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Functional Neurological Disorder: Neuropsychological and psychological management in children and adults

BRIEFING PAPER

November 2024

Acknowledgements

This guidance has been produced by the British Psychological Society's Practice Board, drawing upon expertise from various Members and Networks across the discipline.

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This paper is dedicated to **Dr Jason Price 1971–2022**, who originally conceived it.

ISBN 978-1-85433-909-6

https://doi.org/10.53841/bpsrep.2024.rep181.a

Contents

Executive summary

- We have reviewed the current evidence and practice in the neuropsychological and psychological theory and management of Functional Neurological Disorder (FND) in the context of the emerging wider field of multidisciplinary management of FND and with recommendations for the direction of travel in developing better services for people with FND. We hope this will be useful for psychologists working in the field or encountering FND within other specialties, as well as for colleagues from other professions, patient/service user representatives and commissioners.
- Given the biopsychosocial nature of FND, we highlight the importance of an integrated multidisciplinary approach at the therapeutic level and a whole-system approach at the service and care pathway level. We support a whole-system approach such as that outlined in the National Neurosciences Advisory Group (NNAG) recommendations for an optimal clinical pathway for adults in FND (Edwards et al., 2023).
- In view of the heterogeneous and complex nature of FND, we recommend adopting a matched care framework, with a stepped range of intervention options, using individual Multidisciplinary Team (MDT) formulations to guide treatment planning. Neuropsychologists and psychologists have a key role to play in formulation and treatment planning in collaboration with MDT colleagues. Within this framework, it is important that patients have access to a wide range of specialist services, ranging through specialist neuropsychological and psychological assessment, psychoeducation, and a range of different psychotherapies, delivered in group, one-to-one, or co-therapy formats with MDT colleagues, as well as specialist psychotherapy for complex presentations.
- There is a historical lack of such services in the UK, resulting in a lack of appropriate care, poor outcomes, high costs, inequality of care, and harm to people with FND. To provide access to specialist FND services, and within the scope of this document addressing the role of neuropsychology and psychology, we recommend development of new services or new provision within existing services, with new funding and new posts, and ideally a new national framework for services to deliver these services effectively and equitably, close to patients.

RECOMMENDATIONS

We support a whole-system care pathway with a tertiary MDT-based consultation/treatment service

Access to neuro/psychology is essential at secondary and tertiary levels

Neuro/psychological roles include service development, assessment/diagnosis/formulation/triage, treatment, supervision, education and research/audit

A matched care model with a stepped and wide range of psychological therapies is needed to address heterogeneity and complexity

Consideration of culture, diversity and inequality is an essential part of formulation

Training in FND should be a core component of psychologist training programmes

FND services are best located within neurological/neurorehabilitation services

A national framework and new funding is needed to develop effective services in all areas

Given historical lack of services, new neuro/psychological posts are needed and should include a consultant and resources appropriate to the needs of the local population

Introduction

Advances in research and clinical practice in the field of FND have accelerated in the last two decades. Correspondingly the attitude amongst researchers and clinicians has shifted radically to acknowledge this condition, and the suffering of children and adults who have it, and to engage in active management to help. In this briefing document, we aim to provide a resource for colleagues linking key findings in research and clinical practice and set out the role of the adult or paediatric neuropsychologist in the management of FND.

The context of this paper is the current service provision in the UK, which is lagging behind research and clinical developments at the time of writing. Although service provision is variable, the most common picture is of piecemeal provision organised by motivated clinicians within existing and already stretched funding frameworks. In the absence of strong top-down pressures within healthcare organisations and within regional and national systems, clinicians are in the position of having to drive forward services themselves.

Accordingly, we hope that this paper will contribute to better services for both children and adults with FND in two ways: by providing neuropsychologists and psychologists[1] with information to help in developing and delivering effective services, and by providing an authoritative statement of the role of neuropsychology and psychology with this group to inform local and national commissioning of services.

On terminology, we recognise that this has been a field with a diversity of terms, but that the umbrella term Functional Neurological Disorder has broad support amongst both clinicians in neurosciences and patient groups. In the subclass of paroxysmal transient symptom episodes, there continues to be a diversity of practice favouring a variety of terms (Non-epileptic Attack Disorder, Psychogenic Non-epileptic Seizures, Dissociative Seizures, Functional Seizures and so on). While this issue had not been finally settled until now (Reilly et al., 2013; Wardrope et al., 2021), there is a consensus proposal from a task force of the International League Against Epilepsy, which is currently consulting on a position paper proposing the term ‘Functional/Dissociative Seizures’ at the time of writing. This terminology enables the use of either ‘Functional Seizures’, ‘Dissociative Seizures’, or ‘Functional/Dissociative Seizures’. For brevity we propose to use the term functional seizures in this document.

NOTE ON THE ISSUE OF THE NATURE OF FND

Discussions about the nature of FND have in the past been framed in terms of opposing psychological and physical views. Historically, FND was seen as purely psychological in origin, and more recently, in the light of advances in theory and the understanding of brain mechanisms, the pendulum has swung more towards speaking of them as physical. While the purely psychological view is now widely considered to be unsustainable, the purely physical view is also unsustainable

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[1] In the UK, the statutorily regulated term for psychologists registered with the Health and Care Professions Council is Practitioner Psychologist, although this is less commonly used outside regulatory contexts. Thus, colleagues with a range of professional qualifications with substantial overlap as well as differences in competencies, including but not limited to Clinical Psychology, Counselling Psychology, Forensic Psychology and Educational Psychology, are collectively referred to as Practitioner Psychologists. Neuropsychologists, in the context of this document, are usually Practitioner Psychologists with expertise in clinical neuropsychology, as indicated by their entry to the BPS Specialist Register for Clinical Neuropsychology. For brevity and clarity, in this document we will use the terms neuropsychologist and psychologist – these should be understood to refer to Practitioner Psychologists, and where there is a reference to neuropsychologists, then these are Practitioner Psychologists with this additional expertise.

unless we accept a radical physical reductionism. While many would think that the view that FND has both physical and psychological aspects or elements is probably closer to the truth, and a biopsychosocial framework is the norm, this leaves the fundamental dualism unresolved. In this discussion we consider psychosocial factors together under the psychological category.

Ultimately, this question will require a much better and more detailed understanding of both physical and psychological mechanisms and how they give rise to symptoms than we have at present, or a unified model encompassing both. In the meantime, we propose a broad framework for thinking about the relationship of the psychological and the physical. While acknowledging that all human experience/action has a neural basis, we propose that the psychological and the neurological can be seen as representing different levels of explanation, and that making coherent links between those levels is a possibility. The key concept linking these levels is that of brain processing. We can see the psychological level as a presentation of brain processing or, conversely, see brain processing as the mechanism underlying psychological functioning. In this view, the psychological is simply what the brain ‘does’ and in the broadest sense includes not just emotions and thoughts, but all cognitive, sensory and motor function, including processing that is inaccessible to conscious awareness. If we think of FND as a disorder of brain processing, then the dualism is resolvable.

Even though we can define the psychological very broadly as being the same as all brain processing, the term is usually used more narrowly to include mainly emotions, thoughts/beliefs, cognition and behaviour; that is, the domains in which psychologists and neuropsychologists have particular expertise. Other professionals have expertise in other functions of brain processing. Depending on the individual patient and the situation, FND-relevant brain processes would therefore be accessible to members of the MDT with expertise in those processes. In this document we will focus mainly on the psychological aspect, more narrowly defined, within a broader view of the nature of FND as a disorder of brain processing.

NOTE ON EQUALITY, DIVERSITY AND INCLUSION

We recognise that the research literature in this field is skewed by samples taken more frequently from western, global north, white majority populations, and this is a general limitation in the field. We have included a review of FND in cross-cultural research, but more research is needed within under-represented populations, and indeed a mapping of the limitations of the research literature in terms of sociocultural and geographic factors would be a useful piece of work.

We further recognise that non-majority experiences, such as of socio-economic disadvantage, trauma, neurodiversity, racial prejudice and prejudice against other forms of diversity may be relevant background factors for some people with FND. In general, a wide variety of disadvantaging factors are over-represented in the backgrounds of people with FND, who are further disadvantaged by poor provision of services and experiences of discrimination as people with FND, including in clinical settings, so that inequality is a frequent feature of the experience of people with FND for a variety of reasons.

Epidemiology and healthcare costs of FND

DEMOGRAPHICS

FND is a common cause of neurological disability and distress and occurs across all ages. UK studies report a peak incidence for women between the ages of 35 and 50 years, whereas presentation remains common for men across the lifespan (Carson & Lehn, 2016). During childhood, studies suggest an increased incidence of symptoms with age, with the peak incidence reported to be around 11 to 13 years of age (Ani et al., 2013).

Current UK literature indicates that functional neurological symptoms are more likely to affect women than men, with a ratio of around 3:1 across children, young people and younger adults, with equal proportions in both genders over the age of 50 years (Carson & Lehn, 2016). Studies of functional seizures in the UK indicate a skewed age distribution amongst women with a modal onset age of 19 (Goldstein et al., 2019) and, it is of note for service organisation, that this peak incidence straddles the paediatric/adult service boundary.

Cross-cultural research on somatic symptoms suggests that women generally report more intense and frequent symptoms than men (Osman et al., 2020; Şar, 2017). This is a complex area with further socio-demographic and epidemiological research needed.

INCIDENCE AND PREVALENCE

FND is a common diagnosis in neurological practice in the UK, with an estimated annual incidence of 4–12 per 100,000 and accounting for 6% of all outpatient visits to neurology clinics (Carson & Lehn, 2016), with a prevalence of 50,000 to 100,000 (75–149 per 100,000) people with FND in the community (Bennett et al., 2021). In one study, functional symptoms were the second most common reason to attend outpatient neurology after headache (Stone et al., 2010).

FND in adults and children is a common presentation in emergency departments (ED) with frequent re-attendance (Stephen et al., 2021; Williams et al., 2022), as well as in rehabilitation (Williams et al., 2016), in stroke services (Popkirov et al., 2020), and in paediatric clinics, where FND accounts for up to 20% of children attending epilepsy clinics (Operto et al., 2019; Yong et al., 2023). Co-occurring neurological conditions are estimated to be present in 20% of FND cases (Stone et al., 2012), and somatic conditions, such as headache, fatigue and pain, are also common in combination with FND, and believed to share underlying mechanisms (Bennett et al., 2021; Yong et al., 2023).

SUBTYPES

FND is a heterogeneous condition with many different sub-cohorts. There are a wide range of descriptive terms for motor and sensory subtypes, and examples include dystonia, limb weakness, gait disturbance, myoclonus, numbness, tremor, tics, dysphagia and speech problems, functional cognitive disorder, visual loss or diplopia, hearing loss or sensitivity, functional seizures and other sensory and movement subtypes, as well as persistent postural perceptual dizziness (Bennett et al., 2021).

Functional cognitive disorder (FCD) refers to the experience of cognitive symptoms associated with alterations in functioning (McWhirter et al., 2020). FCDs are commonly encountered in memory and cognitive disorder clinics, and presentations often account for more than half the patients seen, especially in adults at younger ages compared to those with dementia or mild cognitive impairment (Larner, 2021).

The prevalence of functional seizures is estimated as 2–33 per 100,000 (Benbadis & Hauser, 2000; Hansen et al., 2021). Carson et al. (2011) report that functional motor disorders (FMDs) account for more than 50% of FNDs (prevalence 50–100,000 cases) and mainly occur in young and middle-aged adults (35–50 years).

Presentation with multiple symptoms is often reported in paediatric populations, with the most commonly reported symptom being disorders of motor function (motor weakness, 63%; abnormal movements, 43%), followed by functional seizures (40%) and sensory disturbances (32%) (Ani et al., 2013).

Recent epidemiological studies demonstrate an overlap of stressful life events and psychological/ psychiatric comorbidity between structural and functional disorders, and a lack of identifiable psychological factors in a proportion of people with FND. Psychological factors were removed from the diagnostic criteria for FND in the *Diagnostic and Statistical Manual of Mental Disorders – Fifth edition* (*DSM-5*), where they are now defined as risk factors.

COMORBIDITIES

Functional conditions often coexist with other persistent physical symptoms, such as dizziness, acute and chronic pain, chronic fatigue, irritable bowel syndrome, fibromyalgia, migraine, asthma and chronic post-concussion syndrome (Ducroizet et al., 2023; Popkirov et al., 2019; Stone et al., 2020). Mild traumatic brain injury has been cited as a known precipitant for the development of FND with some authors arguing that persistent symptoms represent functional overlay (Wäljas et al., 2015). While pain, fibromyalgia and migraine are common comorbidities, they are not included in the FND classification (Espay et al., 2018).

FND has a high incidence of psychological and psychiatric comorbidities (Ludwig et al., 2018), and symptoms frequently co-occur with post-traumatic stress disorder, anxiety, depression, psychosis, complex trauma, personality disorders, dysfunctional relationships, attachment issues, somatoform/dysfunctional illness beliefs, emotional regulation problems and also lower socio-economic status (Asadi-Pooya et al., 2021; Popkirov et al., 2019). In contrast with adults, a recent study carried out by Yong and colleagues (2023) in Scotland showed that children diagnosed with FND did not differ on a measure of socio-economic status compared with the general childhood population. Co-occurring symptoms reported in children and young people commonly include depression, anxiety, specific learning disorder, intellectual disability, fatigue or pain (Canavese et al., 2012).

Children and young people with autism spectrum disorder (ASD) are overrepresented in those diagnosed with FND (McWilliams et al., 2019). In adults there is emerging recognition of a high prevalence of ASD in FND (Gonzalez-Herrero et al., 2023). Given the comorbidity of ASD and ADHD of 50–70% (Hours et al., 2022), there is emerging professional interest in possible comorbidity of FND and ADHD. One study using a psychiatric semi-structured interview found 30% of a sample of 34 adolescents with functional seizures had comorbid ADHD (Say et al., 2014). A small-scale study (poster not peer-reviewed) screening 92 consecutive patients in the UK with functional seizures found 88% screened positively for ADHD (Singhal, 2023). However, there is very limited published research, especially in adults, and this is an area in which further research is needed. Nevertheless, there is a rationale for screening for neuro-developmental disorders in FND clinics.

Studies highlighting a higher-than-expected rate of past and present stressful life events and psychological/psychiatric comorbidity in FND suggest these are risk factors (Ludwig et al., 2018), although in a substantial sub-group of patients, no overt psychological risk factors were indicated (Espay et al., 2018). Onset of FND is typically abrupt, particularly in children and young people, and antecedent stressors have been reported for up to 80% of paediatric cases (e.g. school-related concerns, interpersonal family conflicts, stressful life events and minor injuries), with bullying in school most commonly cited (Guerriero et al., 2014; Reilly et al., 2013).

Given the heterogeneity of FND and the range of factors associated with precipitating and/or maintaining symptoms, persons with the same symptoms may have different risk factors or different responses to treatments, thus the nature and aetiology of FND is complex and diverse.

PROGNOSIS

In adults, the prognosis for untreated FND is poor; studies have shown low spontaneous remission rates (Gelauff & Stone, 2016) and patients can be left with social and physical disability (Carson et al., 2011). A one-year follow-up study found that only 23% of 1144 patients with FND experienced an improvement in their symptoms (Stone et al., 2009), and a systematic long-term review of 10,000 patients with functional motor disorders by Gelauff et al. (2014) indicated that approximately 40% had ongoing similar or worse symptoms. Delayed diagnosis in adults and the overall duration of functional symptoms have been found to predict long-term outcomes, and having a functional symptom is a risk factor for developing other functional symptoms, while emotional and personality problems have been found to be inconsistent predictors of outcome (Gelauff & Stone, 2016). Litigation and receiving welfare benefits have been found to be negative predictors in some studies but not in others (Gelauff & Stone, 2016).

In reviews of long-term outcomes for children presenting to paediatric neurology services with FND, persistence of symptoms and remission rates are high (Raper et al., 2019; Samuels et al., 2019; Yong et al., 2023). However, children with FND may experience prolonged delays and undergo multiple medical investigations before a diagnosis is reached, with average waits reported between 9 and 20 months (Canavese et al., 2012; Ferrera & Jankovic, 2008; Schwingenschuh et al., 2008). Due to this difficulty with service access, functional neurological symptoms may impact significantly on development and hinder social, emotional and academic functioning, with increased burden on the family system (De Gusmão et al., 2014; Ramesh, 2013). Of note is that two paediatric studies to date have suggested that early detection and diagnosis and positive premorbid adjustment may be predictive of more positive prognosis and outcome (Pehlivantürk & Unal, 2002; Schwingenschuh et al., 2008).

QUALITY OF LIFE

Subjective ratings of quality of life in FND are poorer than for those of individuals with comparable structural conditions (Ilic, 2013). Carson et al. (2011) and Carson and Lehn (2016) report that FND causes levels of emotional distress and physical disability equal to, or higher than, other chronic neurological conditions. The general stigma of functional symptoms causes higher levels of systemic distress (Rommelfanger et al., 2017; Sowińska, 2018) and this relates to increased complaints, repeat attendance at emergency departments (ED) with the same symptoms, as well as visits to multiple specialists (Crimlisk et al., 2000).

The negative impact of FND on social functioning and quality of life appears to be consistent across nations and cultures (Asadi-Pooya et al., 2021; Jennum et al., 2019). FND has a negative impact on employment (Healthcare Improvement Scotland, 2012; O'Sullivan et al., 2007), education (Asadi-Pooya et al., 2019; Doss et al., 2017) and on families (Karakis et al., 2014). FND is associated with a higher risk of iatrogenic harm, unnecessary diagnostic procedures and inappropriate medication (Reuber et al., 2004), and studies have reported higher mortality rates for functional seizures compared to the general population, with rates that are similar to those with treatment-resistant epilepsy (Nightscales et al., 2020).

THE FINANCIAL COST OF FND

The often laborious and extensive diagnosis process has a high cost to individuals, family life, the NHS and the workplace (Crimlisk et al., 2000; Espay et al., 2018). Around a third of people with FND will not be able to work (Carson et al., 2011), with a third medically retired after having FND for 12 years or more (Stone et al., 2003).

International research has established that, in adults and children, delays in diagnosis, extensive medical investigations, hospital admissions, outpatient attendance, prescription costs, emergency services costs and lack of appropriate services for FND all cost varying but significant sums of money: USA (Ahmedani et al., 2013; Stephen et al., 2021), Australia (Seneviratne et al., 2019), Denmark (Jennum et al., 2019) and Italy (Tinazzi et al., 2021).

UK studies indicate a similar pattern. Healthcare Improvement Scotland (2012) found that 27% of people with symptoms unexplained by disease were not working for health reasons, and the group incurred higher social costs, as well as having a higher consumption of health services; costs were estimated to be £1.3 million per year for outpatients, £6.01 million for inpatients (including 13,887 bed days), and £4.01 million for primary care; thus, healthcare utilisation was double for FND compared to other patient groups (Healthcare Improvement Scotland, 2012). Most recently a study assessing the 6-month cost of FND preceding consultation at a tertiary specialist centre found that as well as high direct healthcare costs, indirect costs were even higher, and that costs increased with duration of illness and presence of anxiety/depression, making the case for reform of pathways and services to make earlier diagnoses and interventions (O'Mahony et al., 2024). There are no paediatric studies that report on the cost to the UK healthcare system. Two illustrative case studies are described in Boxes 1 and 2.

Box 1. Case Study. An NHS Grampian audit (Insch, 2019) of 30 patients with FND found that this was a heterogeneous group, and healthcare utilisation involved many NHS specialties in the patient's care. The mean number of NHS specialities was 7.20 (SD = 2.91) and, consistent with the literature, 50% of the sample had symptoms of anxiety and depression, although 28% would not attend, declined or cancelled appointments with mental health services. 57% attended ED and were discharged the same day, and 40% were seen in ED and admitted. Those admitted had an average length of stay of 15.3 nights and, on average, patients had 2.7 MRI scans, 7.4 X-rays, 3.8 ultrasounds and 2.6 CT Scans. As the audit was retrospective, it was difficult to attribute the costs for all of the services accessed; however, the cost of the radiology investigations demonstrated that £30,923 had been spent on this small group of patients, with ED costs of £55,554.

Box 2. Case Study. A cross-sectional evaluation of health resource utilisation by patients with FND scheduled to attend a neurology and neuropsychiatry FND clinic at St George's Hospital found that the mean cost of healthcare was £3,328, with inpatient admission representing a disproportionate 58.9% of total healthcare costs. Outpatients represented 21.1% of costs with 89% of patients attending GP surgery appointments. High cost of resource use was maintained regardless of disorder duration. Employment loss and informal care involved the largest costs, with means of £6,594 and £9,255 respectively. Mean total costs for the neuropsychiatry subgroup were £3,633 higher than that of the neurology subgroup, and patients visiting ED had mean total costs of £3,223, which were also higher (Nelson-Sice et al., 2019).

Issues of culture and diversity

CULTURAL FACTORS

Cultural meaning is highly salient in the development of FND (Canna & Seligman, 2020) and draws on beliefs about illness and response to trauma in the context of the individual. Functional Neurological Disorders are reported across the five continents (Sharifian et al., 2019). Although most publications are from Europe and North America, the number of case reports have increased in recent years in Africa (du Toit & Pretorius, 2017; Naidoo & Bhigjee, 2021; Thabit et al., 2021) and Asia (Fang et al., 2021). The term 'culture' is often used to refer to identity that results from complex social factors (Mironenko & Sorokin, 2018). Some researchers have suggested that FNDs are culturally patterned variants of a universal phenomenon, formed through local understanding of the body, illness, healing, and religion (Brown & Lewis-Fernández, 2011) and, as commented on earlier, are influenced by gender, age of onset, socio-economic factors, co-occurrence with psychiatric conditions, and other potential factors. It is also helpful to consider that healthcare professionals also work within a culture that will affect the patient and their experience of care.

The literature offers evidence of a range of FNDs that previously may have appeared to have been tied to specific contexts or cultures but in fact may be found across cultures. A specific example is resignation syndrome, which describes a persistent functional neurological disorder primarily reported in traumatised children and adolescents following stressful migration experiences in Sweden (Sallin et al., 2016), although reports of a similar condition, referred to as pervasive refusal syndrome, are found in other countries which offer asylum (Ngo & Hodes, 2020). Canna and Seligman (2020) describe functional seizures in the Miskito people of Nicaragua and Honduras, who attribute dizziness as an interoceptive affordance for demonic attacks. Similarly, Candomblé mediums in Salvador, Brazil, associate sensations like tingling with the onset of possession by a spirit (Seligman, 2014). Common to both of these groups, and for many patients reported worldwide with functional seizure disorder, uncomfortable feelings and/or an increase in heart rate are antecedents for seizures, so although the interpretation of the behaviour may differ, the experience is similar. Canna and Seligman (2020) note that different cultures describe different interoceptive experiences, which impact patients' expectations and shape their reactions but result in similar illness behaviour across cultures. Notably, Osman et al. (2020) report on patients presenting with FND in a clinic in Khartoum, Sudan. Within the sample, the authors highlight an over-representation of females to males, low socio-economic status, elevated rates of mood and anxiety disorder and higher rates of functional seizures compared with other FND presentations. Reports of sexual trauma were lower than other country populations, which the authors attribute to stigma associated with this experience in a socially conservative context. Positively, the authors note that the majority of patients responded well to a combination of psychotherapy and pharmacotherapy.

IMPACT OF A GLOBAL STRESSOR

The impact of a major worldwide stressor, such as the Covid-19 pandemic, appears to have had differing effects across cultures. A study (Asadi-Pooya et al., 2022) investigated the characteristics of children (>300) admitted as inpatients with functional seizures prior to and during the pandemic from six different countries. The results showed that a history of family dysfunction was associated with increased presentations during the pandemic in all patients, regardless of their country of origin, as compared with those diagnosed prior to the pandemic. In families from Middle Eastern countries, a low level of education appeared to be associated with a new diagnosis of functional seizures, which the authors suggest may relate to associated challenges for the family with problem solving in the context of heightened stress. Interestingly, reports of adults from Brazil show an increased frequency of functional seizures associated with poor sleep and increased stress during the pandemic (Valente et al., 2021). Meanwhile, a cohort of adults in the United States with functional seizures reported improved seizure control (and sleep) (Rosengard et al., 2021), whereas a small comparison group with only epilepsy within the same epilepsy centre reported deterioration. Similarly, an increase in children and adults presenting with functional tics were reported in specialist centres across many countries (Martino et al., 2023).

UK SERVICES

In the UK context, healthcare providers offer services to a highly diverse population in terms of culture and ethnicity. The National Health Service is obliged to offer equality of service to all patients (Department of Health, 2005) regardless of their cultural background, but unfortunately, racial inequity is evident for a significant minority of people from ethnic minorities (Hackett et al., 2020), and psychological professions have historically suffered from very poor diversity. This means that practitioners providing care need to be apprised of the factors that influence the presentations of individuals with FND from various backgrounds and cultures, alongside factors which impact their own clinical decision-making and care. A recent systematic review of healthcare professionals' attitudes to FND highlights fear and uncertainty in relation to providing diagnosis and treatment (Barnett et al., 2022). Begley et al. (2023) note the role of the implicit and explicit attitudes of clinicians – in this case, neurologists, psychiatrists and psychologists working in the UK – on decision-making and referral patterns within clinical services. A higher rate of implicit FND-illegitimate compared with a multiple sclerosis-legitimate bias was noted. Medical doctors had lower treatment optimism and stronger explicit attitudes that FND was illegitimate than psychologists. Surveys by charities such as FND Action and FND Hope UK routinely document a high prevalence of experiences of being dismissed by healthcare practitioners. Experts in the field of FND call for evidence-based guidelines (Tolchin et al., 2021) to inform the culture, which they note is needed due to the interdisciplinary work required in care and the lack of availability of formal training in working with patients who have FND.

DIAGNOSTIC TAXONOMIES

In the most recent *DSM-5* update (American Psychiatric Association, 2016), cross-cultural variation in disorder, including somatization disorders, has been considered more carefully than in previous editions. Guidance for clinicians using *DSM-5* (American Psychiatric Association, 2013) specifically highlights consideration of cultural variables within assessment. In particular, the cultural formulation interview advises that clinicians obtain information 'about the impact of culture on key aspects of an individual's clinical presentation and care' (Paniagua, 2018). The interview includes questions about the patients' background in terms of their ethnicity, culture, race, religion and/or geographical origin. Similarly, the recently published *ICD-11* (World Health Organisation, 2022), is proposed by Gureje et al. (2020) to delineate the cultural factors of the patient in the context of a globally applicable diagnostic system, which can help the clinician make informed decisions, access appropriate care, and communicate the condition to other healthcare providers within and outside the cultural setting. However, it is recognised that this process continues to require additional work, as clinical diagnoses are not formed on the 'basis of immutable neuroscientific validating features, but rather on best expert judgement', and naturally the clinician's personal experience and knowledge of cultural factors will influence the conclusions that they reach, although this will have been mitigated in the case of FND with the shift to the use of positive diagnostic signs in the diagnostic process.

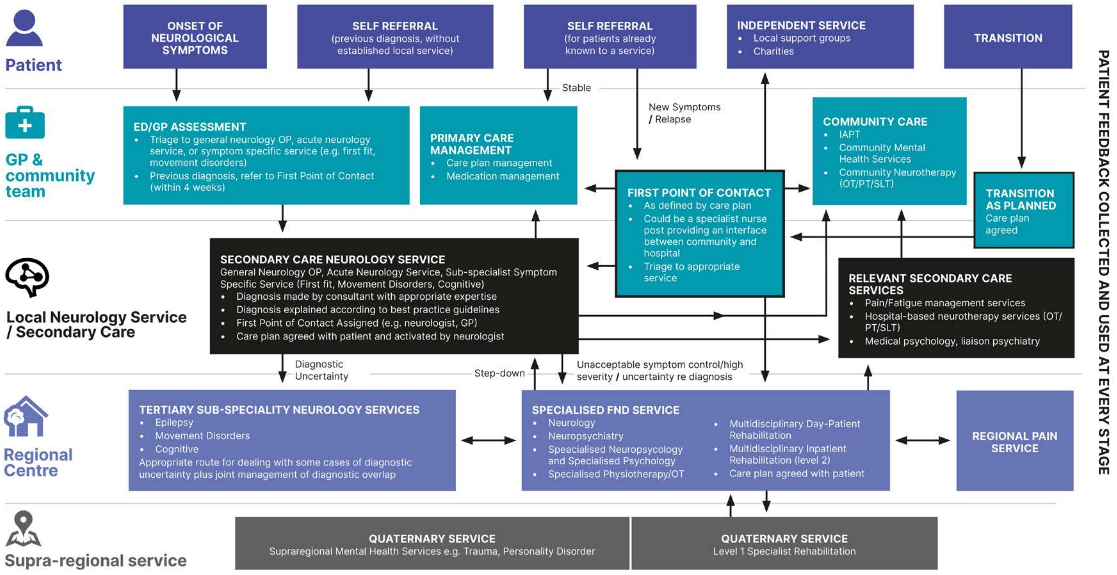
PROGNOSIS

There is a lack of research into cross-cultural differences in FND prognosis, and studies suffer from general methodological limitations and a lack of valid cross-cultural measures. Most studies are small-scale or case reports of somatic symptoms referring to the role of cultural, racial and ethnic variations in symptoms when groups are matched for depression or anxiety scores (e.g. Bagayogo et al., 2013). Further understanding of sociocultural factors (e.g. stigma) is needed. A research review of somatic presentations in China using validated standardised measures reported that somatic symptoms are no more common in this culture than in populations of European origin; however, patient presentations appear to be influenced by the role of culture and patterns of illness behaviour, and this raises issues for adapting assessments and intervention (Zaroff et al., 2012). Intercultural variation in the frequency of stroke-like FND syndromes has been indicated with the development of conceptual models that integrate cultural beliefs, the role of previous illnesses, healthcare experiences and stressful life situations on patient expectations, and perception of somatic symptoms and sensory input (Löwe & Gerloff, 2018).

Policy, guidelines and service background

Although there has been a lack of a full and up-to-date NHS national policy framework in this area in the UK at the time of writing, this is beginning to be addressed, and there are several relevant documents, the first of which is historical. This first is the Scottish NHS document, ‘Stepped care for functional neurological symptoms’ (Healthcare Improvement Scotland, 2012), which, although now somewhat older and with a Scottish remit, remains relevant and useful across the UK. The second is recently published and positioned to be a guiding document during the next period, as localities move to begin establishing effective care pathways for FND: ‘Optimum clinical pathway for adults: Functional Neurological Disorder’ (Edwards et al., 2023). It lays out a map of pathways (see Figure 1) for patients with different entry points to the system and through services at different levels of the system; GP and community teams, local neurology service/secondary care, regional centres and supra-regional services. The specialised FND service would sit as a tertiary regional service in this scheme, with links to other regional neurology services and pain services and links that step down to secondary care local neurology and other services, or step up to quaternary supra-regional services. Patients would be managed at secondary care neurology level with a care plan and a first point of contact assigned (neurologist, GP, specialist nurse), then stepped up to the specialist FND service as needed due to unacceptably high symptom control, high severity, or uncertainty about diagnosis in some cases. The third is the more recently published ‘Scottish Functional Neurological Disorder National Pathway’ (NHS Scotland Centre for Sustainable Delivery, 2024) which outlines the characteristics of an effective service and pathway from the perspective of the patient journey, recommends establishment of specialist FND clinics where these do not exist, and introduces the idea of the role of the FND specialist practitioner (possibly a nurse/AHP/psychologist) embedded in neurosciences centres and acting as liaison with community, primary, and secondary care.

Figure 1: NNAG Optimal Clinical Pathway for FND (Edwards et al., 2023; figure reproduced with permission)



MULTIDISCIPLINARY GUIDELINES

International consortia of colleagues in therapy disciplines have produced a series of consensus recommendations aimed at providing a practical description of best clinical management. In 2014 physiotherapy consensus recommendations were published (Nielsen et al., 2014) which highlighted that physiotherapy has a key role in the multidisciplinary management of patients with FND for functional motor disorders. Within a biopsychosocial framework, physiotherapists are able to address illness beliefs, use self-directed attention techniques and treat abnormal habitual movement patterns through a process of education, movement retraining and self-management strategies. In 2020 occupational therapy (OT) consensus recommendations were published (Nicholson, Edwards et al., 2020). While acknowledging that more research was required to develop evidence-based occupational therapy interventions for those with FND, occupational therapists have an integral role within the multidisciplinary team providing education, rehabilitation and self-management strategies to facilitate, for example, participation in daily activities and determine care needs. Most recently, speech and language therapy (SLT) consensus guidelines (Baker et al., 2021) give detailed practical recommendations for working with functional communication, swallowing, cough and related disorders. They recommend that ‘speech and language therapy for FND should address illness beliefs, self-directed attention and abnormal movement patterns though a process of education, symptomatic treatment, and cognitive behavioural therapy within a supportive therapeutic environment’. A similar consensus guideline for psychological therapy and management has not yet been published, but an international group to develop these has recently been convened.

SERVICE PROVISION

There is no comprehensive reliable source of information on services for children and adults with FND in the UK NHS, but informal surveys and discussions amongst clinician and voluntary sector networks suggest that services are patchy and variable. Commissioned funding for FND patients is rare and where it exists is usually for specific and limited services rather than comprehensive pathways.

Accordingly, in most localities there is an outstanding need for both specific funding for the management of FND patients, and for a planned care pathway with a comprehensive multidisciplinary range of services. To support local commissioners in addressing these needs, there is a need for national frameworks and guidance.

Theoretical background

Various frameworks have been used to understand FND. Each approach tends to emphasise different aspects of the evidence base and of the condition itself, with some theorists focusing on the proximal mechanisms underlying symptom generation (i.e. pathogenesis) and others more on the circumstances and processes that might lead someone to develop FND (i.e. aetiology). In this document we focus on those concepts that are most useful for neuropsychological practice, which tend to be those that emphasise the psychological aspects of FND. We recognise, however, that FND is a biopsychosocial phenomenon, and that there are increasingly influential neurobiological ideas that may inform formulation in future.

Some of the most commonly used, and research-informed, psychological concepts for understanding FND are described below[2]. In practice, these are often combined with a theoretically agnostic formulation (such as the 5Ps model: presenting problem, predisposing factors, precipitating factors, perpetuating factors, and protective factors) to tailor psychological interventions to the individual. This enables the clinician to work alongside the patient's goals, whether these be functional symptom reduction and rehabilitation, psychiatric symptom improvement, and/or enhancements in quality of life.

TRAUMA AND ADVERSITY

Historically, FND was often seen as a post-traumatic condition linked to sexual abuse and/or other forms of childhood maltreatment. FND is sometimes treated in adults using an adapted post-traumatic stress disorder (PTSD) model (e.g. Myers et al., 2017). However, the evidence shows that many people with FND do not report exposure to overtly traumatising events, and these are no longer seen as a necessary precursor for the condition (Ludwig et al., 2018). Nevertheless, there is good evidence that potentially traumatising events are more common in adults with FND than neurological, psychiatric and healthy controls (Ludwig et al., 2018), and in children FND may be precipitated by stressful life events (Guerriero et al., 2014). It remains to be established why this is the case, although various pathways explaining the link have been suggested.

As previously summarised, physical disease or injury are also very common in people with FND and may serve as both triggers and models for symptoms (Brown & Reuber, 2016a). Similarly, 'everyday' psychosocial stressors (e.g. interpersonal conflict, bullying) and adverse life events (e.g. loss of job, divorce, bereavement) may be more relevant predisposing, precipitating and/or maintaining factors for many people with FND (Morsy et al., 2022) and are potentially important targets for psychological intervention. Not all people with FND identify obvious stressors, however.

ATYPICAL EMOTIONAL PROCESSING

There is a growing body of evidence that some patients with FND exhibit atypical emotional processing, including differences in how they represent, recognise, express and/or regulate emotional states (Pick et al., 2019). This is often interpreted as indicating that the physical symptoms of FND are somehow related to the misrepresentation of emotional signals. This evidence could be seen as consistent with psychodynamic approaches to FND that emphasise the suppression of emotional states that are conflicting, unacceptable or otherwise threatening (e.g.

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[2] Some of the most common comorbidities, such as PTSD or anxiety disorders, in people with FND have also been seen as contributing to symptom maintenance through these or related processes. There is no assumption that such comorbidities are necessary or sufficient for FND to develop, however.

Cretton et al., 2020). Some dynamically oriented practitioners also cite the importance of specific defence mechanisms (e.g. conversion, somatization) in this process, as well as the idea that FND serves an emotional function (e.g. indirect expression of distress, socially acceptable escape from adversity), though other dynamic models (e.g. Howlett & Reuber, 2009) make fewer assumptions in this respect and simply cite the potential importance of emotional suppression as an important factor in FND for some people (Brown & Reuber, 2016a; Novakova et al., 2015).

Of particular interest from a psychological perspective is emerging evidence that functional symptoms are influenced by negative affect stimulation and stressful life events, and associated with objective autonomic arousal, but without awareness of affect or arousal (Pick, Millman, Ward et al., 2024; Pick, Millman, Hodsoll et al., 2024). This builds on a literature about abnormalities of interoception in FND (Korecki et al., 2020; Wolters et al., 2022) and suggests that treatments targeting awareness, integration and regulation of autonomic signals, and emotion awareness (such as mindfulness-based approaches and other therapies incorporating interoceptive and emotional focus) might be helpful to some people with FND.

There is some evidence that there are distinct sub-groups of people with functional seizures, characterised by different types of emotional processing (e.g. Brown et al., 2013; Cragar et al., 2005; Reuber et al., 2004). This may also be true of other types of FND (e.g. Kozlowska et al., 2011), although further research on this is needed.

DISSOCIATION

Dissociative processes are often thought to play an important role in FND, and various strands of evidence have been cited in support of this (e.g. Brown & Reuber, 2016b). Some research suggests that detachment phenomena (e.g. depersonalisation-derealisation) are relatively common in the period prior to FND onset (Stone, Warlow et al., 2012) and there is good evidence that a significant proportion of people with functional seizures experience this before, during or after their attacks (e.g. Goldstein & Mellers, 2006; Hendrickson et al., 2014). Other studies indicate that functional seizures are often accompanied by a panic-like surge in autonomic symptoms in the absence of subjective fear, so-called ‘panic without panic’ (Goldstein & Mellers, 2006; Hendrickson et al., 2014), which has also been attributed to a dissociative process with plausible links to the atypical emotion processing described above.

The abnormal compartmentalisation (i.e. reversible inaccessibility) of memories and/or processes within the cognitive system has also been cited as an important dissociative process in FND by some (e.g. Brown & Reuber, 2016b; Kuyk et al., 1999).

PREDICTIVE PROCESSING, BODY MISREPRESENTATION AND COGNITIVE-BEHAVIOURAL CONCEPTS

One increasingly popular account is a Bayesian predictive processing model (Edwards et al., 2012), which describes the symptoms of FND as aberrant percepts resulting from excessive weighting of top-down expectations, also known as ‘priors’ (abbreviation of prior probabilities in Bayesian statistics). This is said to cause bottom-up sensory inputs to be misrepresented as abnormal, in a manner similar to nocebo phenomena. Various factors are said to drive this process, including those that contribute to an ongoing expectation of illness (e.g. previous illness and injury; Brown & Reuber, 2016b), those that undermine the operation of normally automatic processes, such as excessive symptom- and self-focused attention (e.g. well-intentioned but excessive efforts to exert conscious control over an abnormal gait; Brown & Reuber, 2016b), and those that reduce the precision of the sensory inputs themselves (e.g. impaired interoception, potentially – although not necessarily – related to stress, dissociation and atypical emotional processing; e.g. Pick, Rojas-Aguiluz et al., 2020). Similar processes have been implicated in other functional symptoms and symptom-reporting more generally (Van den Bergh et al., 2017).

The predictive processing account provides a plausible theoretical platform for physiotherapy interventions that seek to retrain normal movements in people with functional movement disorders. A large multicentre RCT applying this approach (Nielsen et al., 2024) demonstrated the effectiveness of both specialist physiotherapy based on this theory and pragmatic control therapy (community neurophysiotherapy), with superiority of specialist physiotherapy on some measures. This can be in addition to challenging unhelpful beliefs and fears about illness and reducing avoidance, which are also central to second-wave cognitive behavioural therapy (CBT) interventions for FND. Second-wave CBT is often based on an adapted fear-avoidance model, which assumes that FND is similar to anxiety disorders, chronic pain and other conditions in being maintained by the person's avoidance of situations that the person fears will provoke symptoms, as well as increased attention to or misinterpretation of internal bodily sensations and other factors that maintain illness beliefs and disability (e.g. Goldstein et al., 2015).

One issue that is rarely considered is the potential heterogeneity of the condition, both in terms of the specific mechanisms responsible for particular symptoms and the underlying causes of FND. Working towards a widely accepted, comprehensive theory of FND that unites these aspects should be a future research priority, as should improving the extent and quality of evidence pertaining to the psychology of FND, which remains limited. Further research is also required to delineate the neural basis of FND and how this links to psychological aspects and treatment of the condition. Although there is a growing body of cross-sectional studies on neural correlates (Perez et al., 2021), much of it informed by the concepts described here, it is too early to draw conclusions about the causal role of particular neurological structures, circuits or processes in FND.

THE STRESS-SYSTEM MODEL

This model has developed from work with children and adolescents as being a useful framework to understand FND symptoms clinically, to explain those symptoms to children and their families and to inform treatment programs (Kozlowska, 2017; Kozlowska et al., 2019). The stress-system model proposes that the neurobiological systems that regulate body state (i.e. circadian clock, hypothalamic–pituitary–adrenal axis, autonomic nervous system, immune–inflammatory system) and brain stress systems that underpin salience detection, arousal, pain and emotional states, are interconnected and form part of a larger integrated system that protects the individual from threats. Activation to any part of the system, whether from emotional stress, pain, injury, infection or psychological trauma, is proposed to trigger the body's stress response. FND symptoms occur due to aberrant patterns of functional connectivity between arousal/emotion-processing regions and motor-processing regions, which occurs when one (or more) of the components from the stress system is activated too much, too little, too long or in aberrant ways.

The model is based on research that demonstrates an association between stress and the onset or exacerbation of physical and mental health problems, with a role for dysfunctional immune–inflammatory processes in FND. This is similar to the neurobiology of psychiatric conditions, such as anxiety, depression and chronic pain, which are common comorbidities in FND. The stress-system model highlights the complex interaction between the different components of the brain–body stress response, though the applicability of the model to those that do not report stressful antecedents is also unclear. To address this, a stress–diathesis model has been proposed (Keynejad et al., 2019), where biological susceptibility interacts with early life adversity, such that FND can be precipitated by traumatic events later in life and maintained by psychological responses.

This model has been used to develop treatment interventions for children and adolescents with FND, where the focus is on the ‘stress system’ and the factors that activate and dysregulate the stress system and not the symptoms per se. In this sense, there is a similarity to the predictive processing accounts, as both consider the roles of cognitive processes on symptom amplification and maintenance.

Intervention and management in adults

Appropriate delivery and discussion of the FND diagnosis by the diagnosing clinician is generally considered an important first step in treatment (Carson et al., 2016; LaFrance et al., 2013). Some studies have suggested that this may lead to symptom cessation in a proportion of patients with functional seizures (e.g. Duncan et al., 2011; Mayor et al., 2010). Diagnosis is best made by positive diagnostic signs, and as a general principle it will be made by a neurologist, as they have the necessary expertise in neurological examination and differential diagnosis and are in a position simultaneously to perform the necessary exclusion of possible neurological comorbidity. One partial exception to this is in the diagnosis of Functional Cognitive Disorder, in which neuropsychologists have a key role (see below). It is worth noting in general that the presence or absence of psychological and psychiatric factors are no longer considered relevant in making the diagnosis as such, even if they are relevant to the formulation and management. Following the FND diagnosis, psychological therapies are widely regarded as potentially beneficial treatments, often in the context of wider multidisciplinary team input (Carson et al., 2016; LaFrance et al., 2013; Raymond & Vivas, 2021). Psychological approaches to FND include psychoeducation, second- and third-wave cognitive behavioural therapies (CBT) and psychodynamic psychotherapies (PDT). Both individual and group interventions have been studied. At present, the available research is limited in quality, and important methodological issues, such as the heterogeneity of people with FND, have received insufficient attention. Most recent reviews highlight the need to expand the evidence base in this area (e.g. Carlson & Nicholson Perry, 2017; Elliott & Carberry, 2022; Ganslev et al., 2020; Gutkin et al., 2021; Martlew et al., 2014).

Gutkin et al. (2021) reviewed adult studies employing CBT or PDT interventions for a range of FND presentations, with most studies focusing on single symptom types. CBT was considered to have the highest quality evidence base, with most studies yielding positive results. One important caveat is that the definition of CBT in this review encompassed a number of potentially quite different treatments that may or may not be appropriate to aggregate. These include CBT-informed psychoeducation for any FND (Sharpe et al., 2011), second-wave CBT and seizure-control techniques for functional seizures based on an adapted fear avoidance model (Goldstein et al., 2010; Goldstein et al., 2020), second-wave CBT with or without adjunctive physiotherapy for FMD (Dallochio et al., 2016), trauma-focused CBT for functional seizures with comorbid PTSD (Myers et al., 2017), Mindfulness-based Therapy for functional seizures (Baslet et al., 2020) and Acceptance and Commitment Therapy for any FND (Graham et al., 2018). Hybrid CBT approaches have also been studied for functional seizures, including Mindfulness-based Therapy with adjunctive Motivational Interviewing Techniques (Tolchin et al., 2019) and second-wave CBT with psychodynamic, Dialectical Behaviour Therapy, interpersonal therapy and mindfulness elements (LaFrance et al., 2014). Readers should therefore consult individual studies for evidence pertaining to specific treatment variants. Although most studies have been small, several were judged to be good quality by Gutkin et al. (2021). Eye Movement and Desensitisation Reprocessing Therapy and Acceptance and Commitment Therapy are sometimes used for FND, though published evidence is currently limited to single case studies (Cope et al., 2023; Graham et al., 2018). Further funded pilot and feasibility studies are currently underway (Cope, 2022; Poole et al., 2022).

The largest and most robust FND trial to date, the CODES trial, focused on second-wave CBT for functional seizures in adults (Goldstein et al., 2020). The CODES trial randomised a total of 368 people, removing some of the bias present in smaller scale studies, where recruitment might occur in only a few specialist centres, and reducing susceptibility to therapist effects. While its primary outcome (monthly seizure frequency at 12 months post-randomisation) did not

https://doi.org/10.53841/bpsrep.2024.rep181.7

differ between groups, other secondary outcomes (including seizure-related and psychosocial outcomes) suggested that functional seizure-specific CBT plus standardised medical care was superior to standardised medical care alone, and both groups showed reduction in the primary outcome. The CBT group also showed a more rapid reduction in seizure frequency than controls, with a significant group difference at six months (Goldstein et al., 2022). Research funders are increasingly recognising the importance of such multi-centre and adequately powered randomised controlled trials in FND. An advantage of such large trials is that they also allow evaluations of treatment-related safety and associated harms (e.g. Goldstein et al., 2020), which have not typically been reported in smaller trials for people with FND (Ganslev et al., 2020). In this case, no evidence was found for any adverse events specifically being associated with receipt of second-wave CBT for functional seizures.

Psychodynamic psychotherapies have not reached the gold standard threshold of the CODES trial but, as with the smaller scale CBT studies, do provide preliminary evidence of efficacy (Gutkin et al., 2021). PDT encompasses a number of different formats, including Psychodynamic Interpersonal Therapy (PIT), Intensive Short-term Dynamic Psychotherapy (ISTDP) and other less specified short-term or more traditional models. Promising outcomes for both FND and wellbeing improvement have been found in studies of these approaches to FND broadly (Hubschmid et al., 2015; Reuber et al., 2007; Russell, Abbass et al., 2022), functional seizures specifically (Mayor et al., 2010; Russell et al., 2016; Santos Nde et al., 2014) and for FMD (Hinson et al., 2006; Kompoliti et al., 2014). One study with positive results for a hypnotic intervention for FMD also included elements aimed at promoting emotional insight and expression that might be considered psychodynamic (Moene et al., 2003). While there is a quality gap between some of the PDT and CBT study methods, a relative strength of the PDT research is the gathering of longer-term follow-up data after treatment end. In one case (ISTDP), there is also a systematic method for identifying who might benefit from treatment by identifying positive signs of a relationship between functional symptoms and psychological factors (Abbass, 2005).

A recent narrative review (Aybek & Perez, 2022) has suggested that rehabilitation-based approaches leaning heavily on occupational and physiotherapy may be treatments of choice for functional motor symptoms, while psychotherapeutic interventions have an emerging evidence base of effectiveness in a range of FND subtypes.

Of note also, although from the paediatric literature, is the Retraining and Control Therapy (ReACT) approach (Fobian et al., 2020), which uses an overarching CBT approach with elements of habit-reversal training, focusing on preventing the onset of functional seizures with the use of these techniques at the time of seizure onset, and they are extending this approach to adults. Richardson and colleagues (2023), using a related approach in a small consecutive case series of adults, have reported successful treatment with symptom remission, emphasising use of a grounding approach during *in vivo* graded exposure to seizure triggers. Such approaches directly targeting seizure onset seem promising and need further research.

Beyond the question of which psychological therapies are effective for FND, there are broader therapeutic issues to consider. It is not yet clear whether treatment focus is optimally directed to the presenting FND symptoms (e.g. seizures, abnormal movements), any associated psychological concerns (e.g. PTSD, depression, anxiety symptoms), or improving quality of life. Clinician views vary around this (O'Connor & Reuber, 2021). In the example of the CODES trial, the results suggest that, even in the absence of clear superiority over standardised medical care for functional seizure frequency at 12 months, functional-seizure-specific CBT improves a wider range of psychosocial and treatment-related outcomes, with clear superiority (including for seizure frequency) for CBT seen at 6 months following the end of treatment (Goldstein et al., 2022).

Of note, the standard medical care control condition in the CODES trial was substantially better than routine care in standard clinical practice, and seizure frequency improved in both arms of the trial at 12 months. Related to this is an ongoing debate as to the most suitable outcomes to be used in FND trials (Nicholson, Carson et al., 2020; Pick, Anderson et al., 2020), especially given the heterogeneity of symptom presentations and the lack of validated measures so far for these populations (Pick, Anderson et al., 2020). Whatever the main outcome selected, it is also going to be important for treatment trials to consider the proportions of participants who improve/deteriorate in a pre-defined manner on those measures, in addition to considering between-group treatment effect sizes.

Since neuropsychologists are commonly members of multidisciplinary teams, it is also encouraging to see the potential benefits of multidisciplinary treatment approaches in both non-randomised evaluations (Jimenez et al., 2019; McCormack et al., 2014) and small controlled RCTs (Dallochio et al., 2016). It will be important for treatment studies to clearly describe the role and input of psychologists and other members of the team in this context if interventions are to be reproducible and evaluated systematically.

DIAGNOSIS AND MANAGEMENT OF FUNCTIONAL COGNITIVE DISORDER

Functional Cognitive Disorder (FCD) is the subtype of FND presenting primarily with cognitive symptoms, although cognitive symptoms are common secondary symptoms in FND and somatoform syndromes more generally. These sorts of problems have long been a bread-and-butter aspect of neuropsychological practice. Although the broad entity of cognitive symptoms and complaints not fully explained by brain pathology has long been recognised, this terminology is relatively recent (Stone et al., 2015). It is a disorder that is still in the process of being defined, with a number of presentations identified (McWhirter et al., 2020), several of which may represent a single disorder with common mechanisms (Teodoro et al., 2018; Teodoro et al., 2023), although some have argued for a more narrowly defined disorder (Kemp et al., 2022). In paediatrics, while functional cognitive symptoms may be identified in clinical practice, this is not an area where there is a body of literature or research to report on, with clinical practices best informed by adult studies.

FCD has been defined with the following features (McWhirter et al., 2020): (1) One or more symptoms of impaired cognitive function are present; (2) Clinical findings show evidence of internal inconsistency with observed or measured function, or between different situations; (3) Symptoms and impairment are not better explained by another medical disorder, although might be comorbid with another medical disorder; (4) Symptoms or impairment cause clinically substantial distress or impairment in social, occupational, or other important areas of function, or warrant medical investigation.

Within this definition a number of potentially overlapping presentations have been identified (Stone et al., 2015): (1) Excessive attentional focus on normal cognitive symptoms; (2) Health anxiety about dementia with perceived cognitive deficit; (3) Isolated functional cognitive symptoms with or without impairment on cognitive tests; (4) Cognitive symptoms as part of depression or anxiety; (5) Cognitive symptoms within broader functional/somatoform syndromes, such as other FND, chronic fatigue syndrome, and fibromyalgia; and (6) Dissociative cognitive states, such as dissociative amnesia, fugue states and Ganser syndrome. Teodoro and colleagues (2018, 2023) present evidence that the ‘isolated’, ‘depression/anxiety’, and ‘other functional disorder-related’ groups all share the same underlying pattern. Although the Stone categories of excessive attention and health anxiety are distinguishable from this pattern, it is worth noting that they do share some features. Dissociative amnesic states, however, have been considered a separate and already clearly defined category.

Kemp and colleagues' (2022) paper is a neuropsychologically sophisticated discussion of the spectrum of functional cognitive symptoms and their differential diagnosis, with case examples and neuropsychometry, worth reading in detail. They also go on to a discussion of the differential diagnosis of FCD from varieties of feigning, which is largely beyond the scope of the current document, but noteworthy. In relation to the definition of FCD, they argue that it is reasonable to consider FCD as distinct from the cognitive symptoms associated with mood/anxiety and from health anxiety about cognition, and that it is distinguished from these by severity and complexity. The case examples they give are characterised by substantial impairment or disability in everyday life and occupation, with or without below-expected performance on cognitive tests. This is consistent with the McWhirter definition, but that definition may include milder cases. The distinction between health anxiety and FCD in these definitions remains somewhat unclear and needs further research.

In line with the neurological diagnosis of FND more generally, the diagnosis of FCD is a positive diagnosis based on the assessment of inconsistencies amongst the following: cognitive complaints; performance in everyday life; performance in clinic, both on formal cognitive assessment and informally; evidence of brain injury, and the consistency of complaints with that injury. Various common features that may be seen in FCD, and that can indicate inconsistencies, depending on context, are listed by McWhirter and colleagues (2020). These include attending alone; the patient being more aware of the problem than others; the patient answering independently; giving a detailed description of complaints and maybe bringing a written list; frequently offering elaboration and detail; the ability to answer questions with multiple components; giving a detailed account of history, drugs, and previous interactions with doctors; loss of recent and remote autobiographical memories; complaints of memory gaps for specific periods and events; memory symptoms that would be within most people's normal experience; approximate answers close to the correct answer; dating symptom onset with precision; unstable longitudinal course; and marked variability. Of interest, a detailed description by the patient of cognitive failures has been shown to be a sensitive and specific positive diagnostic feature of FCD (McWhirter et al., 2022), and younger age and longer spoken response explained 74% of diagnostic variability. Screening measures such as the Montreal Cognitive Assessment can show a difference with healthy controls but did not distinguish FCD from Mild Cognitive Impairment (MCI) in older adults (Pennington et al., 2019).

There has been a historical practice of relying on performance validity tests (PVTs) in the diagnosis of FCD, but recent evidence suggests their interpretation requires more nuance in the overall context, and that they cannot be used straightforwardly as a specific diagnostic marker. PVTs are also extensively used in medico-legal contexts to assess feigning. In fact, PVTs are commonly passed in FCD (Teodoro et al., 2018), and although a subgroup of patients may fail, the rate of this is not sufficient to be helpful in discriminating FCDs from other conditions in which failure is also seen (McWhirter et al., 2020). As an aside, the historical reliance on PVTs in the diagnosis of FCD may owe something to a historical failure to distinguish clearly enough between concepts of feigning and what we now call FCD, often under the imprecise umbrella concept of effort, a concept which is not useful in this situation and probably needs re-evaluating. Kemp and colleagues have made the important point that the interpretation of PVT failure as indicative of a particular conclusion (the positive predictive power, or PPP), such as feigning or indeed FCD, depends on the base rate of that phenomenon in the relevant population, with low base rates giving low PPP. So we can consider that although PVTs may be effective, in combination with other evidence, in the assessment of feigning in a medico-legal population where there is a high corresponding base rate, the much smaller and unknown base rate of cognitive feigning in clinical practice means that PVTs have a very low PPP for feigning in the clinical population and are not useful to determine that. Furthermore, although PVTs would have a slightly higher (but still not high) PPP for FCDs in the clinical population, based on the above observations that people with diverse cognitive diagnoses fail PVTs, they cannot be used as a diagnostic marker. PVT failure is nevertheless an example of an inconsistency that may contribute to FCD diagnosis, as well as an indicator of caution about validity of test performance. Although PVT failure may count as an example of an inconsistency within the history and wider neuropsychological battery and contribute to the diagnosis, it would not have sufficient sensitivity or specificity by itself to use it as pathognomonic of FCD, and a broader pattern of inconsistency, including in relation to patterns of neurological cognitive impairment and consistency with patterns typical of FCD, needs to be demonstrated.

Teodoro and colleagues (2018, 2023) propose a multifactorial model that synthesises a number of mechanisms producing or exacerbating cognitive symptoms, including reduced cognitive reserve from factors such as pain, fatigue, mood, sleep, obsessiveness and dissociation, with psychomotor slowness secondary to these as a separate factor in its own right, as well as factors of abnormal prior expectations, maintained by over-interpretation of cognitive errors, and a feedback loop of increased subjective cognitive effort leading to increased effortful control of cognitive processing, in turn exacerbating the perception of cognitive symptoms. Interestingly, they found both that local metacognition was preserved (i.e. judgement of task performance) with impaired global metacognition (i.e. global judgement of cognitive function) in FCD, and that subjective task effort for tasks of varying difficulty was not associated with a brain measure of cognitive effort (P300 event-related potential). So, people with FCD were performing tasks well and knew it, while continuing to believe they suffered with cognitive impairment, and reporting increased subjective mental effort on harder tasks without evidence of increased brain effort.

Models such as that of Teodoro and colleagues suggest clear treatment targets that can further inform CBT treatment plans within an individualised formulation: in particular, addressing patterns of hypervigilance, over-interpretation of cognitive errors and abnormal prior expectations or catastrophic beliefs cognitively, and patterns of maladaptive coping through over-control of cognitive processing and other avoidance and safety behaviours behaviourally, while of course attending to any contributing factors in the family system. A clear explanation of the common processes in FCD and the individual formulation, as well as supporting the therapeutic alliance and directing the patient's efforts and attention in the right direction, may also be effective in helping patients to start to reframe prior expectations of sickness and symptoms. Well-established techniques of cognitive rehabilitation can be adapted for use in appropriate cases, as long as care is taken not to maintain abnormal prior expectations of cognitive impairment. A discussion of some of these issues is included in a review of the role of neuropsychology in FND by Van Patten and colleagues (2024). Physiological contributors, such as certain medical comorbidities or medications, should be reviewed (McWhirter & Carson, 2022). Meanwhile, comorbid problems of pain and fatigue, or the stress of these, and mood, sleep, obsessiveness or dissociation, are also potential treatment targets.

Intervention and management in children and adolescents

Relative to adult populations, there are a number of distinct challenges in clinical practice when working with children and families affected by FND. Many challenges, such as a paucity of research, or a lack of consensus on the conceptualisation of such cases, appear to be magnified within child populations, with fewer well-controlled outcome studies reported. This can pose substantial challenges for the clinical practice of paediatric neuropsychologists in this area, and it is perhaps unsurprising that professionals report uncertainty about the clinical management of FND cases. This is particularly true when considered in the context of the clinical formulation and management of a condition recognised to have substantial psychological elements, but with a physical presentation that is often associated with the possibility of excessive or iatrogenic clinical investigations. This can be exacerbated by findings that the majority of families may seek multiple opinions and hold views disbelieving the diagnosis of FND (e.g. Brown et al., 2013), together with high rates of stigmatisation reported by both children and parents (e.g. McWilliams et al., 2016).

There is currently limited research available regarding the effective treatment of paediatric FND, and in this context consensus recommendations for assessment and management have been published (Reilly et al., 2023). In a review of the literature (Elliot & Carberry, 2022), only one RCT study was identified, which examined the effects of a manualised treatment for FND compared to supportive therapy (Fobian et al., 2020), with significant improvement of functional seizures in the treatment group after seven days, while those in the control group continued to experience symptoms. This was a specially developed treatment (ReACT) based on habit-reversal training within a CBT framework and combined with systemic elements to manage family and school interactions. Other studies have reported on the use of CBT with biofeedback (Sawchuk et al., 2020), CBT with attention training (Robinson et al., 2020) and CBT as a family-based intervention (McFarlane et al., 2019). These studies reported a reduction in FND symptoms and improvements in social, emotional and behavioural functioning. A reduction in FND symptoms, with increased school attendance and reduced emergency room visits, has also been reported following an intervention that included psychoeducation, with exploration of the family's reaction to the diagnosis, specific recommendations about medication management, behavioural responses to seizures, referrals for mental health services and advice about reintegration to school and extracurricular activities (McFarlane et al., 2019). Systemic family therapy has been reported to be effective in single case studies (Chudleigh et al., 2013; Kozlowska, 2016; Özsungur et al., 2012), as has EMDR (Demirci & Sagaltici, 2021). CBT-informed physiotherapy has also been advocated for functional movement symptoms in children, with an emphasis on achieving functional outcomes, such as completing tasks and redirecting attention away from the physical symptoms (Gray et al., 2020). Similarly, a recent narrative review in children and adolescents (Kim et al., 2022) reported that physiotherapy was an effective approach for the management of functional motor symptoms; however, this was alongside psychological, family, school and other interventions. Thus, for children, a multidisciplinary approach with the use of psychological interventions embedded within the physiotherapy interventions was deemed important to supporting symptom reduction and return to full-time schooling, with authors reporting symptom resolution in 85–95% of children and return to full-time schooling in two-thirds. The authors propose that the biopsychosocial (systems) approach is the gold standard for treating paediatric FND, with a need to develop methodologies that assess the efficacy of components of multi-modal treatment interventions. A comprehensive biopsychosocial in-patient and out-patient service using evidence-based treatments is described by Kozlowska and colleagues (2023), and this paper is notable for its detailed case-based description of the patient pathway and interventions, which may be a useful resource.

One of the most substantial factors to consider in clinical practice in the paediatric population is the role of developmental factors. More specifically, it is important to recognise that both aetiological factors and the presentation of the FND will vary, depending on the chronological age, the developmental level, and the interaction of these two factors for each specific young person. It is also important to recognise that paediatric-based FND may evolve and change as the child gets older, with untreated FND symptoms changing and with presentations jumping from bodily system to bodily system, but likely associated with similar psychological processes and with comparable levels of functional impairment. A further point to be considered is that, while FND may present in a similar fashion between children and adults, there is no evidence to suggest that these conditions lie on a developmental spectrum and that children with FND grow into adults with FND.

Developmental factors are also particularly pertinent due to children with FND presenting with neurodevelopmental and learning needs (McWilliams et al. 2019; Rawat et al., 2015; Sawchuk & Buchhalter, 2015), with rates higher than those seen in the general population of intellectual disability (23.5–26%), specific learning disorders (14.7–38%), Attention Deficit Hyperactivity Disorder (ADHD; 22.7%) and Autism Spectrum Disorder (16.9%). As such, clinical practice with children with FND should include screening for, and where necessary, formal assessment of such difficulties. It is hypothesised that the identification and implementation of evidence-based interventions for co-occurring conditions (e.g. neurodevelopmental and mental health conditions) can provide a pragmatic means of intervention for children who are experiencing difficulties as a result of FND symptomatology. In doing so, and through reduction of the day-to-day stress experienced by the child through addressing such aetiological or maintaining factors, FND symptoms can be reduced. Support for such a clinical approach is outlined in a number of clinically oriented studies (e.g. Kozlowska et al., 2021; McFarlane et al., 2019).

Family and systemic factors play an important role in the presentation of FND symptoms, and working with these aspects is a necessary part of the intervention in paediatric settings. For instance, it is already recognised that the presentation of FND can be influenced by illness within the family. For example, Reilly et al. (2013) highlight the presence of high levels of epilepsy in the families of children presenting with functional seizures. As such, taking account of the family's views of the young person's symptoms, their accommodation and response to them, as well as the views of wider medical and school-based systems, is particularly important. This is particularly evident amongst children with specific learning disorders (e.g. dyslexia), with other authors reporting elevated levels of academic difficulties or school phobia (Li et al., 2021; Sawchuk & Buchhalter, 2015). As such, it is unsurprising that many clinicians have found that FND can be triggered in educational settings. Approaches aimed at providing psychoeducation for school staff, together with de-escalating the threat imposed by a perceived medical emergency, have been advocated in the clinical literature (e.g. Owen et al., 2022; Plioplys et al., 2007).

One of the implications for such an approach is that many of the skills and pathways for the management of FND, particularly those relating to the identification and implementation of existing, evidence-based recommendations for both neurodevelopmental conditions (such as autism and ADHD) and common co-occurring mental health conditions (such as anxiety and depression), are already present within existing services (e.g. CAMHS, paediatric psychology services). However, it is also widely recognised that the management of such difficulties within the context of FND is likely to require significant liaison and co-working between the above clinicians and the neurology team or physical health service to which the child most likely initially presented. It is widely recognised in clinical practice that optimising outcomes for the child and family typically requires significant co-working between departments and services who are typically located on different sites, with clinicians who have different backgrounds and training. As such, successful management of such patients often requires flexible working practices, building new relationships with clinicians with whom one does not typically work, agreement on a shared model, and often assertive risk holding between the teams involved.

Multidisciplinary working

One of the major issues in the treatment of FND, for both adults and children, has been lack of understanding of the condition amongst healthcare professionals. A synthesis of 11 qualitative studies into the experience of healthcare professionals (HCPs) in working with patients with FND commonly found uncertainty in the management of FND, which frequently led to simply moving the patient's care onto another discipline (Barnett et al., 2022). Barnett and colleagues observe that this typically leads to a vicious cycle whereby patients are 'passed from one professional to another but without receiving clear, honest information, or effective treatment'. They propose that clear clinical pathways are part of the solution to alleviate uncertainty in HCPs and improve treatment for patients with FND. O'Neal et al. (2021) reported that patients with FND were typically referred to a multitude of specialists, often in a fragmented manner, with no comprehensive clinical services unified and streamlined to their care, which likely contributed to high healthcare cost and poor outcomes, and that FND-informed professionals are difficult to access.

O'Neal and colleagues (2021) describe the complexity of care required for patients with FND and suggest a chronic-care model, already validated for patients with other conditions, to be adopted as the standard of care for people with FND. They report essential components as care coordination (to deliver a cohesive message and minimise unnecessary testing and hospitalisation) and team members from multiple disciplines for individualised, targeted treatment plans. Included in their model are the elements of self-management support, community resources, healthcare organisation, delivery system redesign, decision and treatment plan support and computer information systems. They detail explicit operational recommendations, such as which professionals are core members of the MDT team, regular meetings, a nominated team leader, use of local providers, family and community supports, enhanced communication via a written summary, use of teleconferencing for inclusion of local providers outside the FND team for case discussion, coordination and education and FND-informed experts recording short videos on local websites.

In 2023 NHS Grampian in Scotland commissioned Glasgow School of Art and Robert Gordon University to complete a detailed review of services for patients with FND, which included in-depth interviews with patients to gain a greater understanding of lived experience, a review of literature of models and of treatments and workshops attended by healthcare professionals (Raman & Teal, 2023). Six key focus areas for the improvement of services emerged: developing systems and tools for communication and collaborative working; enabling multidisciplinary care through understanding patient goals and setting up MDT goals and shared access to information; developing a coordinated pathway that works across boundaries to link different services and sectors; visual tools to enable health professionals' understanding of the patient's experience and their health and care interactions to ensure tailored, person-centred care; developing resources for patients to support early understanding of FND and signposting to appropriate resources of information; and training and education for primary and secondary care health professionals to increase confidence in FND and capacity for providing ongoing reassurance and support for those living with FND.

In a sparse literature on treatment models in practice, Aybek et al. (2020) give a valuable description of three different FND service models in three national referral centres (UK, Switzerland, Canada). Two of these are MDT based, with Switzerland using a primary neurology/psychology clinic and interdisciplinary treatment with weekly MDT meetings over 3–6 months, Canada offering full MDT consultations fortnightly over 3 months and then key-worker follow-up, and the other (UK) offering a primary neurology clinic with interdisciplinary treatment and follow-up by the treating multidisciplinary clinicians. They briefly describe each model, present demographic data, and draw lessons from their experience. They concluded that specialty clinics have an important role in ensuring correct diagnosis, they provide time and expertise to triage patients into appropriate treatment, and that close collaboration between FND clinics and acute neurology facilities might improve outcomes. The lessons they draw out are that FND has complex comorbidities and that specialist neurological evaluation is useful, that a high percentage require physical rehabilitation, that neuropsychiatric/psychological treatment specific for FND is needed, and that earlier detection and treatment of FND is needed.

Russell, Butler et al. (2022) describe a different UK model (Exeter) in more detail. The underlying principle of this model is that the assessment and treatment of FND is part of the core business of acute and community services and therefore should be integrated with coherent pathways and clear roles. The multidisciplinary nature of the team overseeing this pathway is seen as essential in order to capture patients presenting to different parts of the system, to develop coherent care plans that reach across stepped care, and to disseminate the expertise required to support patients and families throughout the pathway (i.e. beyond the specialist FND MDT). The pathway includes a twice-monthly MDT meeting to discuss the management of complex case presentations, reflect on the functioning of the pathway, establish new practices and protocols, and develop new initiatives for raising awareness of FND within local healthcare settings.

The literature on multidisciplinary inpatient treatments and rehabilitation for FND is emerging. It is generally noted that consensus treatment guidelines have yet to be established. However, multidisciplinary-team-based interventions that include the role of physical therapy in addition to psychotherapy have increasingly been recognised (Jacob et al., 2018; McCormack et al., 2014; McKee et al., 2018), with preliminary evidence for the benefits of a multidisciplinary approach that utilises physiotherapy and psychological therapies such as CBT, hypnosis and motor retraining (Humblestone et al., 2021; Jacob et al., 2018; Schmidt et al., 2021). Denno et al. (2021) evaluated a multidisciplinary inpatient treatment programme for FND and found global improvement in quality of life. Cope et al. (2021) found that a multiprofessional and expert-patient delivered outpatient education group, which included patients and carers/friends/relatives, significantly enhanced understanding of FND and increased belief in treatability and hopefulness regarding recovery and in agreement with diagnosis for both patients and their relatives. Saunders and colleagues (2024) report on outcomes of in-patient multi-disciplinary rehabilitation with a retrospective cohort of 52 patients with severe and chronic FND. 43/52 showed global improvement at discharge, with measurable changes in physical and psychological functioning. Of note, patient confidence in treatment at admission was predictive of eventual outcome, suggesting that early educative interventions, while not symptom-reducing treatments in their own right, may be relevant in enabling better treatment outcomes.

In children and adolescents with FND, Kozlowska et al. (2021) report outcomes of a multidisciplinary psychologically informed rehabilitation intervention, which demonstrated resolution of FND symptoms and return to health and wellbeing (including full-time school attendance) in the large majority of participants.

Of particular relevance for multidisciplinary services, the theory and practice of physiotherapy, occupational therapy, and speech and language therapy for FND (Baker et al., 2021; Nicholson, Edwards et al., 2020; Nielsen et al., 2014) include the use of psychological techniques and techniques targeted at psychological processes, especially anxiety reduction and regulation. There is scope for co-working between psychologists and multidisciplinary colleagues, as well as training and supervision to enhance these interventions.

Reducing costs with psychological interventions

The general argument for cost savings from effective treatment for FND is that FND is an often-chronic condition without treatment (Gelauff & Stone, 2016), resulting in mounting costs with longer duration in both healthcare and in wider society. Studies examining costs in FND have been summarised in the section on financial costs of FND and make this case well. Relatively inexpensive interventions, such as good communication, may reduce healthcare costs from over-investigation and ED attendance. Additionally, evidence for the effectiveness of psychological therapies, reviewed above, and other therapies, suggests that there is potential for reduction of long-term costs through wider provision of effective therapies. It is reasonable to consider that costs of FND service provision would at least be off-set by cost savings, and possibly better, but the degree of this is unclear. Further research is needed, both on the cost benefits of individual interventions and on the cost benefits of investing in standardised care pathways. Not specific to FND, the King's Fund (Naylor et al., 2016) has highlighted the benefits, in outcomes and cost savings, of having specialist psychologists embedded in multidisciplinary teams and the need to develop service models at the interface between mental and physical health, involving collaboration across the care pathway and underpinned by a biopsychological framework (e.g. Duarte et al., 2015; Katon et al., 2012; Katon et al., 2008; Simon et al., 2007).

There is evidence that the costs of including psychological initiatives within disease management or rehabilitation can be outweighed by savings due to improved physical health and decreased service use (Howard et al., 2010; Moore et al., 2007). Relatively inexpensive psychoeducation and self-help interventions may produce initial cost savings; for example, 50% of patients with functional seizures who attended ED reduced healthcare utilisation by 74% once they had received appropriate information and treatment, and antiepileptic medication was gradually withdrawn (McKenzie et al., 2010). In another study, there was a 94% reduction in ED visits and 100% reduction in hospital visits (Razvi et al., 2012). Furthermore, a study by Duncan et al. (2011) demonstrated reduced use of emergency services post-diagnosis for functional seizures. In the paediatric population, two sessions of group psychoeducation for children and parents was found to lead to reduced ambulance call outs (Gurcan et al., 2022). However, an RCT of an internet-based self-help programme for functional motor disorder showed no impact on symptoms, although it had a high patient satisfaction rating (Gelauff et al., 2020). Accordingly, although such interventions and resources may be helpful or, in some cases, show benefits to healthcare costs, they should not be considered effective symptomatic treatments and may be best conceptualised as useful early educational interventions in a care pathway.

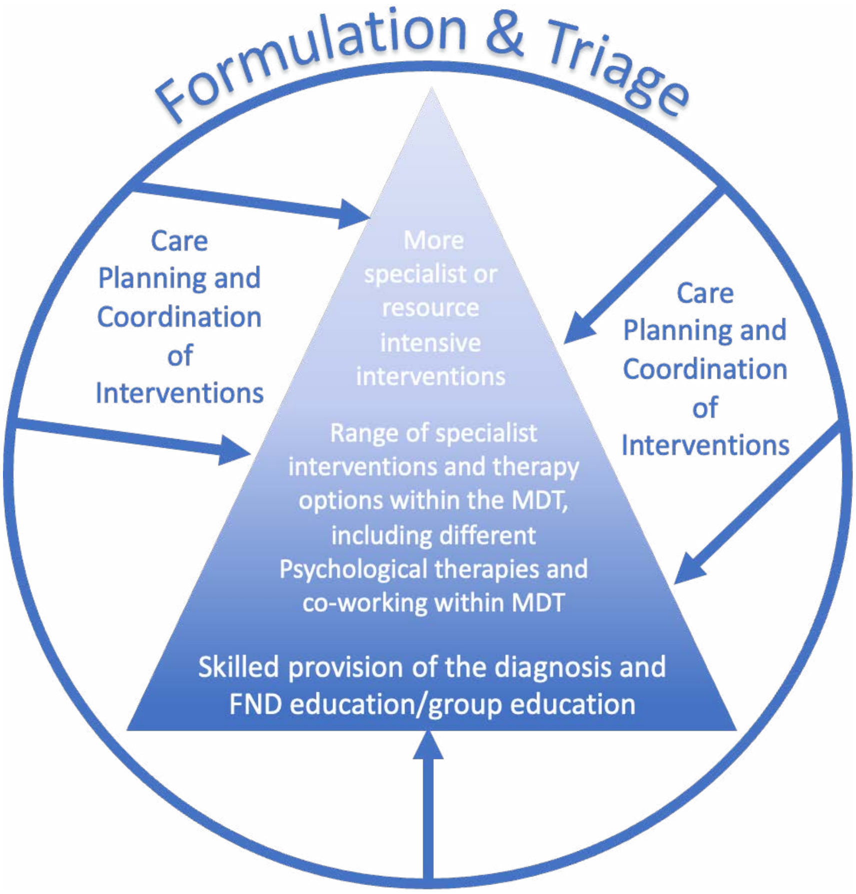
A small literature addresses the further questions of cost reduction through treatment and treatment value. For example, one small-scale study showed healthcare cost reduction from short-term dynamic psychotherapy in functional seizures (Russell et al., 2016). Several studies in the broader field of somatoform disorders and pain reviewed by Russell and colleagues (2022) also report cost reduction as an outcome after dynamic psychotherapy. More such research in this area is needed. Reuber and colleagues (2007) also report a cost analysis, with a relatively low treatment cost and a cost-per-QALY (quality-adjusted life year) well within standard criteria for cost-effectiveness.

Stepped and matched care

Many experts propose that a stepped care model is appropriate for FND (Healthcare Improvement Scotland, 2012; LaFaver et al., 2021), with interventions ranging from presentation of the diagnosis and simple information-giving, through simpler group-based treatments, to more specialist, individualised and multidisciplinary interventions for complex presentations. There is some positive evidence for relatively minimal CBT-informed interventions, including guided self-help (Sharpe et al., 2011) and both individual and group-based psychoeducation (e.g. Chen et al., 2014; Conwill et al., 2014; Cope et al., 2017; Mayor et al., 2010; Wiseman et al., 2016; Zaroff et al., 2004), although educational approaches have not been evaluated rigorously. One study found high patient satisfaction for an unguided internet-based self-help website for motor FND (Gelauff et al., 2020), and although it was not associated with improvements in self-rated health, perhaps unsurprisingly, it was thought by the authors nevertheless to be of value in a stepped care model. There may be some practical advantages to following low-intensity interventions (e.g. guided self-help and psychoeducation) with more formal courses of CBT in the first instance, before considering scarcer PDT approaches if appropriate, particularly given the availability of a larger CBT-trained workforce in mental health services. Depending on the formulation, treatments such as specialist physiotherapy (Nielsen et al., 2024) or specialist occupational or speech and language therapy may be delivered prior to, or instead of, psychotherapy for many people.

However, although stepped care approaches are commonly recommended, a purely stepped care approach to FND may not be the best fit. The rationale for the stepped care model is the efficient use of resources – to apply interventions of lower resource cost early in the care pathway, with the aim of reducing demand for higher resource-cost interventions as some patients improve from lower intensity treatments. Implicit in a purely stepped-care rationale are some assumptions: that the relative proportion of simpler cases sensitive to lower-intensity interventions will be greater than the relative proportion of complex cases, so that as the simpler cases achieve reasonable levels of remission following lower-intensity treatment, only a smaller proportion of cases need to be stepped up to higher intensity, and scarcer, treatments; and that a similar sequence of interventions will be suitable for all. But in FND there is a much lower expectation of spontaneous improvement, and the presentation of people with FND is more commonly not simple, but both heterogeneous and complex. It is not clear that all low-intensity interventions, such as, for example, educational approaches (e.g. Gelauff et al., 2020), are an effective treatment step, in the sense that some people might improve and not need to be ‘stepped up’, and instead such approaches might be a universal first step for efficiently providing necessary information, or as a tool for waiting list management, with the expectation that all or the large majority of patients would go on to further steps rather than any real expectation of symptom remission at the low intensity stage. The various further steps, including a variety of interventions of varying intensity and resource cost (e.g. group psychoeducation, group psychological therapies, individual CBT, specialist therapies for trauma, or psychodynamic approaches) and also focus (physiotherapy, occupational therapy, speech and language therapy, psychological therapy, systemic interventions), will not all be appropriate for all patients and might be appropriate in a different order for any given patient, depending on the biopsychosocial formulation. The heterogeneity means that care plans need to be individualised based on formulation, and that a variety of psychological therapies allows the greatest flexibility in matching patients to therapies according to the individual characteristics of the formulation. The complexity in many cases means that it is less likely that low-intensity therapies will be sufficient in the larger proportion of cases. Accordingly, the most appropriate over-arching framework is one of matched care (Russell, Butler et al., 2022), in which interventions are matched to the individual according to the formulation, within a service with a range of interventions of stepped therapeutic intensity (see Figure 2). Some of the benefits of the stepped care approach can be maintained by frontloading lower-intensity or less scarce interventions, where appropriate, within an individualised matched care plan. However, the implicit expectation of a much-reduced requirement for higher-intensity resources after lower-intensity interventions is somewhat reversed in FND, with instead an expectation that a higher proportion of patients will need aspects of the higher-intensity interventions.

Figure 2: Matched care model



The roles of a neuropsychologist working in FND

Functional Neurological Disorders defy our common categorisation into physical and psychological. As disorders of brain processing, they manifest with symptoms or dysfunction in diverse domains, and the importance of a multidisciplinary framework has become evident, even though specific disciplines may take the lead, depending on the primary symptoms. Neuropsychology has key roles to play, both as lead discipline in some cases and in multidisciplinary working in others, not least because of the inter-disciplinary character of the profession, straddling the borderland of the neurological and the psychological, and because the thread of psychological processes runs through the work of colleagues in other professions. Of course, not all settings in which neuropsychologists work will be explicitly multidisciplinary, and may include research settings, private and medico-legal practice, as well as mental health, acute neurosciences, and post-acute and rehabilitation settings. In working with patients with FND in any of these settings, the following key and potential roles may be relevant, to an extent depending on the setting:

1. **Service/pathway development and leadership.** Neuropsychologists can provide specialist knowledge, expertise and leadership to support the development and evaluation of evidence-based and coherent care pathways, which are aimed at improving the experiences of people with FND and their families.

2. **Assessment, formulation and triage.** Neuropsychologists are in a key position to be able to draw on knowledge of psychological, neurobiological and social processes in understanding the predisposing, precipitating and perpetuating factors at work in an individual case to contribute to a formulation of the problem. An evidence-based, individual biopsychosocial formulation is needed to guide appropriate intervention to achieve the best outcomes for the person with FND. It supports MDT decision-making and frames information appropriately for the person with FND and their family. Effective formulation and triage are necessary to direct resources efficiently within the pathway. Clear communication of the formulation and neuropsychological explanation of FND can also help patients to feel understood and more confident in the help they are offered, to understand their symptoms better themselves, to engage with more motivation in rehabilitation, and to reframe potentially problematic expectations of illness based on non-FND conditions.

3. **Neuropsychological assessment.** Neuropsychologists provide specialist neuropsychological assessments, diagnosis and formulation, especially in cases of diagnostic uncertainty, and have a key role to play in diagnosis of functional cognitive disorder (FCD). Comprehensive neuropsychological assessment includes, as well as cognitive assessment; evaluation and observation of behaviour, emotion and mental state, diagnosis of psychological disorders, and incorporation of results from other medical investigations.

4. **Neuropsychological rehabilitation.** There is a specialist role for neuropsychologists in providing therapy and rehabilitation for FCD and for the cognitive complaints commonly encountered as comorbidities within FND generally. This is through the use of detailed formulation and rehabilitation of functional cognitive symptoms, applying FCD-specific cognitive rehabilitation techniques, and targeting psychological processes such as over-monitoring, conscious over-control of usually automatic cognitive processes, loss of confidence and cognition-related anxiety, illness expectations, and various avoidance and safety behaviours.

5. **Clinical psychoeducation.** Psychoeducation is particularly relevant in FND. FND is hard for people to make sense of anyway, and the process of engagement, formulation and education about FND as a whole is a key part of the early stage of the clinical pathway. In addition, the psychological aspects of FND are particularly hard to understand, and patterns of unawareness or ignoring of emotional feelings and psychological processes are prevalent in people with FND and a key target of psychological intervention. Neuropsychologists, alongside specialist psychologists, have an important role to play in providing psychoeducation about emotional and cognitive processes and guidance on self-management, self-care and psychological stabilisation techniques at the start of the clinical pathway. Education and psychoeducation with families at an early stage will often also be relevant with adults, as well as with children.

6. **Specialist psychological therapy.** Neuropsychologists are psychologists with core psychological therapy competencies. The role of neuropsychologists in providing psychological therapy will depend on the skills and training of individual neuropsychologists, as not all will have further specialist training in psychological therapies. There are a variety of psychological roles within the broader work of the MDT for neuropsychologists with core psychotherapeutic training, including provision of short-term psychological therapy for functional seizures and comorbid anxiety and depression, stress management, optimising quality of life, co-working with physio/OT/SLT, focusing on psychological processes within FND symptom manifestations and rehabilitation, and working with families. Some specialist training in therapies such as CBT, ACT and mindfulness-based interventions, among others, may have a role here. There is a need for specialist psychotherapy for some patients with complex problems and to address trauma, systemic or psychodynamic processes underlying symptoms (using for example, schema-focused and trauma-focused CBT, EMDR, systems/family therapy, and psychodynamic therapies). Provision of specialist therapies will need psychologists or neuropsychologists trained in those therapies in the team. Recruiting and managing specialist psychologists will often be part of the role of the neuropsychologist.

7. **Therapeutic co-working.** In some cases, it may be most effective to work jointly in therapy sessions with physio/OT/SLT colleagues, combining psychological work focusing on emotions and cognitions within rehabilitation therapies to address psychological processes as they arise in relation to FND symptoms and in relation to the rehabilitation work.

8. **Liaison, consultation, supervision, training and support.** The mind-body nature of FND means that psychological processes will be interwoven through all stages of the clinical pathway, and there is a role for neuropsychologists in sharing psychological and neuropsychological expertise and perspectives with other MDT members and colleagues across the pathway. This support could be by training, consultation or supervision, and such activities may be routine parts of the care pathway, or provided as needed. This may range from support with the initial diagnosis and provision of appropriate information for patients and families, to providing consultation, training and support for MDT colleagues or other professionals working in primary, secondary, or tertiary care, the third sector and other community services. Separately, there is a role in contributing to clinical governance.

9. **Education/dissemination to colleagues and the public.** There is a specific role in education of colleagues and the public to reduce stigma and promote understanding of FND and people with FND. Engagement with points of clinical contact, such as GPs, emergency departments, and nursing colleagues, may be particularly effective, and within neurology there is a role for liaison and development of shared messages and protocols. In addition, training in FND needs to be a core part of teaching in clinical psychology training.

10. **Risk assessment.** Neuropsychologists can provide appropriate risk assessments balancing emotional, physical and cognitive risks and supporting individuals and teams to manage risk, in collaboration with MDT colleagues.

11. **Research and audit.** Neuropsychologists have the skills and responsibility to lead, develop and carry out research and audit and support MDT colleagues in research and audit. As new services develop, funders will need evidence of effectiveness and value for money, which are also key levers in further developing and growing effective services. There is also a role in contributing to the broader published evidence base.

ROLE WITHIN A SPECIALIST FND SERVICE

All of these roles become relevant in a specialist FND service. Such a service should be a part of an integrated healthcare pathway and include a multidisciplinary team (MDT) including neurology, psychiatry/neuropsychiatry/liaison psychiatry, neuropsychology, psychology/psychological therapists, physiotherapy, occupational therapy, speech and language therapy, nursing and possibly social work colleagues. A specialist FND service would have both outpatient and inpatient elements and links to the wider pathway, including neurology at secondary care level, mental health services and community services. Triage and formulation would be a vital element within the pathway to match care to individual patient needs and make effective use of resources. The MDT would have a key role in triage, especially in complex cases, which may need an extended assessment. The MDT would have a variety of options available for matched care, including physiotherapy, occupational therapy, speech and language therapy, and a variety of psychological therapies, with provision for follow-up support and liaison with community teams, as well as access to a long-term condition pathway for those patients not suited to active rehabilitation but needing management of long-term disability. Multidisciplinary rehabilitation could include, as appropriate, co-working of two or more professionals, and neuropsychologists and psychologists have a role in supporting colleagues in other professions with joint working or training and supervision to address psychological processes at work during symptom experiences and rehabilitation.

The issue of psychological therapy in FND presents particular practical issues, related to the historic split between mental and physical health services. A proportion of FND patients present with psychological complexity in a way that is appropriate for the kind of specialist psychological therapy services usually found in mental health organisations. However, for a variety of reasons, mental health organisations face systemic limitations in the management of patients with FND, and are also not best placed to be the host of the specialist tertiary FND service. These organisations operate to different criteria, pathways and timescales than a specialised FND service, meaning that patients with FND will not always meet criteria for a service, or meet it in a timely way in relation to the FND pathway, and mental health organisations also lack the integrated neuro-multidisciplinary care that people with FND need. Providing the tertiary multidisciplinary service within a mental health organisation would cut across the grain of the natural care pathway as patients present and re-present with physical symptoms, and are naturally the responsibility of physical health organisations, while some patients are disinclined to engage with mental health services. On the other hand, splitting off the psychological care of patients with FND into a service based in the mental health organisation while the rest of the FND MDT is based in another organisation is inconsistent with the needs of patients with FND for a coordinated MDT approach and is likely to cause a variety of practical problems in delivering effective care. Therefore, psychological therapy for people with FND will be best provided within the specialised FND service in a physical health organisation, which will therefore need expertise in working with complex psychological presentations and with a variety of psychological therapies for appropriate matched psychological care. Of course, where severe mental health comorbidities dominate the clinical picture or where specialist services already exist within the mental health service (such as for complex needs/personality disorders), then it may indeed be best for FND patients to be seen in the mental health service with appropriate liaison with the FND service. Managing that liaison would be a key role for psychologists.

It would be part of the role of neuropsychologists to develop an effective psychological therapy service within a specialised FND service, with psychologists or neuropsychologists with specialist psychotherapy skills. The application of all interventions in a clinical setting should be guided by individual case formulation and formally evaluated using validated outcome measures (Nicholson, Carson et al., 2020). This practice enables the clinician to work within the current limitations of the wider evidence base, acknowledge the heterogeneity of FND presentations and incorporate the complexity of comorbid psychological and health difficulties.

Conclusions and recommendations

1. We support a whole system approach such as that in the NNAG recommendations for an Optimal Clinical Pathway for adults in FND (Edwards et al., 2023; see Figure 1), and note the need for a similar optimal clinical pathway for children. In order to work effectively in the long-term, the care of people with FND must be distributed across the care pathway rather than delegated to the specialist tertiary care level, with each patient's long-term management held at primary or secondary care, and specialist tertiary services involved as needed. Thus, multidisciplinary working needs to go beyond the specialist MDT and include links and liaison across primary, secondary and tertiary care. In establishing a new service and care pathway in each locality, due attention will be needed to disseminate this model throughout the pathway. Such systems also need to address transition arrangements between child and adult care, especially in functional seizures in whom the modal age of onset in women straddles the child/adult boundary, so adult services need to accommodate this. Neuropsychology and psychology have key roles to play at both secondary and tertiary care level.

2. Within an integrated care pathway for people with FND at both secondary and tertiary specialist FND care levels, access to neuropsychologists and specialist psychologists are essential. At a specialist tertiary care level, a multidisciplinary approach and team is essential for effective treatment of people with FND and should be established, with the contribution of neuropsychology an essential part of that team.

3. Neuropsychology and psychology have a number of key roles to play in specialist tertiary FND services within a multidisciplinary team, in service development, assessment, formulation and triage, treatment, supervision, education, and research/audit. Although there is overlap in providing psychological formulation and therapies, both disciplines also have separate roles to play, with psychologists having a specific role in providing specialist psychological therapies, and neuropsychologists having specific roles based on neuropsychological expertise.

4. Because of psychological heterogeneity in FND, a range of psychological therapies will be needed to match patients' needs, including CBT, third-wave therapies (e.g. Mindfulness, ACT), trauma-focused and emotion and relationally focused/psychodynamic therapies.

5. A matched care model with a stepped range of intervention options is best suited for working with the variety and complexity of presentations of FND, providing both formulation-based matching of care to address wide individual variability of needs, and escalating steps of care with increasing complexity and specialism (see Figure 2). This is consistent with an optimal clinical pathway model that emphasises person-centred care in a flexible pathway. Psychological elements of a matched and stepped care provision would include neuropsychological/psychological assessment and formulation, education (both FND-specific and psychoeducation), group interventions, neuropsychological rehabilitation, therapeutic co-working with MDT colleagues, psychological therapies and specialist psychological therapy for complex cases. The timing and coordination of these interventions in concert with other MDT interventions is important for optimal effectiveness.

6. Consideration of factors of culture and diversity is an important aspect of an individual's neuropsychological formulation, a point which has been more recently recognised in diagnostic taxonomies. There are promising advances from multi-centre research groups in understanding cultural factors that show both commonalities and

https://doi.org/10.53841/bpsrep.2024.rep181.13

disparities across contexts, but further research is needed in relation to all aspects of diversity in FND. In the meantime, there is a duty on clinicians to consider the contextual background and the clinician lack of knowledge and potential unconscious assumptions in individual cases and to seek knowledge and supervision on these factors where necessary.

7. In view of the specialist nature of the field of FND, characterised by a distinct mind–body scientific paradigm, and clinical characteristics and patient needs, in contrast with other neurological and psychological conditions, it is essential that training in neuropsychological and psychological approaches to FND should be a core component of psychologist training programmes.
8. FND services are best located within organisations serving patients with neurological symptoms, rather than organisations with a mental health focus. Tertiary FND services will most likely be best linked to existing neurorehabilitation services.
9. In view of the historical lack of provision for FND in most areas, a national framework and mandate is needed to develop effective tertiary FND services and pathways in all areas. New funding will be necessary in most areas as existing resources are fully committed and have often historically excluded FND.
10. Given the historical lack of provision, and the specialist needs of people with FND, new neuropsychology and psychology posts specialising in FND will be needed where these do not exist. These should include a consultant-level post specialising in FND and suitable neuropsychology and psychology provision appropriate to the needs of the local population, given upper estimates of an annual incidence of 12 per 100,000 and prevalence of 149 per 100,000, with recognition that incidence/prevalence can vary by area, depending on socio-economic factors. Detailed recommendations on workforce planning are available in separate guidance (British Psychological Society, 2024).

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