO 5)	1
Quality of Life in Neurological Disorders (NeuroQOL)	1
Clinical Assessment Scale in Autoimmune Encephalitis (CASE)	1

As can be seen in Figure 2, the most common area of psychosocial functioning explored was impact on employment, with seven of the studies (53.85%) providing data around how autoimmune encephalitis impacted their ability to return to work, followed by five of the studies (38.46%) providing data around the impact on quality of life.

Figure 2

Frequency of Areas of Psychosocial Functioning Data Provided across Studies



Psychosocial Factors Identified

Impact on employment/education

The impact of autoimmune encephalitis on individual's employment/education was reported in 7 of the 13 studies. However, methodological inconsistencies and limited detail restrict the reliability and generalisability of these findings. The data was presented as both qualitative reports from single participants in smaller samples, and percentages of participants in studies with larger samples. For the smaller samples, the two participants in the study by Bach et al., (2014) were not in employment at the time of assessment. Participant one had not returned to work due to cognitive and physical difficulties. Participant two was due to enrol onto a university course prior to her illness, but the study reported that executive impairments had the potential to significantly impact her future educational and employment prospects. One participant in the study by Ariño et al., (2020) reported disruption to their work due to the need to take naps as a result of a sleep disorder which was a residual symptom of their autoimmune encephalitis.

From the studies with larger samples (range16-92 participants), between 27% and 85% (*M*= 47%) of participants were unable to return to work/education due to their illness. However, not all studies provided clear enough data to determine whether individuals who had returned to work had done so at their premorbid level of functioning. In these cases, it was assumed that, unless otherwise specified, participants had returned without requiring adjustments. Therefore, these figures should be interpreted with caution.

For the two studies that did provide additional data, 18% (Brenner et al., 2024) and 21% (Binks et al., 2024) of those who returned to work, returned to a reduced role or with adjustments in place. Furthermore, Binks et al., (2024) reported a median age of 56 years for participants who had to retire due to encephalitis, or who had to return to work in a less demanding role. They note that this a reduction of 10 years of productive working life based on the current retirement age in the UK. All of these findings highlight the significant impact on employment for this patient group.

Quality of life

Quality of life was the second most frequently evaluated factor of psychosocial functioning, assessed with a range of measures; QOLIBRI-OS, SF36, EQ5D5L, LSQ, WHO-5, NeuroQOL. It is recognised that these measures include domains relevant to other aspects of psychosocial functioning discussed in this review, however domain-specific data were unavailable to analyse. As the included studies specified using these measures to assess overall quality of life, the discussion will focus on their overall interpretations.

Four of the five studies reported a significant reduction in quality of life. The remaining study reported results similar to normative population, with the exception of a moderate reduction on the vitality sub-score which focuses on energy and fatigue levels (Benoit et al., 2023). However, it is important to note this study had the longest median duration since symptom onset among the five studies, which may have allowed participants more time to recover and adjust. Previous research has suggested an association between disability acceptance and life satisfaction, which could explain the higher quality of life scores in this study (Ditchman et al., 2017). Furthermore, the sample consisted of individuals with CASPR2 encephalitis, whereas the other studies consisted of anti-NMDAR (*n* = 3) and LGI1 encephalitis (*n* = 1). Therefore, the variation in results may also be attributed to differing recovery trajectories across encephalitis subtypes (Guo et al., 2022; Seifert-Held et al., 2021), making cross-study comparisons difficult.

Two studies provided specific data in relation to particular areas which had impacted quality of life (Bach, 2014; Hirose et al., 2023), with both identifying the ability to participate in social roles and activities. This highlights the impact on social functioning and the importance this has on quality of life. Additionally, Brenner et al., (2024) found that resuming work/education was associated with better quality of life.

Social Functioning

Five studies reported on the impact of autoimmune encephalitis on social functioning. As previously mentioned, two of these studies linked lower quality of life to reduced satisfaction with and ability to participate in social roles and activities (Bach, 2014; Hirose et al., 2023). Bach (2014) provided further details regarding specific social impairments for their two participants. These included social withdrawal, a reduced social network, and anxiety in crowds. Both participants also reported that they no longer felt confident to go out on their own. However, it is important to note the very small sample size limits generalisability.

In another study 5/6 participants (83.33%) described a change in social functioning following their illness, with social difficulties including withdrawal, disinhibition, and lack of self-awareness in social situations (McKeon et al., 2016). Although these studies provide some insight into perceived difficulties, the absence of standardised assessments reduces objectivity and reproducibility of results. Furthermore, Brenner et al., (2024) reported a statistically significant persisting effect on social functioning. In contrast, one study which used the ABAS to access adaptive functioning, found average median scores on all domains including social functioning (Gordon-Lipkin et al., 2017). However, these results are inconsistent with findings from Yeshokumar et al., (2017) who found lower scores across all three ABAS domains. It is possible this is a reflection of the difference in sample size, with only 6 participants in the former study compared to 44 in the latter.

Daily Living Skills

Four studies provided data regarding daily living skills, however detail was limited and reports of impact were mixed. Bach (2014) noted that one participant was independent in personal care, but was dependent on others to arrange appointments, manage money and accompany her outside. Furthermore, Yeshokumar et al., (2017) found that 50% of participants could travel independently in the community, 77% could take their own medication, and 46% were responsible for their own finances, suggesting persistent impairments in some daily living skills for a large proportion of their sample at follow-up (*M* = 4 years since diagnosis). However, details regarding the measures used to assess these skills were limited, making it difficult to evaluate the findings.

In contrast, Brenner et al., (2024) found that participants experienced difficulties with daily activities within the initial months following diagnosis, but this reduced over time. However, the nature of the activities were not explicitly mentioned, therefore it is difficult to compare across studies. Benoit et al., (2023) reported that 80% of their participants had regained functional independence at a median of 5 years after symptom onset, with only 20% of individuals dependent in three or more activities as measured by the FAQ. They conclude that long-term functional independence was preserved for the majority of their participants. However, it could be argued that the 20% of individuals who remained dependent in multiple areas of daily living represents a significant proportion of the sample facing daily challenges and requiring support from others, which could have wider implications for carers, health and social services.

General functioning

Some of the studies used global measures to assess overall daily functioning. While these measures comprise of multiple domains, data was not available to analyse specific aspects of psychosocial functioning independently. However, given that the measures include questions relevant to psychosocial functioning it was deemed important to include them as they provide valuable insight into the broader impact of autoimmune encephalitis on general functioning.

Ariño et al., (2020) used the GAF which measures psychological, social and occupational functioning. For 12 of the 14 adult participants (85.71%), their functioning was rated as having severe deficits (GAF score= 0-50), one participant was rated mild to moderate (GAF= 51-70) and one participant was rated absent or minimal deficits (GAF= 81-90). This finding highlights that a significant proportion of the sample continued to experience severe impairments as a result of autoimmune encephalitis.

Ten of the included studies reported mRS scores, however the format of reporting them varied significantly across the studies (e.g. median, mean, range or percentage of participants by score), limiting direct comparison. For clarity, these results can be viewed in the data extraction (see Table 2). While most of the studies reported that the majority of participants had mRS scores indicating 'good' outcomes (defined by mRS ≤ 2), a number of the authors questioned the measure's suitability for individuals with encephalitis. They noted discrepancies where mRS scores suggested 'good' outcomes despite other findings suggesting significant ongoing impairments (Gordon et al., 2017; McKeon et al., 2016; Morgan et al., 2024; Yoshokumar et al., 2017). This issue is explored further in the discussion.

Discussion

This review aimed to explore the long-term impact of autoimmune encephalitis on psychosocial functioning. A large proportion of the research has focused on long-term impacts on cognitive functioning (Kvam et al., 2024), and psychosocial functioning is currently limited in the literature. This was important to address given the influence various aspects of psychosocial functioning can have on wellbeing and quality of life.

Summary of Findings & Clinical Implications

The review identified data relating to the following areas of psychosocial functioning; employment/education, quality of life, social functioning, daily living skills, and general functioning. The areas which were reported on most were impact on employment/education and quality of life. As research specifically addressing these areas is limited for encephalitis, the discussion will draw on research from related fields such as traumatic brain injury and acquired brain injury, to contextualise the current study's findings and to consider clinical implications.

All studies that reported on employment outcomes found that autoimmune encephalitis impacted a large proportion of participant's ability to work, with individuals either returning to reduced roles or being unable to return to work altogether. This finding is crucial, given previous research has highlighted the positive effects of employment on individuals who have experienced serious illness; such as improved quality of life, higher level of subjective well-being, and life satisfaction (Matérne et al., 2018; Vestling et al., 2003). Employment is also linked to higher self-esteem and self-confidence (Harrod & Serpe, 2021), along with significant loss of income should individuals find themselves unable to return to work (Dixon., 2015). This loss of income can create financial challenges for the individual, and their family, along with wider systems as government assistance becomes necessary for financial support.

Edwards et al., (2017) found difficulties with activities of daily living (ADLs) and neurological impairment were significant predictors of return to work outcomes following a stroke. They suggest that interventions that focus on improving ADLs and address neurological deficits may improve the likelihood of successful work reintegration. Furthermore, research indicates that a combination of work-focused interventions, coaching/education and skills training- including coping and emotional support, may be effective in supporting return to work for individuals with acquired brain injury (Donker-Cools et al., 2016). Given that autoimmune encephalitis often affects individuals of working age (Ferreira et al., 2024), the impact on employment highlighted in this review is particularly concerning. Therefore, targeted support to help people get back into employment could be incredibly helpful for individuals wellbeing and financial stability.

Autoimmune encephalitis had a significant impact on social functioning in a number of the included studies, with difficulties such as withdrawal, disinhibition, and lack of self-awareness in social situations. Participants felt dissatisfied with their social roles and activities, which subsequently influenced ratings of quality of life. The impact of social functioning on quality of life is consistent with research into brain injury, which found that loneliness predicted quality of life, emotional wellbeing, depression and anxiety (Salas et al., 2021). Furthermore, Williams et al., (2014) found community integration was associated with higher levels of life satisfaction and lower levels of emotional distress in adults with traumatic brain injury.

Unfortunately, research consistently demonstrates that social withdrawal can lead to lower levels of quality of life and well-being, which in turn further discourages individuals from engaging in social activities- becoming a self-perpetuating cycle (Ahmend et al., 2024; Zhu et al., 2024). Therefore, it is important to ensure individuals with autoimmune encephalitis are supported with social reintegration. Research suggests that having an available, understanding, and well-informed social network can increase the likelihood of resuming activities following an acquired brain injury by encouraging inclusivity and supporting skill development. However, placing excessive demands can have the opposite effect, leading to activity loss, social isolation and reduced well-being and quality of life (Jellema et al., 2021). This highlights the need for services to work carefully with families to create a gradual plan for reintegration of social activities. Additionally, one of the studies in the present review identified that a fear of relapse can lead to avoidance of social situations (Bach, 2014), therefore interventions could focus on addressing the anxiety associated with relapse to reduce social withdrawal.

Although the data was limited, there was evidence to suggest there is persisting impairment in daily living skills following autoimmune encephalitis; such as managing finances and appointments, and travelling in the community. This is consistent with research in other areas, including stroke (Appelros et al., 2006) and traumatic brain injury (Ali et al., 2023). Cognitive impairment can reduce an individual's ability to complete ADLs, and interventions which focus on neuropsychological

rehabilitation have been found to be effective in improving ADLs and community reintegration (Kanchan et al., 2018). This is a relevant and interesting finding, given autoimmune encephalitis can result in persistent cognitive impairment (Kvam et al., 2024).

Although quality of life was examined separately in this review, it is evident from both the findings and existing literature that it is closely connected with other aspects of psychosocial functioning including; employment, social integration, and daily living skills. These factors can influence quality of life, just as quality of life can impact them in return. Therefore, this research has highlighted the need for ongoing support and targeted interventions for individuals recovering from autoimmune encephalitis, to ensure they have opportunities to reach their full potential and promote overall wellbeing.

An important finding of this review, was the significant variability of outcome measures used across the included studies. This is consistent with a systematic review that explored the range of outcome measures used for long-term follow-up of individuals with encephalitis. They identified 37 outcome measures that had been used across 35 studies, with 22 of them only being used in one paper each. Only one of the included measures had been developed for use in patients with encephalitis (The Liverpool Outcome Score- LOS) and this was not used for 88% of the individuals within the included studies. They also found that 14 of the studies used either the mRS or Glasgow Outcome Score (GOS) as it's only measure of long-term outcome (Van Den Tooren et al., 2022).

For the current review the mRS was used across the majority of the studies. This measure was originally designed to assess clinical outcomes following stroke and primarily reflects motor impairments (Gordon-Lipkin et al., 2017). However, it has been argued that this does not accurately represent the type of impairments observed in individuals with encephalitis, where emotional and social impairments are often more prevalent than physical (Brenner et al., 2024; Gordon-Lipkin et al., 2017; Morgan et al., 2024). Furthermore, studies in this review identified conflicting evidence for outcomes when using the mRS. For example, Yoshokumar et al., (2017) found 40% of individuals had low ABAS scores despite their mRS scores suggesting 'good' outcomes. This is concerning as a large amount of existing research has reported high recovery rates in autoimmune encephalitis based on mRS outcomes, which may not adequately capture the true extent of impairments (Brenner et al., 2024).

Strengths & Limitations of the Review

A strength of this review is that it aimed to consolidate research in an area that is currently underrepresented in the literature, yet is so important for individuals with autoimmune encephalitis. It highlighted the lack of a consistent approach to measuring psychosocial functioning and the absence of validated measures for encephalitis. However, as this is a relatively new area of research,

the number of studies available for analysis was limited. As a result, the inclusion criteria for the review had to remain broad and focus on all forms of autoimmune encephalitis rather focusing on specific subtypes. This could be problematic as different encephalitis subtypes could have differing recovery trajectories (Guo et al., 2023; Seifert-Held et al., 2021) which could result in different psychosocial outcomes.

The rare nature of encephalitis meant that many of the studies included small samples which can limit the generalisability of findings. Several studies had to be excluded from the analysis as they included child data, which was not reported separately from the adult data. Therefore, it is possible valuable data had been lost because of this. However, authors considered it important to focus on adults separately from children, given the possibility that psychosocial functioning and outcomes may differ between the groups e.g. in relation to attending education or work.

All but three of the studies scored 'good' on the quality assessment tool (see Appendix C). For the two rated as 'fair' this was due to the sole use of the mRS as an outcome measure which is not a validated measure for assessing encephalitis outcomes (Guo et al., 2023; Seifert-Held et al., 2021). For Bach (2014) this was largely due to the number of items scored as 'not reported'.

Conclusion

This review examined the long-term impact of autoimmune encephalitis on psychosocial functioning. The analysis identified the negative impact on employment prospects, quality of life, social functioning, activities of daily living, and general functioning. This highlights specific targets for intervention which could potentially increase individual's wellbeing. The review also highlighted the lack of consistent and validated measures used across the research. It discussed the implications of relying on the mRS; which is a regularly used measure in encephalitis research, to draw conclusions on outcomes for individuals, despite the literature raising concerns regarding its use. Therefore, it is important for future research to use consistent and appropriate measures to ensure accurate reflections of individuals functioning.

References

Ahmed, M., Cerda, I., & Maloof, M. (2023). Breaking the vicious cycle: The interplay between loneliness, metabolic illness, and mental health. *Front Psychiatry*, *14*, 1134865. https://doi.org/10.3389/fpsyt.2023.1134865

Al-Ansari, A., & Robertson, N. P. (2019). Autoimmune encephalitis: frequency and prognosis. *J Neurol*, *266*(5), 1287-1289. https://doi.org/10.1007/s00415-019-09273-5

Ali, S., Deborah, M. S., Ben, L. Z., & David, H. L. (2023). Measuring long-term outcomes after injury: current issues and future directions. *Trauma Surgery & Acute Care Open*, *8*(1), e001068. https://doi.org/10.1136/tsaco-2022-001068

Appelros, P., Ingegerd, N., & and Terent, A. (2006). Living setting and utilisation of ADL assistance one year after a stroke with special reference to gender differences. *Disability and Rehabilitation*, *28*(1), 43-49. https://doi.org/10.1080/09638280500165278

Ariño, H., Muñoz-Lopetegi, A., Martinez-Hernandez, E., Armangue, T., Rosa-Justicia, M., Escudero, D., ... & Santamaria, J. (2020). Sleep disorders in anti-NMDAR encephalitis. *Neurology*, *95*(6), e671-e684. https://doi.org/10.1212/WNL.0000000000009987

Bach, L. J. (2014). Long term rehabilitation management and outcome of anti-NMDA receptor encephalitis: Case reports. *NeuroRehabilitation*, *35*(4), 863. https://doi.org/https://dx.doi.org/10.3233/NRE-141176

Balu, R., McCracken, L., Lancaster, E., Graus, F., Dalmau, J., & Titulaer, M. J. (2019). A score that predicts 1-year functional status in patients with anti-NMDA receptor encephalitis. *Neurology*, *92*(3), e244-e252. https://doi.org/10.1212/wnl.0000000000006783

Benoit, J., Muñiz-Castrillo, S., Vogrig, A., Farina, A., Pinto, A. L., Picard, G., ... & Joubert, B. (2022). Early-stage contactin-associated protein-like 2 limbic encephalitis: clues for diagnosis. *Neurology: Neuroimmunology & Neuroinflammation*, *10*(1), e200041. https://doi.org/10.1212/NXI.0000000000200041

Binks, S. N., Veldsman, M., Handel, A. E., Jacob, S., Maddison, P., Coebergh, J., ... & Irani, S. R. (2024). Fatigue predicts quality of life after leucine-rich glioma-inactivated 1-antibody encephalitis. *Annals of Clinical and Translational Neurology*, *11*(4), 1053-1058. https://doi.org/10.1002/acn3.52006

Binks SNM, Veldsman M, Easton A, et al. Residual fatigue and cognitive deficits in patients after leucine-rich gliomainactivated 1 antibody encephalitis. JAMA Neurol. 2021;78 (5):617-619. doi:10.1001/jamaneurol.2021.0477

Blum, R. A., Tomlinson, A. R., Jette, N., Kwon, C. S., Easton, A., & Yeshokumar, A. K. (2020). Assessment of long-term psychosocial outcomes in anti-NMDA receptor encephalitis. *Epilepsy and Behavior*, *108*, 107088. https://doi.org/https://dx.doi.org/10.1016/j.yebeh.2020.107088

Butler, M., Abdat, Y., Zandi, M., Michael, B. D., Coutinho, E., Nicholson, T. R., Easton, A., & Pollak, T. A. (2024). Mental health outcomes of encephalitis: An international web-based study. *Eur J Neurol*, *31*(1), e16083. https://doi.org/10.1111/ene.16083

Brenner, J., Ruhe, C. J., Kulderij, I., Bastiaansen, A. E., Crijnen, Y. S., Kret, C. N., ... & Titulaer, M. J. (2024). Long-Term Cognitive, Functional, and Patient-Reported Outcomes in Patients With Anti-NMDAR Encephalitis. *Neurology*, *103*(12), e210109. https://doi.org/10.1212/WNL.0000000000210109

Centre for Reviews and Dissemination. (2009). Narrative synthesis. In *Systematic reviews: CRD's guidance for undertaking reviews in health care* (3rd ed., pp. [insert pages]). University of York

Ditchman, N., Sung, C., Easton, A. B., Johnson, K. S., & Batchos, E. (2017). Symptom severity and life satisfaction in brain injury: The mediating role of disability acceptance and social self-efficacy. *NeuroRehabilitation*, *40*(4), 531-543. https://doi.org/10.3233/nre-171440

Donker-Cools, B. H. P. M., G., D. J., Haije, W., & and Frings-Dresen, M. H. W. (2016). Effective return-to-work interventions after acquired brain injury: A systematic review. *Brain Injury*, *30*(2), 113-131. https://doi.org/10.3109/02699052.2015.1090014

Dubey, D., Pittock, S. J., Kelly, C. R., McKeon, A., Lopez-Chiriboga, A. S., Lennon, V. A., Gadoth, A., Smith, C. Y., Bryant, S. C., Klein, C. J., Aksamit, A. J., Toledano, M., Boeve, B. F., Tillema, J.-M., & Flanagan, E. P. (2018). Autoimmune encephalitis epidemiology and a comparison to infectious encephalitis. *Annals of Neurology*, *83*(1), 166-177. https://doi.org/https://doi.org/10.1002/ana.25131

Edwards, J. D., Kapoor, A., Linkewich, E., & Swartz, R. H. (2018). Return to work after young stroke: A systematic review. *International Journal of Stroke*, *13*(3), 243-256. https://doi.org/10.1177/1747493017743059

Ferreira, J. H. F., Disserol, C. C. D., de Freitas Dias, B., Marques, A. C., Cardoso, M. D., Silva, P. V. C., Toso, F. F., & Dutra, L. A. (2024). Recent advances in autoimmune encephalitis. *Arq Neuropsiquiatr*, *82*(12), 1-13. https://doi.org/10.1055/s-0044-1793933 (Avanços recentes em encefalite autoimune.)

Gold, S. M., Willing, A., Leypoldt, F., et al. (2019). Sex differences in autoimmune disorders of the central nervous system. *Seminars in Immunopathology, 41*(2), 177–188. https://doi.org/10.1007/s00281-018-0723-8

Gole, S., & Anand, A. (2025). Autoimmune Encephalitis. In *StatPearls*. StatPearls Publishing

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Gordon-Lipkin, E., Yeshokumar, A. K., Saylor, D., Arenivas, A., & Probasco, J. C. (2017). Comparative Outcomes in Children and Adults with Anti- N -Methyl-D-Aspartate (anti-NMDA) Receptor Encephalitis. *Journal of Child Neurology*, *32*(11), 930. https://doi.org/https://dx.doi.org/10.1177/0883073817720340

Guasp, M., Rosa-Justicia, M., Munoz-Lopetegi, A., Martinez-Hernandez, E., Armangue, T., Sugranyes, G., Stein, H., Prades, L., Arino, H., Planaguma, J., De La Serna, E., Escudero, D., Llufriu, S., Sanchez-Valle, R., Santamaria, J., Compte, A., Castro-Fornieles, J., & Dalmau, J. (2023). Clinical characterisation of patients in the post-acute stage of anti-NMDA receptor encephalitis: a prospective cohort study and comparison with patients with schizophrenia spectrum disorders. *Neurology*, *100*(17 Supplement 2). https://doi.org/https://dx.doi.org/10.1212/WNL.0000000000202506 (American Academy Of Neurology Annual Meeting, AAN 2023. Boston, MA United States.)

Guo, K., Liu, X., Lin, J., Gong, X., Li, A., Liu, Y., Zhou, D., & Hong, Z. (2022). Clinical characteristics, long-term functional outcomes and relapse of anti-LGI1/Caspr2 encephalitis: a prospective cohort study in Western China. *Ther Adv Neurol Disord*, *15*, 17562864211073203. https://doi.org/10.1177/17562864211073203

Harrison, P. L., & Oakland, T. (2015). *ABAS-3*. Western Psychological Services Torrance.

Harrod, M., & Serpe, R. (2021). Identity, Attribution, and Self-Esteem: When Employment Status Matters. In (pp. 201-222). https://doi.org/10.1007/978-3-030-76966-6_10

Hébert, J., Muccilli, A., Wennberg, R. A., & Tang-Wai, D. F. (2022). Autoimmune Encephalitis and Autoantibodies: A Review of Clinical Implications. *J Appl Lab Med*, *7*(1), 81-98. https://doi.org/10.1093/jalm/jfab102

Heine, J., Kopp, U. A., Klag, J., Ploner, C. J., Prüss, H., & Finke, C. (2021). Long-Term Cognitive Outcome in Anti-N-Methyl-D-Aspartate Receptor Encephalitis. *Ann Neurol*, *90*(6), 949-961. https://doi.org/10.1002/ana.26241

Herken, J., & Prüss, H. (2017). Red Flags: Clinical Signs for Identifying Autoimmune Encephalitis in Psychiatric Patients [Original Research]. *Frontiers in Psychiatry*, *Volume 8 - 2017*. https://doi.org/10.3389/fpsyt.2017.00025

Hirose, S., Hara, M., Yokota, Y., & Nakajima, H. (2023). Long-term effects of anti-N-methyl-d-aspartate receptor encephalitis on quality of life. *Front Neurol*, *14*, 1170961. https://doi.org/10.3389/fneur.2023.1170961

Importance, Definitions, History, Classification, and Frequency of the Autoimmune Encephalitides. (2022). In J. Dalmau & F. Graus (Eds.), *Autoimmune Encephalitis and Related Disorders of the Nervous System* (pp. 1-18). Cambridge University Press. https://doi.org/DOI: 10.1017/9781108696722.002

Jellema, S., Sabine, v. E., G., N.-v. d. S. M. W., Rob, v. d. S., & and Steultjens, E. M. J. (2021). Activity resumption after acquired brain injury: the influence of the social network as described by social workers. *Disability and Rehabilitation*, *43*(8), 1137-1144. https://doi.org/10.1080/09638288.2019.1652855

Kanchan, A., Singh, A. R., Khan, N. A., Jahan, M., Raman, R., & Sathyanarayana Rao, T. S. (2018). Impact of neuropsychological rehabilitation on activities of daily living and community reintegration of patients with traumatic brain injury. *Indian J Psychiatry*, *60*(1), 38-48. https://doi.org/10.4103/psychiatry.IndianJPsychiatry_118_17

Kvam, K. A., Stahl, J.-P., Chow, F. C., Soldatos, A., Tattevin, P., Sejvar, J., & Mailles, A. (2024). Outcome and Sequelae of Autoimmune Encephalitis. *J Clin Neurol*, *20*(1), 3-22. https://doi.org/10.3988/jcn.2023.0242

Lejuste, F., Thomas, L., Picard, G., Desestret, V., Ducray, F., Rogemond, V., Psimaras, D., Antoine, J. C., Delattre, J. Y., Groc, L., Leboyer, M., & Honnorat, J. (2016). Neuroleptic intolerance in patients with anti-NMDAR encephalitis. *Neurol Neuroimmunol Neuroinflamm*, *3*(5), e280. https://doi.org/10.1212/nxi.0000000000000280

Matérne, M., Strandberg, T., & Lundqvist, L. O. (2018). Change in quality of life in relation to returning to work after acquired brain injury: a population-based register study. *Brain Inj*, *32*(13-14), 1731-1739. https://doi.org/10.1080/02699052.2018.1517224

McKeon, G. L., Scott, J. G., Spooner, D. M., Ryan, A. E., Blum, S., Gillis, D., ... & Robinson, G. A. (2016). Cognitive and social functioning deficits after anti-N-methyl-D-aspartate receptor encephalitis: an exploratory case series. *Journal of the International Neuropsychological Society*, *22*(8), 828-838. https://doi.org/10.1017/S1355617716000679

Morgan, A., Li, Y., Thompson, N. R., Milinovich, A., Abbatemarco, J. R., Cohen, J. A., ... & Kunchok, A. (2024). Longitudinal disability, cognitive impairment, and mood symptoms in patients with anti-NMDA receptor encephalitis. *Neurology*, *102*(4), e208019. https://doi.org/10.1212/WNL.0000000000208

Ouzzani, M., Hammady, H., Fedorowicz, Z., & Elmagarmid, A. (2016). Rayyan—a web and mobile app for systematic reviews. *Systematic Reviews*, *5*(210), 1-10. https://doi.org/10.1186/s13643-016-0384-4

Patel, P. S., Pleshkevich, M., Lyu, C., Gabarin, R., Lee, S., Tang-Wai, D. F., Xia, D., Hébert, J., & Steriade, C. (2025). Long-Term Psychiatric Outcomes of Autoimmune Encephalitis. *The Journal of Neuropsychiatry and Clinical Neurosciences*, appi.neuropsych.20240122. https://doi.org/10.1176/appi.neuropsych.20240122

Popay, J., Roberts, H., Sowden, A., Petticrew, M., Arai, L., Rodgers, M., ... & Duffy, S. (2006). *Guidance on the Conduct of Narrative Synthesis in Systematic Reviews: A Product from the ESRC Methods Programme*. Lancaster University

Salas, C. E., Daniel, R.-L., Osvaldo, C., Ramiro, C., Jonathan, E., Darinka, R., Camilo, A.-R., Julio, T., & and Aliaga, Á. (2022). Social isolation after acquired brain injury: Exploring the relationship between network size, functional support, loneliness and mental health. *Neuropsychological Rehabilitation*, *32*(9), 2294-2318. https://doi.org/10.1080/09602011.2021.1939062

Sanvito, F., Pichiecchio, A., Paoletti, M., Rebella, G., Resaz, M., Benedetti, L., Massa, F., Morbelli, S., Caverzasi, E., Asteggiano, C., Businaro, P., Masciocchi, S., Castellan, L., Franciotta, D., Gastaldi, M., & Roccatagliata, L. (2024). Autoimmune encephalitis: what the radiologist needs to know. *Neuroradiology*, *66*(5), 653-675. https://doi.org/10.1007/s00234-024-03318-x

Sarkis, R. A., Nehme, R., & Chemali, Z. N. (2014). Neuropsychiatric and seizure outcomes in nonparaneoplastic autoimmune limbic encephalitis. *Epilepsy & Behavior*, *39*, 21-25. https://doi.org/10.1016/j.yebeh.2014.07.018

Seifert-Held, T., Eberhard, K., Lechner, C., Macher, S., Hegen, H., Moser, T., Jacob, G. B., Puttinger, G., Topakian, R., Guger, M., Kacar, E., Zoche, L., De Simoni, D., Seiser, A., Oberndorfer, S., Baumgartner, C., Struhal, W., Zimprich, F., Sellner, J., . . . Höftberger, R. (2021). Functional Recovery in Autoimmune Encephalitis: A Prospective Observational Study. *Front Immunol*, *12*, 641106. https://doi.org/10.3389/fimmu.2021.641106

Thakolwiboon, S., Gilligan, M., Orozco, E., Britton, J. W., Dubey, D., Flanagan, E. P., Lopez-Chiriboga, A. S., Smith, K., Valencia-Sanchez, C., Zalewski, N. L., Zekeridou, A., Pittock, S. J., & McKeon, A. (2025). Autoimmune encephalitis: recovery, residual symptoms and predictors of long-term sequelae. *Journal of Neurology, Neurosurgery & Psychiatry*, jnnp-2024-334957. https://doi.org/10.1136/jnnp-2024-334957

Titulaer, M. J., McCracken, L., Gabilondo, I., Armangué, T., Glaser, C., Iizuka, T., Honig, L. S., Benseler, S. M., Kawachi, I., Martinez-Hernandez, E., Aguilar, E., Gresa-Arribas, N., Ryan-Florance, N., Torrents, A., Saiz, A., Rosenfeld, M. R., Balice-Gordon, R., Graus, F., & Dalmau, J. (2013). Treatment and prognostic factors for long-term outcome in patients with anti-NMDA receptor encephalitis: an observational cohort study. *The Lancet Neurology*, *12*(2), 157-165. https://doi.org/https://doi.org/10.1016/S1474-4422(12)70310-1

Van Den Tooren, H., Easton, A., Hooper, C., Mullin, J., Fish, J., Carson, A., Nicholson, T., Solomon, T., & Michael, B. D. (2022). How should we define a 'good' outcome from encephalitis? A systematic review of the range of outcome measures used in the long-term follow-up of patients with encephalitis. *Clinical Medicine*, *22*(2), 145-148. https://doi.org/https://doi.org/10.7861/clinmed.2021-0505

Wang, W., Li, J. M., Hu, F. Y., Wang, R., Hong, Z., He, L., & Zhou, D. (2016). Anti-NMDA receptor encephalitis: clinical characteristics, predictors of outcome and the knowledge gap in southwest China. *Eur J Neurol*, *23*(3), 621-629. https://doi.org/10.1111/ene.12911

Yeshokumar, A. K., Gordon-Lipkin, E., Arenivas, A., Cohen, J., Venkatesan, A., Saylor, D., & Probasco, J. C. (2017). Neurobehavioral outcomes in autoimmune encephalitis. *Journal of Neuroimmunology*, *312*, 8

EP - 14. https://doi.org/https://dx.doi.org/10.1016/j.jneuroim.2017.08.010

Zhang, X., Yang, H., Ma, H., Teng, C., Wang, H., Diao, K., & Zhang, N. (2022). Development of a psychosocial functioning questionnaire for patients with major depressive disorder. *Gen Psychiatr*, *35*(1), e100527. https://doi.org/10.1136/gpsych-2021-100527

Zhu, S., Kong, X., Han, F., Tian, H., Sun, S., Sun, Y., Feng, W., & Wu, Y. (2024). Association between social isolation and depression: Evidence from longitudinal and Mendelian randomization analyses. *Journal of Affective Disorders*, *350*, 182-187. https://doi.org/https://doi.org/10.1016/j.jad.2024.01.106

Understanding Caregiver Experiences of Caring for Someone with Anti-NMDA Receptor Encephalitis

Chapter 2 Empirical Paper

Understanding Caregiver Experiences of Caring for Someone with Anti-NMDA Receptor Encephalitis

Word count: 8328 (including abstract, excluding tables, figures and references)

Abstract

Introduction: Anti-NMDAR encephalitis typically presents with psychiatric symptoms and is associated with high rates of misdiagnosis. These symptoms can have a significant impact on both the patient and their family. However, no study to date has qualitatively explored family caregivers' experiences of anti-NMDAR encephalitis.

Methods: Four family members of individuals who had experienced anti-NMDAR encephalitis participated in semi-structured interviews. They shared their experiences of initial symptoms, the diagnostic process, treatment, and where their loved ones were in their recovery now. Interpretive Phenomenological Analysis was used to examine the individual's experiences.

Results: The analysis identified the following group experiential themes and subthemes: 'The Fight for Diagnosis- *Feeling Let Down by Medical Professionals* and *Feeling in the Dark*', 'Everything Changed after Diagnosis', 'The Caring Role Takes it's Toll- *The Impact on Wellbeing* and *Long Lasting Impact on Relationships*' and 'Reflecting on the Experience Now- I'm Just Glad They're Still Here- *The Experience Changed me as a Person* and *It Could Have Been so Much Worse*'.

Conclusions: The study highlighted the traumatic and emotionally challenging nature of caring for someone with anti-NMDAR encephalitis, along with the lasting effects this experience can have on caregiver wellbeing. It also revealed the critical role healthcare professionals play in shaping the caregiver experience. The findings demonstrate the importance of increasing awareness of encephalitis, improving communication between healthcare providers and caregivers, and the need for support systems to promote caregiver wellbeing. (234/300 words)

Keywords: Anti-NMDAR encephalitis, autoimmune encephalitis, caregivers, experiences

Introduction

Anti-N-methyl-d-aspartate receptor (anti-NMDAR) encephalitis is a relatively newly characterised type of autoimmune encephalitis with an estimated 1.5 cases per million people per year (Dalmau et al., 2007). Although a rare disease, it is the most common type of autoimmune encephalitis (Hiesgen & Schutte, 2023), predominantly effecting females (female to male ratio of approximately 4:1) with a median age of 21 years. However, cases have been reported in individuals ranging from 1 to 85 years old (Dalmau et al., 2019).

Presentation

For the majority of patients, the early stages of anti-NMDAR encephalitis include very subtle symptoms which could easily be mistaken for mild infections or influenza; such as difficulties with concentration, fever, headache and sickness (Peery et al., 2012). However, as the disease progresses psychiatric and behavioural features develop. A retrospective review of the medical records of 111 adult patients with anti-NMDAR encephalitis found that 59% of initial presentations were psychiatric symptoms (Lejuste et al., 2016). This is then followed by neurological symptoms such as seizures in approximately 70% of patients (Titulaer et al., 2013), cognitive impairment, and decreased levels of consciousness (Nguyen & Wang, 2023).

Patients are often initially diagnosed with psychiatric disorders or assessed for drug use, even without any prior history of psychosis or substance misuse (Barry et al., 2011). This misdiagnosis can lead to people being incorrectly admitted to inpatient psychiatric units (Gole & Anand, 2025). This is hugely problematic given research into prognostic factors for long-term outcomes has suggested early access to treatment and no admission to an intensive care unit are associated with better outcomes (Titulaer et al., 2013). Therefore, it is vital patients receive the correct diagnosis and treatment as soon as possible given the time critical nature of the disease.

Long-term Consequences

Treatment for anti-NMDAR encephalitis typically comprises of immunotherapy and removal of any identified teratoma (Nguyen & Wang, 2023). Initial treatment and recovery usually involve lengthy hospitalisations and rehabilitation for the physical and behavioural effects (Dalmau et al., 2011). Despite research suggesting the majority of patients make a substantial recovery, many individuals experience long-term sleep dysfunction and behavioural symptoms (Dalmau et al., 2008) along with impairments in cognitive functioning, such as attention, working memory, episodic memory, and executive functioning (Finke et al., 2012). Patients can also experience long-term impacts on psychosocial functioning which can limit social life, ability to work, and drive (Blum et al., 2020; Tomlinson et al., 2020). Given the

reported difficulties with diagnosis, hospitalisation can last for a number of months (Dalmau et al., 2008) and the incidence of long-term impact on cognitive and psychosocial functioning, it is not surprising patients often require caregiver support for their difficulties (Dalmau et al., 2011).

Hospitalisation of a loved one can have a significant impact on family members, with individuals often prioritising the needs of their unwell family member at the detriment of their own health (Rückholdt et al., 2017). Research has also demonstrated long-term negative impacts on psychological wellbeing, such as anxiety, depression and posttraumatic stress disorder for family members of critically ill individuals (Davidson et al., 2012). Hospitalisation can also have significant financial implications for families, particularly for individuals with disorders such as encephalitis where it largely impacts those of working age (Dalmau et al., 2019). Not only will the patient themselves be unable to continue working whilst hospitalised, caregivers ability to continue to work can also be greatly impacted (Covinsky et al., 1994; Ko et al., 2007). There are also other financial expenses associated with hospital visits such as travel, parking, food and drink, accommodation and childcare costs (Costa et al., 2023).

Research into caregivers of individuals with brain injuries following discharge have identified significant negative impact on social functioning, and higher levels of distress, anxiety and depression (Ennis et al., 2013; Kratz et al., 2017; Livingston et al., 1985; Marsh et al., 1998; Ponsford & Schönberger, 2010). Spouses report changes in relationship dynamics, with a decrease in intimacy (Ponsford, 2003) and describe grief associated with the loss of their loved one‘s former self (Kratz et al., 2017). They define relationships as a caring rather than marital relationship (Bodley-Scott & Riley, 2015). Research has also suggested that poor family functioning can have a negative impact on rehabilitation outcomes (Sander et al., 2002), highlighting the importance of supporting caregiver wellbeing.

Given anti-NMDAR encephalitis is a relatively newly identified condition, research is still progressing in this area and to the authors’ knowledge only one study has examined the impact of the disease on caregivers, which is surprising given the diagnostic uncertainty. (Tomlinson et al., 2020) used online surveys to explore caregivers experiences of care transitions from hospitalisation to outpatient management, and levels of caregiver burden measured using the Zarit Burden Interview (ZBI) (Zarit et al., 1980). Caregivers reported a lack of readable and easily understandable plans for how healthcare needs were to be met and a lack of confidence in knowing how to manage the health of their loved one following discharge. The mean ZBI score was in the moderate to severe burden range, with the majority of caregivers expressing fear for what the future holds, feeling stressed caring for their relative and trying to meet other responsibilities, and not having time for themselves due to caring responsibilities. The study found higher caregiver burden scores were significantly predicted by reports of poorer care transition experiences. This study highlights the high levels of caregiver burden for carers of

people with anti-NMDAR encephalitis and the importance of careful planning and management of care transitions to ensure caregivers feel prepared and supported for their loved one's discharge. However, as this study used structured questionnaires through an online survey, it is possible other aspects of caregiver experiences could have been missed. Therefore, further qualitative studies are needed to openly explore their experiences.

The current study aimed to build on previous research by using a qualitative approach to explore caregivers' experiences of caring for a family member with anti-NMDAR encephalitis from first symptoms, diagnosis, treatment, discharge and current recovery. This study will inform caregiver needs and possible interventions for caregivers of individuals with anti-NMDAR encephalitis.

Materials & Methods

Design

This study adopted a qualitative approach using semi-structured interviews and Interpretive Phenomenological Analysis (IPA). IPA is a qualitative approach which aims to closely examine how a person makes sense of a particular experience. It is idiographic in nature as it explores individual experiences, but is also used to find patterns across cases (Smith et al., 2022). Yardley (2000) suggest there are four key principles to good qualitative research; sensitivity to context, commitment and rigour, transparency and coherence, impact and importance. These recommendations were used to guide the study design and analysis. This included in depth exploration of the relevant literature, reviews of experiential themes with the supervisory team to ensure consistency in interpretations and alignment with the research question, and careful consideration of the clinical implications of the research.

Participants

Originally the study aimed to recruit partners of individuals with anti-NMDAR encephalitis, however the inclusion criteria was later amended to include any family member due to difficulties recruiting partners only. Participants were then screened for the remaining inclusion criteria:

1. I have a family member who has or had anti-NMDA receptor encephalitis within the last 5 years.

2. My family member has been discharged into the community for at least 3 months.
3. My family member and I were residents in the UK during encephalitis symptom onset through to hospital discharge.
4. I have access to a computer and able to participate in an interview using Microsoft Teams software.

Thirteen people contacted the researcher to express an interest in participating in the research of which 9 did not meet the inclusion criteria. This was due to either the patient being a child (*n* = 6), the patient was still in hospital (*n* = 2), or the caregiver was not a family member (*n* = 1). Four participants met inclusion criteria and participated in the study (see Table 1 for demographic information). Although participants varied in characteristics such as gender, age and their relationship to the patient, they were considered a homogeneous group due to their shared experience of being family members of individuals with a rare condition, all navigating care within the UK healthcare system.

IPA sample sizes are usually small to enable comprehensive case-by-case analysis (Pietkiewicz & Smith, 2014). Therefore, it was felt four participants who participated in interviews ranging from 65 to 89 minutes (*M* = 79.5 minutes) would provide sufficient data for the study aims.

Table 1

Participant Demographics

Participant Characteristic	Range, (*M*)
Relationship to person with anti-NMDAR encephalitis	Daughter (*n* = 1), Wife (*n* = 1), Husband (*n* = 2)
Caregiver age/gender	33-66 (*47.25*) years, 50% female
Caregiver ethnicity	100% White British
Months since diagnosis	18-65 (*35.5*) months
Months since discharge	19-60 (*29.76*) months

Materials

An interview schedule/topic guide was produced with assistance from patient and public involvement (PPI) to provide some structure to the interview to ensure topics were covered which were in line with the research question (See Appendix D for interview schedule). Smith et al., (2022) discuss the importance of using open-ended questions which are not leading and are free from assumptions about the participants experiences. The interview schedule was structured to include questions for each stage of their journey (symptom onset, diagnosis, treatment, discharge and recovery) as well as the opportunity to include anything else that they felt was important to their experience.

A caregiver of a spouse who had anti-NMDAR encephalitis was invited to review the interview schedule and was emailed a copy in advance. They provided feedback during a follow-up telephone conversation with the researcher. The caregiver was asked to comment on the clarity, order, and relevance of the questions, and whether they effectively represented the key aspects of caregiving as they had experienced it. They were also invited to suggest any additions or items that should be removed. Revisions were subsequently made in line with their feedback, primarily involving the addition of further prompts to ensure we were fully capturing the caregiver's experience (e.g. Did you feel listened to? Did you feel prepared for discharge?).

Procedure

The study recruitment poster (Appendix E) was advertised on the charity Encephalitis International's website and social media accounts. The charity also sent an email to individuals on their database who they identified as potential participants based on the inclusion criteria. Prospective participants were advised to contact the researcher if they were a family member of a person with anti-NMDAR encephalitis. Potential participants meeting the inclusion criteria were sent the study information sheet and consent form (see Appendix F). Participants were given the option to send the signed consent form back electronically, or to give recorded verbal consent on the day of the interview.

Semi-structured interviews were conducted using Microsoft Teams. Participants were sent a Microsoft Teams link and then sent a reminder email in the lead up to the

appointment date. On the day of the meeting participants were advised of the interview structure and asked whether they were happy to continue with the meeting. Participants were reminded they could stop the interview at any point or have a break due to the emotive nature of discussions.

All interviews were conducted by the primary researcher between January 2025 and February 2025. The interviews were video, and audio recorded as detailed in the consent form and then sent to a third-party secure, confidential transcription service. The interviews were deleted after transcription was complete. Any identifiable information (e.g. names, hospital locations) were removed during the transcription process and participants were given pseudonyms in the write-up. Participants were offered a £30 voucher to reimburse them for their time and this was sent along with the debrief by email at the end of the interview.

Data Analysis

IPA was approached using a six-step process as described by Smith et al., (2022) with the first step involving reading and re-reading the transcripts whilst listening to the audio recordings to become fully immersed in the data. In depth exploratory noting was then undertaken to examine the content of what was said, how it was said, and why. This layered approach assisted with the researcher's critical realist epistemological position by encouraging the consideration of underlying causes and structures that shape experiences, along with the surface level elements (Fryer & Navarrete, 2024). The exploratory notes were used to create experiential statements which were then mapped out visually to look for connections and to group into Personal Experiential Themes (PETs). This was repeated for each of the four transcripts individually (case level summary) before all of the PETs were brought together for a cross-case analysis. This involved looking for convergence and divergence across the data to create Group Experiential Themes (GETs). An example case level summary can be viewed in Appendix G.

The supervisory team reviewed versions of the exploratory statements, PETs and GETs throughout the analysis process to ensure there was agreement amongst the research team about the interpretations that had been made as part of quality control (Biggerstaff & Thompson, 2008). As IPA is an iterative process (Smith et al., 2022), the

research team remained open to new interpretations and re-labelling of statements and themes.

Reflexivity

The research team consisted of professionals who have all had experience of working with neurological disorders and have observed first-hand the impact this can have on caregivers. Therefore, the researchers had to remain mindful of this experience and their motivations for this particular area of research, particularly due to the double hermeneutic nature of IPA described by (Smith & Osborn, 2003). That is, IPA involves a researcher attempting to make sense of something a participant is making sense of, meaning analysis will inevitably be subjective and have the potential for biases. Rodham et al., 2015 note the importance of remaining aware of own experiences, beliefs and biases and how these might influence analysis. Therefore, this was reflected on regularly during meetings with the research team and a reflexive journal was completed throughout the research to further encourage this (Jasper, 2005). A reflexive summary is provided in Appendix H.

Ethics

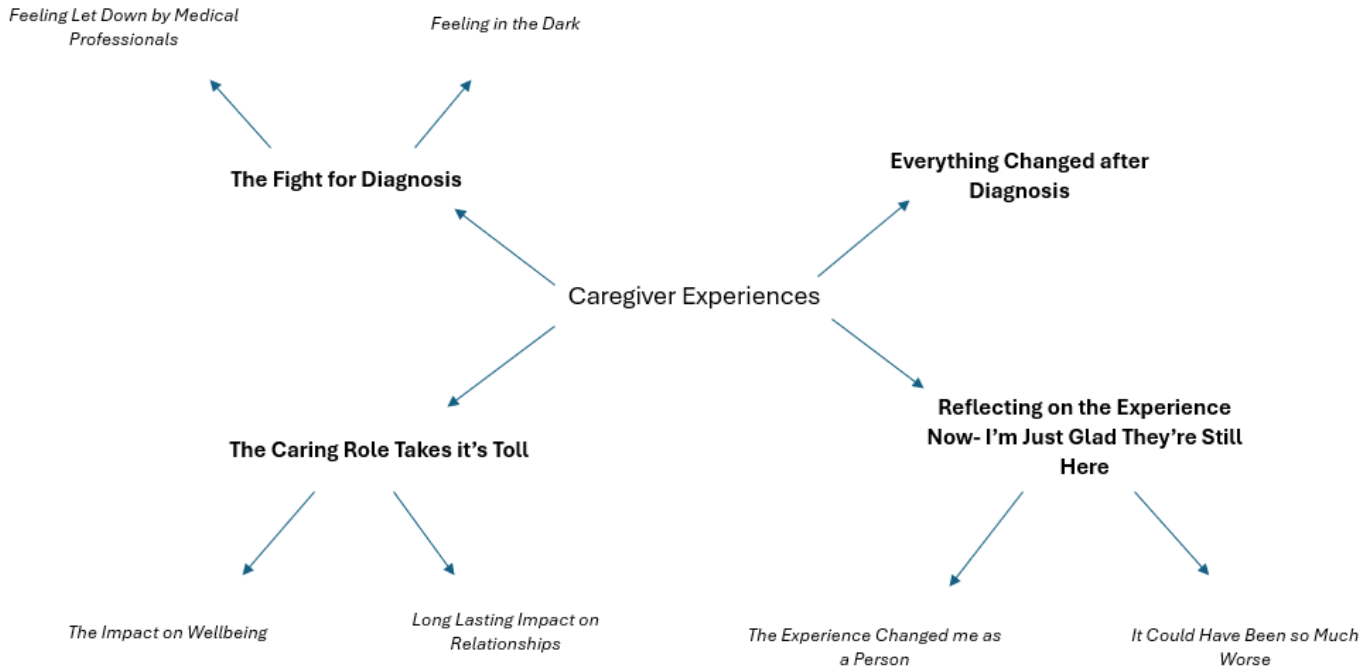
The study was granted ethical approval in December 2023 by the University of Southampton Faculty Ethics Committee (Ergo 87906- see Appendix I).

Results

The analysis identified four group experiential themes: (1) 'The Fight for Diagnosis' which includes two subthemes- *Feeling Let Down by Medical Professionals,* and *Feeling in the Dark*. (2) 'Everything Changed After Diagnosis' (3) 'The Caring Role Takes it's Toll' which contains two subthemes- *The Impact on Wellbeing* and *Long-Lasting Impacts on Relationships* (4) 'Reflecting on the Experience Now- I'm Just Glad They're Still Here' which encompasses two subthemes- *The Experience Changed me as a Person* and *It Could Have Been so Much Worse*.

Figure 1

Group Experimental Themes and sub-themes of Caregiver Experiences



Group Experiential Theme 1- The Fight for Diagnosis

This theme examines participants' experiences during their loved one's journey towards receiving a diagnosis. It captures initial assumptions and responses from healthcare professionals, along with the emotional impact of the process.

Subtheme 1: Feeling Let Down by Medical Professionals

There was a strong sense of feeling let down by medical professionals particularly during the diagnostic journey. All four patients initially experienced a misdiagnosis of a psychiatric condition, with each being informed that admission to a psychiatric hospital would form part of the treatment plan. Ultimately, two of the individuals were sectioned under the Mental Health Act. Prior to this, Laura, Sharon and Neil were all left feeling unheard and upset by earlier assumptions that their loved ones were under the influence of drugs or alcohol:

'like a drugs test, you know, with checking to see if she had taken anything. So, I think until the results of that test came back we just weren't really taken seriously. I think the assumption was she was high or something like that. (Neil, P5, L20-22)...Er, just felt... I just felt very let down really' (Neil, P6, L4)

Furthermore, Chris experienced minimisation of his wife's symptoms from medical professionals, which left him feeling dismissed and invalidated:

'Just go and have a rest. She may be overtired' (Chris P28, L3-4)

Frustration was expressed regarding missed opportunities for earlier diagnosis due to further assumptions made by medical professionals. Both Laura and Sharon recalled discussions with doctors who had mentioned the possibility of encephalitis, however this was quickly dismissed due to their strong belief that the symptoms were psychiatric in nature. Laura was particularly shocked by this assumption:

'The doctor I remember speaking to me saying, "We're going to do the lumbar puncture, but it's pointless because it's going to come back fine. Your mum's got a psychiatric disorder". And that really struck me because I couldn't believe that he was already, without having that lumbar puncture, he'd already ruled out.' (Laura, P12, L4-7)

Staffing levels also created barriers to receiving a timely diagnosis and Laura described the desperation she felt for her mother to receive the tests she needed to find answers:

'Oh we can't do it this week," because it was Easter and a lot of the staff weren't on to do certain scanning and they've got a timeframe to do it and it kind of, just nothing was working out in how obviously when you're desperate, you kind of need it to.' (Laura, P14, L5-8)

Laura, Sharon and Neil reported being left to care for their loved ones as staff were not equipped to deal with their challenging symptoms. They described incidents where they felt staff had been dismissive and lacked compassion despite their distressing experience:

'I'm not quite sure what their positions were, they were very, very rude to me, erm, were sort of just not taking it seriously' (Neil, P9, L14)

Neil's repetition of the word "very" conveys a heightened emotional response and suggests the depth of his perceived mistreatment. His reference to their roles could indicate the significance and expectations he places on professional roles, making their behaviour towards him and their dismissive attitude more concerning to him.

Laura shared her experiences of feeling as though she had to advocate for her mother to ensure even her basic needs were met. Laura gave the sense that she felt the need to take

responsibility for her mother's care whilst in hospital. This likely created a mistrust of staff and left her feeling concerned about her mother's welfare when she was not there:

'If I hadn't have been there to advocate for my mum and say, "Has she had this? Has she had that?" then she would have been really neglected in lots of aspects, I feel, because I had to keep going with a list of things, like, "Has my mum been to the toilet today? Has she done that?" and they'd be like, and she hadn't been to the toilet all day.' (Laura, P55, 18-22)

Three of the participants were also parents, managing additional caregiving responsibilities alongside supporting their unwell loved one. However, they did not feel this was acknowledged or accommodated by staff which added to their emotional and practical burden during an already overwhelming time.

'They said to me, "Visiting hours are between three and four, you can come and visit him, you can't bring children" de, de, de, de. So I got in the car with [Name 3] that night and said, "Well I don't know what to do. I've got the boys, I don't know what to do".' (Sharon, P12, L10-12)

Subtheme 2: Feeling in the Dark

Coping with the unknown and unpredictability emerged as a challenge across participants' accounts. Chris recalled experiencing anxiety in relation to the unfamiliarity of the situation he was faced with. His reflection below in which he hesitates at times, conveys his unease with managing a situation in which he did not feel prepared or supported:

'I had a lot of anxiety about that. Er, anxious to say I'm in a situation here I don't quite know what's...if anything goes wrong, what do I do really?' (Chris, P9, L19-21)

Furthermore, participants reflected on having to deal with the uncertainty of their loved one's illness and not knowing what the future held for them:

'Because we didn't know what was wrong, because we didn't know why he was like this; he could've been like this for the rest of his life. You know, it was the uncertainty.' (Sharon, P17, L1-2)

Sharon, Neil and Laura all felt there was a lack of communication from staff that left them feeling in the dark. Neil described incidents where he had been left with no communication from staff following traumatic incidents. This resulted in him assuming the worst outcome for his

loved one. As Neil described these incidents, he frequently averted his gaze from the camera, paused and swallowed, reflecting how upsetting these memories continue to be for him:

'I'll just check on your wife and let you know how she's doing. I'll be back in a few minutes". And then like ten minutes later she hadn't come back, so I'm thinking, "Oh"...but when someone says, "I'll be back in a few minutes," and then they don't come, you just... given everything else that was going on... I assumed the worst.' (Neil P24, 1L0-19)

Group Experiential Theme 2- Everything Changed After Diagnosis

This theme captures how receiving an accurate diagnosis led to the appropriate treatment and marked the beginning of their journey towards recovery. Participants described a significant improvement in care and support once they had made it through the challenging diagnostic process.

'Once we got through the layers you needed to get through to get the correct diagnosis...We got world class care, I think. You know, they couldn't have done anything better.' (Neil, P61, L15-16)

Once transferred to specialist neurology wards, they felt staff's knowledge and experience meant they were better equipped to care for their loved ones.

'Because they know what they're talking about there". And it was true; as soon as we got there, there was a different way of dealing with him' (Sharon, P23, L3-5)

Having previously felt responsible for her mother's care, Laura felt able to leave her mother without worrying for her safety once she had been transferred to the neurology ward. This relieved some of the mental load Laura had been carrying.

'But they are equipped for it, you know, because it's a neurology ward. So, you felt safe leaving her there. I always felt safe. I never had in my mind like they did at the first hospital or scared to go home.' (Laura, P26, L4-7)

A diagnosis provided access to caregiver support services offered through an Encephalitis charity. The participants reported accessing these services and finding them helpful. Both Laura and Sharon received information from the charity to aid their understanding of encephalitis and to help manage expectations for recovery. Laura described talking to others

with lived experiences as instilling hope which helped her through her difficult experience and similarly Chris shared his experiences of peer support.

'I'm in the group from Encephalitis, er, in which as a carer I talk to people over in [Country] and that is, like, for me that's quite supportive to hear their side of it' (Chris, P40, L17-18)

Although participants described experiences of improved care and support, which offered hope for the future, there was also frustration due to the unpredictable nature of the recovery process. Three participants shared experiences of witnessing signs of progress in their loved one's condition, only to face the emotional setback of subsequent deterioration.

'*Mum's really good today," but then the next day it was like she was going backward again and we were like oh, it's so frustrating.' (Laura, P31, L11-13)*

For Chris, whose wife had experienced reoccurring encephalitis, this initial diagnosis enabled him to recognise the symptoms when they returned and to promptly seek medical intervention. As a result, they were then able to access appropriate specialists and treatment without delay.

'*He did remember us, you know. He did remember us. So he was good. Yeah. He referred us to people.' (Chris, P33, L17-18)*

Group Experiential Theme 3- The Caring Role Takes its Toll

This theme explores how the experience of caregiving affected their overall wellbeing and how relationships changed as a result of their loved one's illness.

Subtheme 1: The Impact on Wellbeing

All four of the participants described significant impairment in their overall wellbeing throughout the course of their loved one's initial symptoms, diagnostic and recovery journey. They reported experiencing stress and worry which severely impacted their sleep and ability to function in everyday activities.

'Oh, it was horrendous. I couldn't go to work. I had to call in sick. I was not sleeping' (Laura, P18, L 12-13)

Neil recalled incidents that were particularly traumatic for him. His descriptions of the events evidence just how much these memories have stuck with him and his reference to seeming *'like something out of a horror movie'* highlight just how disturbing he found the incident:

'Effectively they just strapped her down and forced the mask over her face, and she was screaming and screaming. It was... it was really like something out of a horror movie.' (Neil, P11, L16-18)

All participants recalled feeling overwhelmed by intense stress, persistent worry, fear and sleep deprivation, and at times felt they were at breaking point. Neil described a moment when he needed an outlet for this emotion:

**laughs awkwardly* 'I don't know why I did this, but a few times I just went into the car park and just shouted at the sky' (Neil, P19, L6-8)*

He laughed to himself in an awkward manner before saying '*I don't know why I did this*' which suggests he felt somewhat embarrassed by this display of raw emotion.

Financial concerns were another significant source of stress and worry for participants. All had to either drastically reduce their working hours or stop working altogether. Whilst Laura, Sharon and Neil expressed feeling fortunate that their employers were understanding, this did not lessen the financial strain. They still faced reduced income alongside additional expenses related to their loved one's hospital stay such as travel, parking, food and extra childcare costs.

'I'm still worrying about money, [despite *understanding employer] erm, so we've got a mortgage and the mortgage is up for renewal.' (Neil, P33, L22)*

Self-employed Chris reported that he had received a significant penalty for filing late tax returns and although this penalty was removed, he described the impact this had on him. His use of the word '*threat*' could be interpreted in multiple ways- either a literal reference to being threatened with a penalty, or more broadly as an expression of perceived threat to his overall wellbeing, particularly in the context of the significant challenges he was already facing.

'Well, they were reasonable about it, you know. I think, you know. But it was a big threat,' (Chris, P53, L10-11)

For Chris, his wife has longstanding difficulties due to her encephalitis. Throughout the interview it was clear Chris found it difficult to discuss his emotions and there was a sense that he felt his needs were not as important as others. He frequently referred to other people having problems of their own, so did not want to 'burden them' (Chris P54). He did not seem to acknowledge the difficulties he had faced.

'Yeah, I think it's worn me out in respect that, erm, the stress levels have been high. You know, I haven't...Yeah, I guess it's worn me out that, it's constant stress.' (Chris, P50, 18-19)

It appeared as though there was more Chris wanted to express but was holding back. He begins to open up – '*You know, I haven't...*',- but then stops. His use of 'I' suggests he might have wanted to share something personal. This hesitation could be linked to the possibility that he believes his needs are less important than those of others, leading him to withhold his thoughts as he does not feel they are worth discussing. He later disclosed that his career had been impacted due to his ongoing caring responsibilities, which demonstrates sacrifices he has made as a carer.

There was an overall sense of felt hopelessness for all participants in relation to their current situation and what the future might hold for their loved ones. The uncertainty around whether they would ever return to their premorbid functioning or if they would even survive had a profound impact on their wellbeing.

'I was at rock bottom, when I didn't know if my mum was ever going to improve,' (Laura, P22, L12-13)

Subtheme 2: The Long-Lasting Impact on Relationships

Both Laura and Sharon reflected on how they felt unsupported by friends and family which had resulted in the loss of relationships.:

'I could go on for a long time, but I fell out with a lot of my family on my mother's side because they weren't supportive. So, we don't speak anymore. So, yeah, it definitely, it tore a lot of relationships down. But at the same time, I think I saw some people's true colours and sometimes that happens, doesn't it?' (Laura, P36, L8-12)

Laura's use of the phrase '*it tore a lot of relationships down'* powerfully conveys the emotional weight of her experience, indicating a sense of loss. She concludes with the question

'*sometimes that happens, doesn't it?*' perhaps seeking reassurance for the situation and a desire to hear that she is not alone in this experience, to counteract the pain she is feeling.

Laura also described a long-term shift in parent-child role with her mother. She referred to the *'role of the mum*' as '*bossing*' her mother around '*telling her what to do*' (Laura, P51). It is possible this stems from the need to take control of her mother's care during her hospitalisation, driven by her concerns of neglect by hospital staff and fears for her mother's safety. Perhaps this fear persists at a deeper level, making it hard to let go of this control even after her mother had recovered from her illness.

Chris reflected on the positive, long-term impact on his relationship with his children. He considered this in relation to what their relationship might have been like had he not had to take on the role as their primary caregiver.

'we bonded quite well, with the kids really, from my point of view. More so than I would have done if it had just been, you know, if it hadn't happened so, you know, they had to rely on me and I, you know, had to rely on them' (Chris, P24, L12-14)

Group Experiential Theme 4- Reflecting on the Experience Now - I'm Just Glad They Are Still Here

This theme examines the enduring effects on the caregiver, alongside a sense of gratitude that the outcome was not more severe.

Subtheme 1: The Experience Changed Me as a Person

All of the participants felt they were more anxious about health now as a result of their loved one's illnesses, particularly in relation to the fear of relapse. Laura described herself as more of a 'worrier', and Chris reported feeling the need to constantly be aware and adjust his behaviour due to fear of causing his wife stress which might trigger a relapse. He laughed this comment off, but there was notable concern and seriousness in his tone.

'I have to, I'm conscious, actually, she hasn't been well, I have to rein things in a bit and try not to cause her any stress really (laughs)' (Chris, P42, L6-8)

Neil described his intense fear of relapse and how anything to do with his wife's head makes him fear the worst and significantly impacts his wellbeing:

'the thing we're most worried about now is relapse, and that feels like a sword hanging over your head all the time. So, like any time she gets a headache, I'm panicking, right... I'm in the other room thinking, "Oh, please don't relapse, please, please don't".' (Neil, P58, L1-6)

This quote powerfully illustrates the significant anxiety Neil continues to experience. His use of the metaphor '*a sword hanging over your head all the time'* conveys a pervasive sense of threat and ongoing psychological distress. When he described the panic felt if his wife experiences a headache, he paused and looked away, suggesting a need to compose himself in response to the emotion felt. He added that he must frequently check in with his wife about possible symptoms in an attempt to gain reassurance. However, this does not appear to alleviate his anxiety as he is left pleading to himself. Repetition of the word '*please*' really highlights his fear and desperation. He also noted that he and his wife were once enthusiastic travellers, however they no longer do this due to his ongoing fear of relapse:

'because we used to travel a lot, we used to go to places like Vietnam, Dubai, Thailand, Sri Lanka, and it's just if she'd relapsed, if this had happened abroad, it would have... I don't know if she'd have come back. Erm...'

Interviewer: 'So, has it stopped you wanting to travel?'

Neil: 'Oh, yeah, yeah. I... I just... yeah, I'm very scared about anything like that.' (Neil, P58, 10-16)

Neil and Sharon felt their experiences had made them more assertive and both felt this was in response to their outlook on life changing. Sharon described becoming more selective in how she chooses to spend her time due to time feeling more precious to her now:

'I've been asked to sit on committees and I've just gone, "No". (Laughs) Because it's a waste of my life' (Sharon, P45, L9-10)

Similarly, Neil reflected on having previously been a passive individual but noted that he is now less willing to tolerate certain situations, recognising that in the context of what he has experienced, there are far more serious concerns in life.

'I just think I went through so much that other things don't seem so important any more. Erm, so yeah, if somebody... if somebody is rude to me or slack at work, I'm just going to say what I think now because, you know, there's so much worse things that could happen in life.' (Neil, P60, L12-15)

Sharon spoke candidly about her experiences of her husband's time in intensive care. She recalled being present when other patients had died and seeing the impact this had on their families. She referred to a particular symbol staff would pin to the curtain when someone had passed and indicated feeling triggered by the presence of this symbol.

'I had to walk down this interminably [emphasis on word] long corridor that was just miserable, had to walk past the bereavement centre... And the bereavement centre had this bloody line drawing of a [symbol] which was the same...They had the laminated versions in the ICU. When somebody died they drew the curtains and pinned this bloody laminate of a [symbol] up and I hated that laminate of a [symbol], do you know what I mean? If I ever saw that again I'd probably lose it [hands up, looked away] Umm, and I just used to walk down.' (Sharon, P4, L4-8)

This quote conveys a profound sense of distress linked to Sharon's memory of this symbol. Her repeated use of the word '*bloody*' during the symbol description, along with placing her hands up in front of her- potentially indicating a desire to distance herself from the memory- averting her gaze from the camera, and the swift shift away from the topic, all suggest significant emotional discomfort. This reaction may stem from the traumatic closeness of her husband to death, and the fear that this symbol might have too been pinned to his curtain had he not survived. This possibility appears unbearable for her to contemplate. She reflected on the lasting impact her experiences had on her psychological well-being, noting that the effects had been significant enough for her husband to suggest she might have post-traumatic stress disorder.

'You can't have all of that happen to you without, you know, your psychology changing a little bit' (Sharon, P46, L3-4)

Subtheme 2: It Could Have Been So Much Worse

Both Laura and Neil thought about things that had happened during their journey that had potentially lead to a favourable outcome. For Laura, her mother's referral to the mental health hospital had been rejected due to them feeling she first needed further tests to rule out organic causes. She described believing her mother would have died had her referral been accepted by the mental health team:

'it could have turned out a lot different for us if the mental health team had have taken a bigger role in my mum's care and they would have taken her and she probably wouldn't be here' (Laura, P52, L15-17)

Neil reflected on how he felt their choice of attending a specific hospital was a critical factor in his wife's survival:

'this hospital was just picked purely based on it having the best maternity... we thought it had the best maternity. But yeah, it just so happened it... it had this visiting neurologist who we didn't know anything about, that I think had a major impact on saving [name]'s life.' (Neil, P26, L16-19)

Laura, Sharon and Neil each expressed a sense of relief for their loved one's current condition. They recalled moments during the acute phase of the illness when they feared their loved one's might not survive, and the hopelessness experienced during this time.

'I'm just happy that she's here and that she's able to function and that, you know, because we thought she'd be dead or in a nursing home.' (Laura, P49, 14-16)

'I feel just grateful to be honest, grateful that that she is where she is now.' (Laura, P49, 18-19)

When asked about their loved one's current recovery, they thought about this in reference to what they now knew about possible encephalitis outcomes and how things could have been different for them. They reflected on some of the challenges their loved ones continue to experience, but overall the participants just felt gratitude for their loved ones being alive and home. There was a shared sentiment amongst Laura, Sharon and Neil that despite the trauma they had all endured, the outcome 'could have been so much worse'.

'You read all the stories, don't you, and you just kind of go, "Oh gosh, this could've been so much worse," and at the end of the day that's where I kind of like had to say it, "This could have been so much worse and it isn't". (Sharon, P32, L4-6)

Discussion

This study used IPA to explore caregivers' experiences of anti-NMDAR encephalitis, from initial symptom presentation, diagnosis, and treatment, to present day recovery. Four Group Experiential Themes (GETs) were identified: 'The Fight for Diagnosis', 'Everything Changed after a Diagnosis', 'The Caring Role Takes it's Toll', and 'Reflecting on the Experience Now- I'm Just Glad They're Still Here'.

Research into the impact on caregivers of individuals with encephalitis is limited. However, the findings of this study are consistent with research in other areas such as caregivers of individuals with traumatic brain injury. Kanmani and Raju (2019) used both

questionnaires and focus groups to examine psychosocial concerns of caregivers in trauma care settings following brain injury. The focus groups included questions around difficulties accessing treatment, and what made them feel more worried during hospitalisation. Through the use of thematic analysis, they identified themes of difficulty accessing timely care, uncertain prognosis, financial implications, and emotional distress.

All participants reflected most on their experiences of the diagnostic journey. They highlighted feeling unheard and invalidated by medical staff making initial assumptions around substance misuse and psychiatric illness, despite family members objections and the absence of psychiatric history. This resulted in a delay to diagnosis and the correct treatment. This initial misdiagnosis is something which is consistent with a large amount of encephalitis literature (Baumgartner et al., 2019), and is concerning given research has suggested sooner access to the correct treatment is associated with better recover outcomes (Titulaer et al., 2013).

Some of the participants reported that they started to believe that their loved ones were having ‘a break down’ and there was a sense of self-blame for not noticing signs earlier. Atkin et al., (2010) describe family members experience of guilt when learning their loved ones had encephalitis and not a psychiatric condition like they had believed, and the negative impact this can have on relationships. This emphasises the importance of considering organic causes for psychiatric presentations particularly for individuals with no history of psychiatric difficulties, not just for prompt access to treatment, but also for the wellbeing of family members.

In the current study, participants reported poor communication from staff which created a sense of feeling in the dark. Participants recalled being left without updates, or receiving partial information about their loved one’s condition which resulted in them fearing the worst and experiencing significant distress. This is incredibly important to highlight given a large amount of the research in trauma and ICU settings has identified one of the most important caregiver needs as clear, consistent and timely information from healthcare professionals about their loved one’s condition and progress (De Goumoëns et al., 2019; Kreitzer et al., 2020; Lindlof et al., 2024). Research shows that receiving regular updates on loved one’s condition and clear information can help alleviate family concerns (Dees et al., 2022). In one study, caregivers suggested that having a consistent point of contact for the duration of care could improve communication and support their wellbeing (Kreitzer et al., 2020). This is something that could have helped participants in the current study to feel less in the dark throughout their loved one’s illness.

Participants in the present study felt there was a significant improvement in their overall experience once their loved one had received the correct diagnosis and were transferred to specialist services. One notable positive outcome of diagnostic clarity was that it provided access to support services offered by an encephalitis charity, which all participants reported

was helpful. They described finding both information provided and the opportunity to speak with others who had been through similar experiences extremely helpful, which is consistent with research that has shown that caregivers seeking support from others with the same conditions was beneficial (Adams & Dahdah, 2016; Lindlöf et al., 2024). Participants in the current study found this support offered them hope and described feeling a part of a 'community'. They also valued having a space to offload to people who understood what they were going through. Notably, all four participants found this charity by undertaking their own research and had not been signposted by any of the professionals involved in their loved one's care. This highlights the importance of ensuring the signposting of caregivers to support services is incorporated into patient treatment plans, to ensure caregivers are able to access these valuable means of support.

Participants also reported feeling more confident in staff experience and knowledge on the specialist wards, along with experiencing more compassion from staff; perhaps due to staff's greater awareness of encephalitis. They felt listened to and experienced more person centred care. De Goumoëns et al., (2019) highlight the importance of involving family members as this may improve caregiving wellbeing and patient outcomes. They base their recommendations on the Calgary Family Assessment Model which suggests that healthcare professionals should not only consider the needs of the patient, but also of the family system as they influence health outcomes (Wright & Leahey, 1984). Goumoëns et al., (2019) suggest conducting a thorough evaluation of family dynamics, resources, strengths, and needs to identify risk factors. They highlight the use of a genogram to aid information gathering about families. For the present study, this would have helped identify those with limited support networks and those with additional caring responsibilities, which might have improved staff insight into caregivers' situations and highlighted individuals who may have needed further support or accommodations.

The current study highlights the profound effect the whole experience had on the caregivers wellbeing, and it is clear that this emotional trauma has had a long lasting impact on all four participants. They expressed a persistent fear of relapse and continuous anxiety about potential health issues. Participants described how their experiences of care had led to a permanent mistrust of healthcare services, with them being less likely to seek support in the future and hesitant to return to the same hospital for medical assistance. None of the participants were offered psychological support at any point throughout their loved one's illness, despite feeling as though this would have benefitted them, "*of course I don't even come into the equation…I think that is really missing" (Sharon, P43, L8)*. This is particularly concerning as the literature shows that access to psychological support reduces caregiver distress, and feelings of loss of control and uncertainty (Johnson et al., 1995; Kanmani & Raju, 2019).

All four of the patients in the current study were critically ill, with three of them being admitted to ICU. Mohr (2000) argue that families of individuals in ICU are essential components in patients' recovery and therefore professionals should also focus on their needs alongside the patient's treatment. Studies looking at interventions which support psychological wellbeing for caregivers of ICU patients have reported lower levels of anxiety, depression and insomnia along with improved symptoms relating to post-traumatic stress disorder (Cherak et al., 2021; McPeake et al., 2022; Watland et al., 2025). Furthermore, enhanced caregiver wellbeing has been linked with more effective support for ICU patients during the recovery process (McPeake et al., 2022) . Therefore, the literature suggests supporting caregiver wellbeing is crucial, not only for their own sake, but also for the patient's recovery. In light of these findings, psychological interventions should be considered for caregivers of individuals with encephalitis to offer support during their loved one's hospitalisation. Given the long-lasting psychological impact reported by participants, follow-up services, such as caregiver support groups or referrals to community-based psychological care should form part of the patient discharge process, recognising the wider systemic impact of serious illness on families.

The participants in the current study expressed a sense of gratitude for their current situation, despite the ongoing challenges they continue to face. Their traumatic experience had resulted in a deeper appreciation of life, and highlighted what was truly important to them. This is consistent with the idea of Post-traumatic Growth (PTG) which refers to the positive psychological change that can occur from effectively coping with a traumatic experience. That is, individuals experiences of distress lead to cognitive rebuilding which results in greater resilience. This model suggests growth usually occurs across five domains; a greater appreciation of life, enhanced interpersonal relationships, increased sense of personal strength, recognition of new life opportunities, and spiritual or religious growth (Tedeschi & Calhoun, 2004). Research suggests that there are ways in which healthcare staff can facilitate PTG during hospitalisation; such as daily diaries to create deeper understanding of the hospital experience, family engagement and addressing caregiver burden, and motivational interviewing (Jones et al., 2020).

Strengths & Limitations

To the author's knowledge, this is the first study to qualitatively examine experiences of caregivers of individuals with anti-NMDAR encephalitis, therefore this research has provided valuable insight into their perspectives and challenges. It has identified key areas for service improvement which has the potential to positivity influence caregiver wellbeing and experiences of care.

This study involved a small sample, which may be considered a limitation. However Smith et al., (2022) argue that a smaller sample enables in-depth, detailed analysis of each case and that for IPA quality is more important that quantity. The small number of participants meant the study had a homogenous sample of people who had experience of a rare neurological disorder within the UK healthcare system. A limitation of the sample is that there is the possibility of self-selection bias due to individuals being more motivated to share negative experiences over positive. Therefore, identifying individuals who had a more positive experience of healthcare services as part of pre-screening could help achieve a more balanced sample. Furthermore, the current study included mainly female patients (3:1) and those who were further along in their recovery (*M* = 29.76 months post-discharge), therefore it could be helpful to explore experiences of male patients or those closer to the illness episode to achieve a more representative sample.

Future Research

The present study captured caregivers' experiences of supporting their loved ones through the initial onset of symptoms, diagnosis, treatment, and recovery during hospitalisation. However, there was limited explicit discussion of their caregiving responsibilities during this period or after hospital discharge, which may reflect the scope of the interview questions. Therefore, it could be helpful for future research to explore the caregiving role in greater depth, including aspects such as the nature of care provided, changes in family dynamics, and the emotional and practical burden placed on caregivers.

The experiences of the four participants highlight a clear need for psychological support during the hospitalisation of a loved one with anti-NMDAR encephalitis. Whilst this study provided valuable qualitative insight into experiences, future research could focus on a quantitative exploration of the psychological impacts identified in the present study, such as trauma and anxiety. This could help inform the development of interventions to support caregivers and to evaluate their effectiveness during hospitalisation and in the long-term.

A lack of awareness of encephalitis among healthcare professionals remains an ongoing issue. It is important that those who families have first initial contact with in the early stages (e.g. GP's, Accident and Emergency departments, emergency phone line operators) have more awareness of encephalitis. Future research could explore whether training and increased awareness lead to earlier symptom recognition and improved diagnostic outcomes.

Finally, there were a number of parents who had responded to the study recruitment advertisement and expressed a keen interest to participate, but were unable to do so due to this study exploring experiences of those caring for adults. Therefore, a similar study could look at the experiences of parents caring for a child with anti-NMDAR encephalitis to assess whether similar themes are present.

Conclusion

The present study explored caregivers experiences of caring for a family member with anti-NMDAR encephalitis. The study highlighted challenges faced by caregivers, the key role healthcare professionals play in their experience, and the enduring impact the caregiving role can have on wellbeing. However, despite the significant hardships that the caregivers described, there was a strong sentiment that they were simply relieved that their loved one had survived. This seems to reflect the depth of hopelessness they had once felt regarding their loved one's future. The identified themes demonstrate the importance of increasing awareness of encephalitis amongst healthcare professionals, improving communication between staff and families, and the need for support for caregiver wellbeing.

References

Atkin, K., Stapley, S., & Easton, A. (2010). No one listens to me, nobody believes me: self management and the experience of living with encephalitis. *Social science & medicine*, *71*(2), 386-393.

Adams, D., & Dahdah, M. (2016). Coping and adaptive strategies of traumatic brain injury survivors and primary caregivers. *NeuroRehabilitation*, *39*(2), 223-237. https://doi.org/10.3233/nre-161353

Barry, H., Hardiman, O., Healy, D. G., Keogan, M., Moroney, J., Molnar, P. P., Cotter, D. R., & Murphy, K. C. (2011). Anti-NMDA receptor encephalitis: an important differential diagnosis in psychosis. *The British Journal of Psychiatry*, *199*(6), 508-509.

Biggerstaff, D., & Thompson, A. R. (2008). Interpretative Phenomenological Analysis (IPA): A Qualitative Methodology of Choice in Healthcare Research. *Qualitative Research in Psychology*, *5*(3), 214-224. https://doi.org/10.1080/14780880802314304

Blum, R. A., Tomlinson, A. R., Jetté, N., Kwon, C.-S., Easton, A., & Yeshokumar, A. K. (2020). Assessment of long-term psychosocial outcomes in anti-NMDA receptor encephalitis. *Epilepsy & Behavior*, *108*, 107088. https://doi.org/https://doi.org/10.1016/j.yebeh.2020.107088

Bodley-Scott, S. E. M., & Riley, G. A. (2015). How Partners Experience Personality Change After Traumatic Brain Injury – Its Impact on Their Emotions and their Relationship. *Brain Impairment*, *16*(3), 205-220. https://doi.org/10.1017/BrImp.2015.22

Cherak, S. J., Rosgen, B. K., Amarbayan, M., Wollny, K., Doig, C. J., Patten, S. B., Stelfox, H. T., & Fiest, K. M. (2021). Mental Health Interventions to Improve Psychological Outcomes in Informal Caregivers of Critically Ill Patients: A Systematic Review and Meta-Analysis. *Crit Care Med*, *49*(9), 1414-1426. https://doi.org/10.1097/ccm.0000000000005011

Cohen, J., Sotoca, J., Gandhi, S., Yeshokumar, A. K., Gordon-Lipkin, E., Geocadin, R. G., Frick, K. D., Probasco, J. C., & Venkatesan, A. (2019). Autoimmune encephalitis: A costly condition. *Neurology*, *92*(9), e964-e972. https://doi.org/10.1212/wnl.0000000000006990

Costa, E., Mateus, C., Carter, B., Siner, S., Jones, D., Evans, L., Preston, J., Mehta, F., Lambert, C., Hollingsworth, B., Carrol, E. D., & Sefton, G. (2023). The economic burden experienced by carers of children who had a critical deterioration at a tertiary children's hospital in the United Kingdom (the DETECT study): an online survey. *BMC Pediatrics*, *23*(1), 436. https://doi.org/10.1186/s12887-023-04268-8

Covinsky, K. E., Goldman, L., Cook, E. F., Oye, R., Desbiens, N., Reding, D., Fulkerson, W., Connors, A. F., Jr., Lynn, J., & Phillips, R. S. (1994). The impact of serious illness on patients' families. SUPPORT Investigators. Study to Understand Prognoses and Preferences for Outcomes and Risks of Treatment. *Jama*, *272*(23), 1839-1844. https://doi.org/10.1001/jama.272.23.1839

Dalmau, J., Armangué, T., Planagumà, J., Radosevic, M., Mannara, F., Leypoldt, F., Geis, C., Lancaster, E., Titulaer, M. J., Rosenfeld, M. R., & Graus, F. (2019). An update on anti-NMDA receptor encephalitis for neurologists and psychiatrists: mechanisms and models. *Lancet Neurol*, *18*(11), 1045-1057. https://doi.org/10.1016/s1474-4422(19)30244-3

Dalmau, J., Gleichman, A. J., Hughes, E. G., Rossi, J. E., Peng, X., Lai, M., Dessain, S. K., Rosenfeld, M. R., Balice-Gordon, R., & Lynch, D. R. (2008). Anti-NMDA-receptor encephalitis: case series and analysis of the effects of antibodies. *Lancet Neurol*, *7*(12), 1091-1098. https://doi.org/10.1016/s1474-4422(08)70224-2

Dalmau, J., Lancaster, E., Martinez-Hernandez, E., Rosenfeld, M. R., & Balice-Gordon, R. (2011). Clinical experience and laboratory investigations in patients with anti-NMDAR encephalitis. *Lancet Neurol*, *10*(1), 63-74. https://doi.org/10.1016/s1474-4422(10)70253-2

Dalmau, J., Tüzün, E., Wu, H. Y., Masjuan, J., Rossi, J. E., Voloschin, A., Baehring, J. M., Shimazaki, H., Koide, R., King, D., Mason, W., Sansing, L. H., Dichter, M. A., Rosenfeld, M. R., & Lynch, D. R. (2007). Paraneoplastic anti-N-methyl-D-aspartate receptor encephalitis associated with ovarian teratoma. *Ann Neurol*, *61*(1), 25-36. https://doi.org/10.1002/ana.21050

Davidson, J. E., Jones, C., & Bienvenu, O. J. (2012). Family response to critical illness: postintensive care syndrome-family. *Crit Care Med*, *40*(2), 618-624. https://doi.org/10.1097/CCM.0b013e318236ebf9

De Goumoëns, V., Didier, A., Mabire, C., Shaha, M., & Diserens, K. (2019). Families' needs of patients with acquired brain injury: Acute phase and rehabilitation. *Rehabilitation Nursing Journal*, *44*(6), 319-327.

Dees, M. L., Carpenter, J. S., & Longtin, K. (2022). Communication Between Registered Nurses and Family Members of Intensive Care Unit Patients. *Critical Care Nurse*, *42*(6), 25-34. https://doi.org/10.4037/ccn2022913

Ennis, N., Rosenbloom, B. N., Canzian, S., & Topolovec-Vranic, J. (2013). Depression and anxiety in parent versus spouse caregivers of adult patients with traumatic brain injury: a

systematic review. *Neuropsychol Rehabil*, *23*(1), 1-18. https://doi.org/10.1080/09602011.2012.712871

Finke, C., Kopp, U. A., Prüss, H., Dalmau, J., Wandinger, K.-P., & Ploner, C. J. (2012). Cognitive deficits following anti-NMDA receptor encephalitis. *Journal of Neurology, Neurosurgery & Psychiatry*, *83*(2), 195. https://doi.org/10.1136/jnnp-2011-300411

Gole, S., & Anand, A. (2025). Autoimmune Encephalitis. In *StatPearls*. StatPearls Publishing

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Hiesgen, J., & Schutte, C. (2023). Autoimmune encephalitis : Part 1 (Epidemiology, Pathophysiology and Clinical spectrum). *South African medical journal = Suid-Afrikaanse tydskrif vir geneeskunde*, *113*(3), 116–121. https://doi.org/10.7196/SAMJ.2023.v113i3.780

Jasper, M. A. (2005). Using reflective writing within research. *Journal of Research in Nursing*, *10*(3), 247-260. https://doi.org/10.1177/174498710501000303

Johnson, S. K., Craft, M., Titler, M., Halm, M., Kleiber, C., Montgomery, L. A., Megivern, K., Nicholson, A., & Buckwalter, K. (1995). Perceived changes in adult family members' roles and responsibilities during critical illness. *Image: the Journal of Nursing Scholarship*, *27*(3), 238-243.

Jones, A. C., Hilton, R., Ely, B., Gororo, L., Danesh, V., Sevin, C. M., Jackson, J. C., & Boehm, L. M. (2020). Facilitating Posttraumatic Growth After Critical Illness. *American Journal of Critical Care*, *29*(6), e108-e115. https://doi.org/10.4037/ajcc2020149

Kanmani, T. R., & Raju, B. (2019). Caregiver's Psychosocial Concerns and Psychological Distress in Emergency and Trauma Care Setting. *J Neurosci Rural Pract*, *10*(1), 54-59. https://doi.org/10.4103/jnrp.jnrp_129_18

Ko, J. Y., Aycock, D. M., & Clark, P. C. (2007). A comparison of working versus nonworking family caregivers of stroke survivors. *J Neurosci Nurs*, *39*(4), 217-225. https://doi.org/10.1097/01376517-200708000-00006

Kratz, A. L., Sander, A. M., Brickell, T. A., Lange, R. T., & Carlozzi, N. E. (2017). Traumatic brain injury caregivers: A qualitative analysis of spouse and parent perspectives on quality of life. *Neuropsychological Rehabilitation*, *27*(1), 16-37. https://doi.org/10.1080/09602011.2015.1051056

Kreitzer, N., Bakas, T., Kurowski, B., Lindsell, C. J., Ferioli, S., Foreman, B., Ngwenya, L. B., Thomas, S., Keegan, S., & Adeoye, O. (2020). The Experience of Caregivers Following a Moderate to Severe Traumatic Brain Injury Requiring ICU Admission. *J Head Trauma Rehabil*, *35*(3), E299-e309. https://doi.org/10.1097/htr.0000000000000525

Lejuste, F., Thomas, L., Picard, G., Desestret, V., Ducray, F., Rogemond, V., Psimaras, D., Antoine, J. C., Delattre, J. Y., Groc, L., Leboyer, M., & Honnorat, J. (2016). Neuroleptic intolerance in patients with anti-NMDAR encephalitis. *Neurol Neuroimmunol Neuroinflamm*, *3*(5), e280. https://doi.org/10.1212/nxi.0000000000000280

Lindlöf, J., Turunen, H., Välimäki, T., Huhtakangas, J., Verhaeghe, S., & Coco, K. (2024). Empowering Support for Family Members of Brain Injury Patients in the Acute Phase of Hospital Care: A Mixed-Methods Systematic Review. *J Fam Nurs*, *30*(1), 50-67. https://doi.org/10.1177/10748407231171933

Livingston, M. G., Brooks, D. N., & Bond, M. R. (1985). Three months after severe head injury: psychiatric and social impact on relatives. *J Neurol Neurosurg Psychiatry*, *48*(9), 870-875. https://doi.org/10.1136/jnnp.48.9.870

Marsh, N. V., Kersel, D. A., Havill, J. H., & Sleigh, J. W. (1998). Caregiver burden at 6 months following severe traumatic brain injury. *Brain Inj*, *12*(3), 225-238. https://doi.org/10.1080/026990598122700

McPeake, J., Henderson, P., MacTavish, P., Devine, H., Daniel, M., Lucie, P., Bollan, L., Hogg, L., MacMahon, M., Mulhern, S., Murray, P., O'Neill, L., Strachan, L., Iwashyna, T. J., Shaw, M., & Quasim, T. (2022). A multicentre evaluation exploring the impact of an integrated health and social care intervention for the caregivers of ICU survivors. *Critical Care*, *26*(1), 152. https://doi.org/10.1186/s13054-022-04014-z

Mohr, W. K. (2000). Partnering with families. *Journal of psychosocial nursing and mental health services*, *38*(1), 15-22. https://doi.org/10.3928/0279-3695-20000101-10

Nguyen, L., & Wang, C. (2023). Anti-NMDA Receptor Autoimmune Encephalitis: Diagnosis and Management Strategies. *International Journal of General Medicine*, *16*(null), 7-21. https://doi.org/10.2147/IJGM.S397429

Peery, H. E., Day, G. S., Dunn, S., Fritzler, M. J., Prüss, H., De Souza, C., Doja, A., Mossman, K., Resch, L., Xia, C., Sakic, B., Belbeck, L., & Foster, W. G. (2012). Anti-NMDA receptor encephalitis. The disorder, the diagnosis and the immunobiology. *Autoimmunity Reviews*, *11*(12), 863-872. https://doi.org/https://doi.org/10.1016/j.autrev.2012.03.001

Pietkiewicz, I., & Smith, J. (2014). A practical guide to using Interpretative Phenomenological Analysis in qualitative research psychology. *CPPJ*, *20*, 7-14. https://doi.org/10.14691/CPPJ.20.1.7

Ponsford, J. (2003). Sexual changes associated with traumatic brain injury. *Neuropsychological Rehabilitation*, *13*(1-2), 275-289. https://doi.org/10.1080/09602010244000363

Ponsford, J., & Schönberger, M. (2010). Family functioning and emotional state two and five years after traumatic brain injury. *J Int Neuropsychol Soc*, *16*(2), 306-317. https://doi.org/10.1017/s1355617709991342

Rodham, K., Fox, F., & Doran, N. (2015). Exploring analytical trustworthiness and the process of reaching consensus in interpretative phenomenological analysis: lost in transcription. *International Journal of Social Research Methodology*, *18*(1), 59-71. https://doi.org/10.1080/13645579.2013.852368

Rückholdt, M., Tofler, G. H., & Buckley, T. (2017). The impact of hospitalisation on a visiting family member: A case study and discussion. *Australian Critical Care*, *30*(3), 182-185. https://doi.org/https://doi.org/10.1016/j.aucc.2016.08.003

Sander, A. M., S., C. J., High, J. W. M., Cory, B., Leah, N., & and Scheibel, R. (2002). Relationship of family functioning to progress in a post-acute rehabilitation programme following traumatic brain injury. *Brain Injury*, *16*(8), 649-657. https://doi.org/10.1080/02699050210128889

Smith, J. A., & Osborn, M. (2003). Interpretative phenomenological analysis. In *Qualitative psychology: A practical guide to research methods.* (pp. 51-80). Sage Publications, Inc.

Smith, J. A., Flowers, P., & Larkin, M. (2022). Interpretative phenomenological analysis : theory, method and research (2nd edition. ed.). SAGE.

Tedeschi, R., & Calhoun, L. (2004). Tedeschi RG, Calhoun LGPosttraumatic growth: conceptual foundations and empirical evidence. Psychol Inq 15(1): 1-18. *Psychological Inquiry - PSYCHOL INQ*, *15*, 1-18. https://doi.org/10.1207/s15327965pli1501_01

Titulaer, M. J., McCracken, L., Gabilondo, I., Armangué, T., Glaser, C., Iizuka, T., Honig, L. S., Benseler, S. M., Kawachi, I., Martinez-Hernandez, E., Aguilar, E., Gresa-Arribas, N., Ryan-Florance, N., Torrents, A., Saiz, A., Rosenfeld, M. R., Balice-Gordon, R., Graus, F., & Dalmau, J. (2013). Treatment and prognostic factors for long-term outcome in patients with anti-NMDA receptor encephalitis: an observational cohort study. *Lancet Neurol*, *12*(2), 157-165. https://doi.org/10.1016/s1474-4422(12)70310-1

Tomlinson, A. R., Blum, R. A., Jetté, N., Kwon, C.-S., Easton, A., & Yeshokumar, A. K. (2020). Assessment of care transitions and caregiver burden in anti-NMDA receptor encephalitis. *Epilepsy & Behavior*, *108*, 107066. https://doi.org/https://doi.org/10.1016/j.yebeh.2020.107066

Watland, S., Nes, L. S., Ekeberg, Ø., Rostrup, M., Hanson, E., Ekstedt, M., ... & Børøsund, E. (2025). The caregiver pathway intervention can contribute to reduced post-intensive care

syndrome among family caregivers of ICU survivors: A randomized controlled trial. *Critical Care Medicine*, *53*(3), e555-e566. *DOI:* 10.1097/CCM.0000000000006546

Yardley, L. (2000). Dilemmas in Qualitative Health Research. Psychology and Health, 15(2), 215-228. https://doi.org/10.1080/08870440008400302

Zarit, S. H., Reever, K. E., & Bach-Peterson, J. (1980). Relatives of the impaired elderly: correlates of feelings of burden. *Gerontologist*, *20*(6), 649-655. https://doi.org/10.1093/geront/20.6.649

Appendix A - Journal Submission Guidelines: Journal of Clinical and Experimental Neuropsychology

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Thank you for choosing to submit your paper to us. These instructions will ensure we have everything required so your paper can move through peer review, production and publication smoothly. Please take the time to read and follow them as closely as possible, as doing so will ensure your paper matches the journal's requirements.

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**Usage in 2020-2022 for articles published in 2018-2022.

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- **Structure**

Your paper should be compiled in the following order: title page; structured abstract; keywords; main text introduction, materials and methods, results, discussion; acknowledgments; declaration of interest (disclosure) statement; references; appendices (as appropriate); table(s) with caption(s) (on individual pages); figures; figure captions (as a list).

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2. Should contain a structured abstract of **300 words**. Introduction: Describe the background to the study, hypotheses, aims, objectives, research questions, etc. Method: Include outline of the methodology and design of experiments; materials employed and subject/participant numbers with basic relevant demographic information; the nature of the analyses performed. Results: Outline the important and relevant results of the analyses. Conclusions: State the basic conclusions and implications of the study. State, clearly and usefully, if there are implications for management, treatment or service delivery. Note: Any clinical implications should be clearly stated. Avoid abbreviations, diagrams, and references to the text in the abstract.
3. **Graphical abstract** (optional). This is an image to give readers a clear idea of the content of your article. It should be a maximum width of 525 pixels. If your image is narrower than 525 pixels, please place it on a white background 525 pixels wide to ensure the dimensions are maintained. Save the graphical abstract as a .jpg, .png, or .tiff. Please do not embed it in the manuscript file but save it as a separate file, labelled GraphicalAbstract1.
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Updated 19 May 2023

Appendix B – Search Terms

AB (psychosocial OR "social function*" OR social OR "quality of life" OR "well-being" OR "self-care" OR psychological OR adaptive OR relationship*) OR TI (psychosocial OR "social function*" OR social OR "quality of life" OR "well-being" OR "self-care" OR psychological OR adaptive OR relationship*)

AB ("autoimmune encephalitis" OR "anti* encephalitis" OR "NMDA* encephalitis" OR "ANMDA* encephalitis" "paraneoplastic encephalitis" OR "limbic encephalitis" OR "anna* encephalitis") OR TI ("autoimmune encephalitis" OR "anti* encephalitis "OR "NMDA* encephalitis" OR "ANMDA* encephalitis" "paraneoplastic encephalitis" OR "limbic encephalitis" OR "anna* encephalitis")

Appendix C – Quality Assessment Tool

Quality Assessment Tool for Observational Cohort and Cross-sectional studies (National Heart Lung and Blood Institute, 2013)

Study	1	2	3	4	5	6	7	8	9	10	11	12	13	14	Reviewer 1 rating	Reviewer 2 rating
Ariño et al., (2020)	Y	Y	Y	Y	N	Y	Y	N/A	Y	Y	Y	N/A	Y	N/A	Good	
Bach (2014)	Y	Y	NR	NR	N	Y	N	N/A	Y	Y	Y	N/A	Y	N/A	Fair	
Benoit et al., (2023)	Y	Y	Y	Y	N	Y	Y	N/A	Y	Y	Y	N/A	Y	N/A	Good	
Binks et al., (2024)	Y	Y	Y	Y	N	Y	Y	N/A	Y	Y	Y	N/A	Y	N/A	Good	
Brenner et al., (2024)	Y	Y	Y	Y	N	Y	Y	N/A	Y	Y	Y	N/A	Y	N/A	Good	Good
Gordon-Lipkin et al., (2017)	Y	Y	Y	Y	N	Y	Y	N/A	Y	N	Y	N/A	Y	N/A	Good	
Guo et al., (2023)	Y	Y	Y	Y	N	Y	Y	N/A	Y	Y	N	N/A	Y	N/A	Fair	
Hirose et al., (2023)	Y	Y	N	Y	N	Y	Y	N/A	Y	N	Y	N/A	N/A	N/A	Good	
McKeon	Y	Y	Y	Y	N	Y	Y	N/A	Y	N	Y	N/A	Y	N/A	Good	
Morgan et al., (2024)	Y	Y	Y	Y	N	Y	Y	N/A	Y	Y	Y	N/A	Y	N/A	Good	Good
Sarkis et al., (2014)	Y	Y	Y	Y	N	Y	Y	N/A	Y	N	Y	N/A	Y	N/A	Good	
Seifert-Held et al.,(2021)	Y	Y	Y	Y	N	Y	Y	N/A	Y	Y	N	N/A	Y	N/A	Fair	
Yeshokumar et al., (2017)	Y	Y	Y	Y	N	Y	Y	N/A	Y	N	Y	N/A	Y	N/A	Good	

Quality Assessment Tool Questions

1. Was the research question or objective in this paper clearly stated?
2. Was the study population clearly specified and defined?
3. Was the participation rate of eligible persons at least 50%?
4. Were all the subjects selected or recruited from the same or similar populations (including the same time period)? Were inclusion and exclusion criteria for being in the study prespecified and applied uniformly to all participants?
5. Was a sample size justification, power description, or variance and effect estimates provided?
6. For the analyses in this paper, were the exposure(s) of interest measured prior to the outcome(s) being measured?

7. Was the timeframe sufficient so that one could reasonably expect to see an association between exposure and outcome if it existed?
8. For exposures that can vary in amount or level, did the study examine different levels of the exposure as related to the outcome (e.g., categories of exposure, or exposure measured as continuous variable)?
9. Were the exposure measures (independent variables) clearly defined, valid, reliable, and implemented consistently across all study participants?
10. Was the exposure(s) assessed more than once over time?
11. Were the outcome measures (dependent variables) clearly defined, valid, reliable, and implemented consistently across all study participants?
12. Were the outcome assessors blinded to the exposure status of participants?
13. Was loss to follow-up after baseline 20% or less?
14. Were key potential confounding variables measured and adjusted statistically for their impact on the relationship between exposure(s) and outcome(s)?

Appendix D – Interview Schedule

Topic Focus	Primary Question	Prompts
Pre-diagnosis	Tell me what you remember about your wife's first symptoms of encephalitis	• What were you feeling during this time?
Diagnostic journey	Tell me about how your wife was diagnosed	• Were there any different diagnoses explored before being diagnosed with encephalitis? • How long did it take to receive a diagnosis? • What was this experience like for you? • Did you feel listened to? • Was there any other information that you would have liked or would have found helpful at this stage?
Treatment journey	Tell me about what the treatment was like for encephalitis	• What happened while they were being treated? • Were they admitted to hospital? If so, how long were they in hospital? • Was this near/far from home? • Did you feel staff on the ward were well informed about encephalitis? • How did this affect you personally? • Did you feel you were well informed about encephalitis and what recovery might be like? • Would anything else have felt helpful at this stage?
Discharge	Tell me about the day your wife was discharged.	• Did you feel prepared for discharge? Were you told what to expect? • How was the transition managed? • Were there any support services in place for your wife's discharge into the community? • Can you tell me how you felt when your wife was discharged?
Recovery	Where is your wife in her recovery journey now?	• what difficulties do they currently have? (e.g. mood, personality changes, memory)

		• Did you feel you were well supported during the recovery process/do you feel well supported? • Were you given help finding support (e.g. support groups, charities) • How has your caring role affected you personally?
Views on care	how do you feel about the care/support you and your wife received?	• Did it match up to expectations? Was it different? • Is there anything you would have liked to have been different in the care you received from services? • Has this changed you at all as a person?
Ending	Is there anything that we have not spoken about that you would like to share with me about your experience of caring for your wife?	

Prompts for depth:

Why?

How?

Can you tell me more about that?

Tell me what you were thinking?

How did you feel?

Can you tell me what you mean by "……..."?

Appendix E- Recruitment Poster

Appendix F- Participant Information Sheet, Consent, and Debrief Forms

Participant Information Sheet

Study Title: Understanding caregiver experiences of caring for someone with Anti NMDA Receptor Encephalitis

Researcher: Hayley Grantham (Trainee Clinical Psychologist)

Supervisors: Dr Warren Dunger (Clinical Neuropsychologist), Dr Jane McNeil (Consultant Clinical Neuropsychologist).

ERGO number: 87906 Version 4, 13/12/24

You are being invited to take part in the above research study. To help you decide whether you would like to take part or not, it is important that you understand why the research is being done and what it will involve. Please read the information below carefully and ask questions if anything is not clear or you would like more information before you decide to take part in this research. You may like to discuss it with others, but it is up to you to decide whether or not to take part. If you are happy to participate you will be asked to sign a consent form.

What is the research about?

My name is Hayley Grantham, and I am a Trainee Clinical Psychologists at the University of Southampton. This research is part of my academic qualification with the University of Southampton.

I am inviting you to participate in a study which is exploring caregivers experiences of caring for or who have cared for individuals with anti-NMDA receptor encephalitis living in the UK.

There is limited research on carers of people with anti-NMDA receptor encephalitis and therefore I hope to gain detailed information about carers' experiences from the early stages of their loved one's first symptoms, diagnosis, treatment, discharge into the community, and recovery journey. I hope that this research will help to better understand the needs of this group.

This study was approved by the Faculty Research Ethics Committee (FREC) at the University of Southampton (Ethics/ERGO Number: 87906).

Why have I been asked to participate?

You have been asked to participate because you have cared for a family member who has had anti-NMDA receptor encephalitis within the last 5 years. To participate in this study, you must have known your loved one for at least 6 months before initial symptom onset. Your loved one must have been discharged into the community for at least 3 months at the time of study participation and you must have been living in the UK during symptom onset through to hospital discharge.

I hope to recruit between 6-8 individuals to participate in this study.

What will happen to me if I take part?

This study involves taking part in an interview online via MS Teams, which will last for around 60 minutes. The interview will be video and audio recorded in order for them to be transcribed and analysed in detail after the interview is complete.

There will be two separate recordings:

1. Verbal consent to participate in the interview
2. The interview

The interview recording will be transcribed by a confidential transcription service. Recording of the interview is a requirement for participation in this research.

The recording of your verbal consent (recording 1) will be stored securely in line with the University of Southampton data management policy.

The interview recording (recording 2) will be destroyed once data analysis has taken place.

If you would like to participate in the study, you will be asked to read through a consent form. Together with the researcher, you will plan where and when the interview will take place. Once the details of this meeting are agreed, a confirmation email will be sent to you containing a link for the MS Teams meeting. You will be sent a reminder email one week before and one day before the interview.

You will have the opportunity to ask any questions, and if you are happy, recording will commence in order for you to give verbal consent to participate. You and the researcher will also agree how to let the researcher know if you are feeling distressed or if something is too difficult to discuss, as well as if you would like a break or to stop the interview.

The interview will last up to 60 minutes. You will be asked several questions about your experiences of caring for someone with anti-NMDA receptor encephalitis. These might include things like “tell me about what support was available when your loved one was discharged from hospital”.

You have the right to withdraw at any time during the interview. You can then withdraw your data up until the date that interviews are sent to be transcribed. The deadline date to withdraw your data will be provided on the day of your interview.

Following the interview, you will be thanked for your time and given a debriefing form which will include contact details for the researcher and support services. You will be asked how you are feeling before leaving the room and if there is anything they would find helpful from the researcher.

You will then be sent an email confirming the deadline date to withdraw your data and a code to redeem a £30 Amazon e-voucher to reimburse you for your time. Following this, you will not be contacted again by the researcher.

Are there any benefits in my taking part?

If you choose to take part in the study, you will receive a £30 Amazon e-voucher to reimburse you for your time. Your participation will also contribute to the understanding of the experiences of carers of people with anti-NMDA receptor encephalitis in the UK. This may help us as a scientific community to better understand any areas which have been helpful or are missing from care experiences. This may support the development of recommendations for future support within services for caregivers of people with anti-NMDA receptor encephalitis.

Are there any risks involved?

This study aims to explore detailed accounts of personal experience which can feel distressing. We recommend that you have someone available to offer emotional support after the interview. Your wellbeing will be monitored throughout the interview and options to manage any psychological distress will be discussed.

If you feel that your levels of distress require additional support after participating in this research, contact the following resources for support:

- Your GP
- Your local Community Mental Health Team or Crisis Resolution and Home Treatment Team (out of hours)
- NHS 111
- Samaritans – 116 123

Although physical discomfort is not expected during this research, you may experience physical discomfort whilst sitting for 60 minutes during the interview, or from looking at a computer screen for the duration of the interview. You will be offered breaks and any access needs will be discussed prior to the interview to help you to feel as comfortable as possible. Please bring any visual or hearing aids you may require to support your comfort if you choose to participate.

What data will be collected?

The interview will collect information about your personal experiences of caring for someone with anti-NMDA receptor encephalitis. This information is to help us to understand your experiences on a meaningful level. You will also be asked for demographic information including your age bracket, gender, ethnicity, and time since diagnosis. This will help us to understand some of the contextual factors of your experience.

The interview, including the questions asked and your responses will be recorded. These digital files will be sent to a professional transcribing service. They will be transcribed (converted into

written form) verbatim, meaning that each word will be recorded exactly how it is said. The transcribing service will be confidential, and they will not share any information in the audio recordings with anyone else. Any identifiable information such as names, where people live, or work will be removed from the transcript. All files will be password protected and stored on a secure server.

Will my participation be confidential?

Your participation and the information we collect about you during the course of the research will be kept strictly confidential. Interviews, transcripts, field notes and analysis of transcripts will be stored on a secure university server. They will be password protected and only accessible by the researcher and supervisors. After the research is complete, they will be stored for 10 years in line with university policy.

A professional transcription service who are bound by a confidentiality agreement will be used. The recordings will be kept on secure, password protected servers until full data analysis is complete. This is to allow the researcher to listen back to parts of the interview and explore meaning which may be otherwise lost with the transcription, for example tone of voice. Once full analysis is complete, the recordings will be destroyed.

Only members of the research team and responsible members of the University of Southampton may be given access to data about you for monitoring purposes and/or to carry out an audit of the study to ensure that the research is complying with applicable regulations. Individuals from regulatory authorities (people who check that we are carrying out the study correctly) may require access to your data. All of these people have a duty to keep your information, as a research participant, strictly confidential.

Once transcripts have been completed and identifiable information has been removed, you will be assigned a participant number which will be linked to all personal information. You will be in control of what you choose to discuss, however we ask you to be mindful about what you share in order to reduce the risk of you and your loved one being identified from the information. For example, when discussing your experiences at a hospital, try to refrain from naming the hospital. However, every effort will be made to ensure identities remain anonymous. Any information which is considered to pose a risk to confidentiality will be anonymised or removed from transcriptions.

Do I have to take part?

No, it is entirely up to you to decide whether or not to take part. If you decide you want to take part, you will need to sign a consent form to show you have agreed to take part.

What happens if I change my mind?

You have the right to change your mind and withdraw at any time without giving a reason and without your participant rights being affected. You can withdraw at any point, up until the data is sent to be transcribed. You will be informed of date this is happening in advance. If you withdraw consent during the interview, the interview will be stopped, and the recording will be destroyed. If you have already participated in the interview and withdraw consent, your recording will be destroyed.

What will happen to the results of the research?

Your personal details will remain strictly confidential. Research findings made available in any reports or publications will not include information that can directly identify you without your specific consent. It is hoped that the findings of this research will be published in a psychology journal for the purpose of sharing the findings with other healthcare professionals and researchers. This publication may include quotes of things you have said during the interview. Any details such as names/places will be removed so that you will not be directly identifiable. However, as this research explores personal accounts of experience of a rare disease which may mean you can be identified if others were aware of your experiences. This detail on personal experience is important to allow for a thorough and meaningful understanding.

Where can I get more information?

If you have any questions or would like more information about this study please contact the researcher, Hayley Grantham, using the details below:

Email: h.grantham@soton.ac.uk

Supervised by Dr Warren Dunger

Email: w.n.dunger@soton.ac.uk

What happens if there is a problem?

If you have a concern about any aspect of this study, you should speak to the researchers who will do their best to answer your questions.

If you remain unhappy or have a complaint about any aspect of this study, please contact the University of Southampton Research Integrity and Governance Manager (023 8059 5058, rgoinfo@soton.ac.uk). Please quote the Ethics/ERGO number above. Please note that by making a complaint you might be no longer anonymous.

Data Protection Privacy Notice

The University of Southampton conducts research to the highest standards of research integrity. As a publicly-funded organisation, the University has to ensure that it is in the public interest when we use personally-identifiable information about people who have agreed to take part in

research. This means that when you agree to take part in a research study, we will use information about you in the ways needed, and for the purposes specified, to conduct and complete the research project. Under data protection law, 'Personal data' means any information that relates to and is capable of identifying a living individual. The University's data protection policy governing the use of personal data by the University can be found on its website (https://www.southampton.ac.uk/legalservices/what-we-do/data-protection-and-foi.page).

This Participant Information Sheet tells you what data will be collected for this project and whether this includes any personal data. Please ask the research team if you have any questions or are unclear what data is being collected about you.

Our privacy notice for research participants provides more information on how the University of Southampton collects and uses your personal data when you take part in one of our research projects and can be found at http://www.southampton.ac.uk/assets/sharepoint/intranet/ls/Public/Research%20and%20Integrity%20Privacy%20Notice/Privacy%20Notice%20for%20Research%20Participants.pdf

Any personal data we collect in this study will be used only for the purposes of carrying out our research and will be handled according to the University's policies in line with data protection law. If any personal data is used from which you can be identified directly, it will not be disclosed to anyone else without your consent unless the University of Southampton is required by law to disclose it.

Data protection law requires us to have a valid legal reason ('lawful basis') to process and use your Personal data. The lawful basis for processing personal information in this research study is for the performance of a task carried out in the public interest. Personal data collected for research will not be used for any other purpose.

For the purposes of data protection law, the University of Southampton is the 'Data Controller' for this study, which means that we are responsible for looking after your information and using it properly. The University of Southampton will keep identifiable information about you for 10 years after the study has finished after which time any link between you and your information will be removed.

To safeguard your rights, we will use the minimum personal data necessary to achieve our research study objectives. Your data protection rights – such as to access, change, or transfer such information - may be limited, however, in order for the research output to be reliable and accurate. The University will not do anything with your personal data that you would not reasonably expect.

If you have any questions about how your personal data is used, or wish to exercise any of your rights, please consult the University's data protection webpage (https://www.southampton.ac.uk/legalservices/what-we-do/data-protection-and-foi.page) where you can make a request using our online form. If you need further assistance, please contact the University's Data Protection Officer (data.protection@soton.ac.uk).

A professional, accredited transcription service will be used. They will be bound by confidentiality and data management agreements.

It is not possible for data to be anonymised because of the nature of the personal accounts discussed in the interview. However, data will be pseudonymised using a code. This will be assigned to each participant at the start of data analysis. Only the researcher and supervisor at the University of Southampton will have access to these codes.

Thank you.

Thank you for taking the time to read the information sheet and for considering taking part in the research.

Consent Form

Study title: Understanding caregiver experiences of caring for someone with Anti NMDA Receptor Encephalitis

Researcher name: Hayley Grantham (Trainee Clinical Psychologist)
ERGO number: 87906, 13/12/2024
, Version 5

Please initial the box(es) if you agree with the statement(s):

I have read and understood the information sheet (13/12/24, Version 4) and have had the opportunity to ask questions about the study.	
I meet the following inclusion criteria in order to participate in the study • I have a family member who has or had anti-NMDA receptor encephalitis within the last 5 years. • My family member has been discharged into the community for at least 3 months. • My family member and I were residents in the UK during encephalitis symptom onset through to hospital discharge. • I have access to a computer and able to participate in an interview using Microsoft Teams software.	
I agree to take part in this research project and agree for my data to be used for the purpose of this study.	
I understand my participation is voluntary and I may withdraw at any point up until when data analysis begins for any reason without my participation rights being affected.	
I understand that taking part in the study involves video recording which will be sent to a confidential transcription service. This video recording will be destroyed once data analysis is complete for the purposes set out in the participation information sheet, however video recordings of my verbal consent will be retained and stored securely by the University of Southampton for 10 years.	
I agree for my interview to be sent to a professional, accredited and confidential transcription service.	
I understand that I may be quoted directly in reports of the research but that I will not be directly identified (e.g. that my name will not be used).	
I understand that special category information will be collected about me including age, ethnicity, gender, time since loved one's diagnosis. This data will be used for representation purposes and to see whether there are any patterns in relation to the themes which emerge from the data transcripts. This data will be stored on a separate password protected spreadsheet on a secure university server.	

I understand that special category information will be destroyed if I withdraw my consent.	

Name of participant (print name).....

Signature of participant.....

Date.....

Name of researcher (print name).....

Signature of researcher .....

Date.....

Debrief Form

Study Title: Understanding caregiver experiences of caring for someone with Anti NMDA Receptor Encephalitis

Debriefing Statement written
ERGO ID: 87906
Version 2, 13/12/24

The aim of this research was to develop a deep understanding of the experiences of caregivers of individuals with anti-NMDA receptor encephalitis living in the UK. This included understanding more about first symptoms identified, what the diagnostic process was like (e.g. whether there were any experiences of misdiagnosis), treatment, discharge from hospital, and community support.

We will be analysing the data to look for themes which could help us gain better insight into caregiver wellbeing which we hope will help inform how health services can best support caregivers of people with anti-NMDA receptor encephalitis. Once again results of this study will not include your name or any other identifying characteristics.

You have the right to withdraw your data up until the date that interviews are sent to be transcribed. The deadline date to withdraw your data will be provided on the day of your interview. You will be sent an email with confirmation of this date.

We understand that discussing such experiences can bring up lots of difficult emotions.
For specialist advice and support regarding anti-NMDA receptor encephalitis please contact Encephalitis International on 01653699599 or you can email support@encephalitis.info
There is also a large amount of information available on their website www.encephalitis.info

If you feel that your levels of distress require additional support after participating in this research, contact the following resources for support:
Your GP
Your local Community Mental Health Team or Crisis Resolution and Home Treatment Team (out of hours)
NHS 111
Samaritans – 116 123

Thank you for your participation in this research.
If you have any further questions, please contact me Hayley Grantham at h.grantham@soton.ac.uk.

If you have questions about your rights as a participant in this research, or if you feel that you have been placed at risk, you may contact the University of Southampton Head of Research Integrity and Governance (023 8059 5058, rgoinfo@soton.ac.uk).

Appendix G- Example Case Level Summary (Laura)

Experiential Statement	Page/Line No.	Quotation
PET 1 – A whirlwind of emotions		
Experiencing self-blame	P4, L4	"We got my mum in, we should have called an ambulance, but my dad, we were still thinking perhaps she was having breakdown or something. We really didn't know."
Feeling angry at medical professionals assumptions	P7, L13	"Well, I know she doesn't take drugs, so straight away I was angry that."
Hopelessness for the future	P22, L12-13	"when I was at rock bottom, when I didn't know if my mum was ever going to improve"
The experience of fear created long lasting memories	P2, 12-13	"obviously I remember it vividly because I was so scared of what was happening
PET 2- Hindsight is a wonderful thing		
If I knew what I know now, I could have done something	P6, L11-12	"Like obviously looking back now, if I'd have known, I would have just called out an ambulance there and then."
Knowing what I know now and frustration towards self	P14, L10-13	"I always remember as well, one doctor who was working on a different ward coming over and he actually said to me, and I always remember it now because obviously I sort of kick myself that I didn't even think, he said, "I've seen this before with a patient with encephalitis"
There could have been a different outcome	P52, L15-17	"it could have turned out a lot different for us if the mental health team had have taken a bigger role in my mum's care and they would have taken her and she probably wouldn't be here."
PET 3- The impact of symptoms		
The experience had a significant impact on caregiver's wellbeing	P30, 17-18	"I couldn't function properly because I was so worried all the time."
The long lasting negative impact on relationships	P36, L8-12	"I could go on for a long time, but I fell out with a lot of my family on my mother's side because they weren't supportive. So, we don't speak anymore. So, yeah, it definitely, it tore a lot of relationships down. But at the same time, I think I saw some people's true colours and sometimes that happens, doesn't it?"

Feeling a responsibility to care for loved one	P25, L7-8	“because my mum needed me and I knew she needed me. So, I had to make that choice.”
The need to accept the long recovery process	P22, L18-3	“they're all saying it’s a very long process to recovery because we automatically want somebody to get better straight away. But they were telling me it does not work like that. You're going to have to at least two years minimum really for you to see real difference or at least small changes throughout the time, but you won't see drastic, dramatic changes straight away. And that made me think, “Okay, I'm going to calm down a bit now”
PET 4- The diagnostic journey		
Diagnosis was a difficult and emotive journey	P4, L12-14	“but then it got a hell of a lot worse from then on until they actually diagnosed her, which took about three weeks”
Feeling in the dark	P9, L19-20	“it was difficult because we were like, me and my dad were like, we genuinely just don't know what's going on.”
Left to find their own answers	P20, L2-3	“we still were very much in the dark. We didn't know what encephalitis really was, so it was just me doing all my own research.”
Everything changed following diagnosis	P16, L7-8	“she was transferred to the neurology wards at [Hospital 1] in [Location 1]. And honestly, that was where everything changed”
PET 5- What helped		
Feeling listened to meant everything	P43, L10-11	“Everything. Yeah. I couldn't thank them enough because I felt listened to. I felt like they cared.“
The importance of person centred care	P43, L2-4	“So, it was fantastic that they were able to do that. It just felt a lot more person centred care while she was there. They actually cared about what we wanted, what my mum wanted.”
Experienced and trained staff created reassurance	P42, L2-3	“so they knew what they were dealing with. So, that put our mind at rest as well.”

Appendix H- Reflexive Summary

In reviewing my journal entries from the recruitment phase of the research, I noted feelings of frustration around the challenges of recruiting participants and the pressure felt due to the limited time. Several individuals had contacted me asking to participate but were not eligible due to the patient being a child or their loved one was still in hospital. I felt a deep sense of guilt turning them away, especially as some seemed to be seeking a space to share their experiences during an incredibly difficult time. It felt really hard being in a position where I could not help them.

During data collection, I experienced a wide range of emotions, from disbelief at some of the experiences being shared, heartbreak for the patient and their families, and also joy in hearing about their current progress. When recruiting participants, I had no idea where their loved ones were in their recovery and my journal entries noted relief upon hearing their family members had survived, particularly as during some interviews it was initially unclear if they had. As a parent myself, I reflected on feeling a deep compassion for the parent participants, and the emotional impact this had on me. I wrote about the difficulty of remaining in the role of researcher when I often felt pulled into wanting to offer therapeutic support, and I felt a sense of guilt that I could not do more to help. However, I was moved by participants' gratitude as they thanked me for listening to their stories and expressed appreciation for the research being conducted.

At times, the data analysis felt overwhelming due to the sheer amount of data, the time it required, and in the early stages, I often doubted my ability to complete the analysis.

There were so many themes which felt important and it felt difficult to let some go. I realised I had become overly attached to certain themes at the case level analysis. Sharing my themes with my research supervisor was incredibly helpful. It allowed me to view the data from new perspectives and see connections I had not considered. It was also helpful to see the consistency across interpretations. All of this increased my confidence in my ability to do the analysis. Attending IPA training and regularly revisiting the training materials at each stage, along with the guidance provided in Smith et al., (2022) were invaluable resources during the process.

Appendix I- Ethical Approval

87906 - Caregiver experiences of having a partner with Anti NMDA Receptor Encephalitis

Submission Overview | Submission Questionnaire | Attachments | History

Details

Status Approved
Category Category A
Submitter's Faculty Faculty of Environmental and Life Sciences (FELS)

Latest Review Comments

14/12/2023 17:57:49 - RIG: Approved

Comments:

Dear Researcher

Thank you for making the requested document modifications. I am pleased to inform you that full Governance approval has now been granted by the Research Ethics and Governance Team. We wish you success with your study.

14/12/2023 19:57:03 - RIG: Approved

No comments

Appendix J- Acknowledgment of the Use of Artificial Intelligence

I acknowledge the use of ChatGPT (Open AI, https://chatgpt.com/) to proofread for spelling and punctuation errors, and to assist with APA referencing. This declaration has been made in line with The University of Southampton's guidance for the use of Artificial Intelligence for academic work (https://library.soton.ac.uk/sash/generative-ai)