

# How Is Functional Neurological Disorder Managed in Australian Hospitals? A Multi-Site Study Conducted on Acute Inpatient and Inpatient Rehabilitation Wards

Dharsha Petrie, MRehab,<sup>1,\*</sup> Alexander Lehn, MD,<sup>2,3</sup> Jessica Barratt, BSc,<sup>4</sup> Amy Hughes, BPhy,<sup>1</sup> Kathryn Roberts, BPhy,<sup>5</sup> Sarah Fitzhenry, FACP,<sup>6</sup> and Elise Gane, PhD<sup>1,7,8</sup>

**Abstract:** Background: Successful management for functional neurological disorder (FND) requires multidisciplinary involvement starting with providing a definitive diagnosis. Objectives: To observe clinical management of patients with FND during hospital admission. Methods: A prospective observational study was conducted over six Australian hospitals over a 4-month period. Data collected included patient demographics, communication of the diagnosis of FND, access to the multidisciplinary team, hospital length of stay (LOS), and emergency department (ED) presentations. Results: A total of 113 patients were included. Median LOS was 6 (interquartile range, 3–14) days. Thirty-five (31%) presented to ED with 9 (8%) re-presenting two or more times after hospital discharge. Total hospital utilization cost was AUD\$3.5million. A new diagnosis was made in 82 (73%) patients. Inpatient referrals were made to neurology (81, 72%), psychology (29, 26%), psychiatry (27, 24%), and physiotherapy (100, 88%). Forty-four (54%) were not told of the diagnosis. Twenty (24%) did not have their diagnosis documented in their medical record. Of the 19 (23%) not reviewed by neurology on non-neurosciences wards, 17 (89%) did not have their diagnosis communicated and 11 (58%) did not have it documented. Twenty-five (42%) referred to neurology were not provided with a diagnosis. Conclusions: Current gaps in service provision during inpatient hospital admissions in Australia include low rates of communication of a diagnosis, particularly when patients are not located on a neurosciences ward, and limited and variable access to inpatient multidisciplinary teams. Specialized services are needed to improve education, clinical pathways, communication, and health outcomes while reducing healthcare system costs.

Functional neurological disorder (FND) is a term given to the disorder of voluntary motor or somatosensory nervous system. It is diagnosed with typical clinical features and based on internal inconsistency.<sup>1</sup> The prognosis is poor with symptoms persisting or worsening in 50% of people with FND at long term follow up.<sup>2</sup> This may explain why FND are associated with significant healthcare costs.<sup>3–7</sup> To date, Australia has no health economic related to inpatient care of people with FND.

Diagnosing and exploring epidemiology and healthcare costs has been difficult because of the evolution of the diagnostic criteria,<sup>8</sup> the tendency to experience multiple symptoms simultaneously,<sup>9</sup> and because symptoms often mimic organic deficits.<sup>10</sup> This diagnostic evolution explains the various synonyms for these disorders including “conversion disorder” and “psycho-genic symptoms”.<sup>11</sup> As a result, FND are commonly only diagnosed after lengthy delays resulting in poor outcomes based on

<sup>1</sup>Physiotherapy Department, Princess Alexandra Hospital, Brisbane, Australia; <sup>2</sup>Neurology Department, Princess Alexandra Hospital, Brisbane, Australia; <sup>3</sup>School of Medicine, University of Queensland, Brisbane, Australia; <sup>4</sup>Physiotherapy Department, Bundaberg Base Hospital, Bundaberg, Australia; <sup>5</sup>Physiotherapy Department, Logan General Hospital, Logan, Australia; <sup>6</sup>Physiotherapy Department, Sunshine Coast University Hospital, Sunshine Coast, Australia; <sup>7</sup>School of Health and Rehabilitation Sciences, The University of Queensland, Brisbane, Australia; <sup>8</sup>Centre for Functioning and Health Research, Metro South Health, Brisbane, Australia

\*Correspondence to: Mrs. Dharsha Petrie, Physiotherapy Department, Princess Alexandra Hospital, 07 3176 2401, Brisbane, Australia; E-mail: [dharsa.petrie@health.qld.gov.au](mailto:dharsa.petrie@health.qld.gov.au)

**Keywords:** functional neurological disorder, conversion disorder, inpatient treatment, clinical pathways.

Relevant disclosures and conflict of interest are listed at the end of this article.

Received 24 April 2022; revised 10 February 2023; accepted 22 February 2023.

Published online 28 March 2023 in Wiley Online Library (wileyonlinelibrary.com). DOI: 10.1002/mdc3.13718

inappropriate treatments and costly evaluations.<sup>12,13</sup> Adding to the complexity is the variety of phenotypes patients with FND experience. The most common symptoms experienced in hospital are dissociative episodes and motor symptoms.<sup>9</sup> Pain, fatigue, and co-morbid psychiatric illness are also common.<sup>9,13</sup>

The most successful treatment for FND incorporates both physical and psychotherapeutic modalities after a patient has provided their diagnosis.<sup>10,12</sup> The value of inpatient multidisciplinary team management is well established in the literature.<sup>14–20</sup> Patients may require care during an acute inpatient admission, after which they may transition directly to the community or transition via inpatient rehabilitation, particularly if they are not able to complete instrumental and personal activities of daily living independently or with minimal assistance. Following hospital admission, care transitions to outpatient programs, or other community-based providers.

Health professionals often have negative attitudes toward patients with FND, although FND leads to high levels of disability and distress.<sup>21,22</sup> Patients with FND report feeling abandoned because of poor treatment access, experience iatrogenic harm associated with inappropriate treatment,<sup>22,23</sup> feel that disciplines and specialties are “passing the buck”,<sup>24</sup> and highlight experiences of medical and social stigma causing elevated levels of fear and apprehension.<sup>25</sup>

In 2012, the National Health Service (NHS) in Scotland published a report entitled “*Stepped care for functional neurological symptoms*.”<sup>26</sup> This report recommended that patients need to be diagnosed by a neurologist, and have the diagnosis appropriately explained to them, as the first step of successful management. If this step does not translate to a clinical improvement, then the report suggests the neurologist should move to steps 2 (referral to appropriate therapies, ie, physiotherapy and psychology) and 3 (referral to specialist therapy services, ie, dedicated FND specialists or chronic pain services). In Australia, there are several barriers to implementing these recommendations. In a survey of Australian health and medical professionals, most participants reported poor education and knowledge about FND.<sup>11</sup> Furthermore, resource pressures are cited as limitations for management particularly in hospital settings, causing inpatients with FND to be deprioritised.<sup>24</sup> To explore the current clinical care for inpatients with FND in Australia, a prospective observational study was conducted.

## Objectives

This study had two aims. First, to observe existing inpatient models of care for people with FND in Australian hospitals. Second, to compare those observations of practice to the NHS guidelines.

## Methods

### Study Design

This prospective observational study occurred at six public hospitals in Queensland, Australia. A description of each hospital

profile is available in Table S1. The data collection period at each site was 4 months, between February 2021 and March 2022.

## Participants

Participants were sourced from various inpatient hospital wards including neurosciences, subacute rehabilitation, general surgical units, orthopedics, intensive care, and general medicine. An inpatient ward was defined as a clinical ward to which patients were admitted for at least an overnight stay. To be eligible, patients had to be over 18 years of age, and either: (1) had received a definitive diagnosis of FND from their treating medical team, or (2) the treating medical team were providing clinical care as if they had FND (or another diagnostic term known to be synonymous with FND) without having provided the definitive diagnosis to the patient. The diagnosis (or absence of a diagnosis in the presence of FND clinical management) of FND could have taken place during the patient’s current admission, or before their current admission (ie, been acknowledged as a pre-existing condition by the treating medical team). Patients were excluded if: (1) the treating medical team did not communicate with the physiotherapist that they were managing the patient as having FND; or (2) the physiotherapist alone suspected the person of having FND.

## Study Procedure

Current inpatient models of care for people treated as having FND were observed at each site. There was a local research representative (physiotherapist) at each site, responsible for the conduct of the study at their respective site, who educated their colleagues on the study purpose and participant eligibility criteria via staff meetings and regular emails. Through usual inpatient practices including multidisciplinary ward round or handover meetings, physiotherapists identified potential participants and alerted their local representative. After confirming that the participant was eligible, each local representative conducted a medical chart review to extract data as well as recording information provided to them by the ward physiotherapist (eg, information from meetings and clinical handovers). The data from across sites was collated by researchers A.H. and D.P., and cleaned in preparation for analysis. A.L. reviewed the dataset to confirm FND phenotypes and identify diagnostic methods of treating team.

## Outcome Measures

A data collection tool (Table S2) was created by the research team to record extracted data based on a literature review. This tool underwent expert review before assure content and face validity (D.P., A.L., and E.G.). The tool prompted the local physiotherapy representative to extract data related to the diagnosis and presenting condition, referrals to key disciplines (psychology, physiotherapy, neurology, and psychiatry), inpatient length of stay (LOS), ward clinical area, ongoing referrals for community follow-up, and information regarding accessing the National Disability Insurance Scheme (NDIS).

The information regarding diagnosis and patient awareness of diagnosis was sourced from one or more of the following: medical chart; multidisciplinary meeting; and clinical handover. Occasionally medical staff discussed not providing the diagnosis to the patient with the multidisciplinary team, which was noted by ward physiotherapists. Evidence of provision of diagnosis included documented provision of FND related education.

## Cost Data

Estimated daily hospital fee costs were provided by the Queensland Department of Health. This does not include pharmaceutical, medical imaging, specialist or multidisciplinary management costs. For the number of hospital days, the admission date was defined as day zero. Patient-days were considered equivalent to the number of midnights spent in the hospital. Emergency department (ED) cost per presentation was estimated in accordance with billing data from the finance department of one of the participating hospitals. Total cost was calculated by multiplying bed days by estimated daily hospital fee then adding each ED presentation cost based on triage code.

## Synonyms

Alternative terminology for FND was extracted from each eligible medical record. These synonyms were based on existing literature and investigator experience.

## Phenotypes and Diagnostic Rationale

Symptom phenotypes and assessment procedures by the treating doctors was extracted from each eligible medical record and then summarized. Medical assessment was grouped as “Positive Signs” or “Medical Investigations” or “Unclear”.

## Data Analysis

Data were analyzed in Microsoft Excel and STATA (v14, STATA Corp, College Station, Texas, United States). Summary statistics were prepared for all variables using number (percentage) for categorical data and mean (standard deviation [SD]) or median (interquartile range [IQR]) for continuous data, as appropriate. Histograms of continuous data were inspected to determine normality. Associations between variables were explored by using either a  $\chi^2$  test for two dichotomous categorical variables or a Mann Whitney-*U* test for a non-normal continuous variable and a dichotomous categorical variable. Significance was set at  $\alpha = 0.05$ .

# Results

## Demographics

Six public hospitals recorded 140 episodes of care for  $n = 131$  people with FND,  $n = 113$  of those admitted for their FND. The mean (SD) age of patients was 45.4 (16.83) years. There were more females (85, 75%) than males (28, 25%). Seven (6.2%) had more than one inpatient admission at the same hospital within the study period.

Sixteen (16%) were deemed eligible by the treating team for NDIS, with nine of these patients (56%) approved during their inpatient admission.

## Diagnosing FND

The medical records during 97 (86%) admissions contained the terms “FND”, “functional neurological disorder”, “functional overlay” or “functional” with reference to symptomatology (ie, functional gait disturbance) documented. Remaining admissions extracted 23 different synonyms. The most frequent was “dissociative episode” ( $n = 9$ ), followed by “pseudoseizures” ( $n = 5$ ), “conversion disorder” ( $n = 4$ ), “non-organic” ( $n = 4$ ), “hemiplegic migraine” ( $n = 3$ ), “dissociative attack” ( $n = 2$ ), and “psychogenic non-epileptic seizures (PNES)” ( $n = 2$ ). In addition, the following terms appeared once ( $n = 1$ ): “anxiety related movement disruption”, “atypical seizure disorder”, “behavioural seizure”, “does not fit with organic”, “epileptic functional seizures”, “fluctuating paraesthesia”, “no anatomical cause”, “non-specified neurological disorder”, “malingering/previous avoidant behaviours”, “psychosomatic”, “somatic overlay”, “somatisation”, “somatoform disorder”, and “transient expressive aphasia”.

Fifty-three (38%) admissions were for patients with a pre-existing diagnosis of FND. Of those admissions, two-thirds (31, 58%) were for management of FND. Of those who had FND listed in their past medical history, two (4%) were not aware they had FND.

Of the 82 newly diagnosed patients, 44 (54%) were not provided the diagnosis of FND, despite the treating team managing the patient as having FND. Twenty (24%) did not have their diagnosis documented in their medical record, but rather their diagnosis of FND was verbally communicated only to the treating teams. Figure 2 summarizes how new diagnoses of FND were communicated with patients. A minority (31, 38%) of newly diagnosed patients were managed on a neurosciences ward.

## Hospital Service Cost Burden

Median hospital LOS was 6 days (IQR, 3–14) with a total bed day count of 1454 days. Participants presented across all clinical areas (Fig. 1). The number of admissions that were followed by an ED presentation within 28 days of hospital discharge was 35 (31%), with nine (8%) admissions being followed by two or more ED presentations in this period. Total bed day cost was

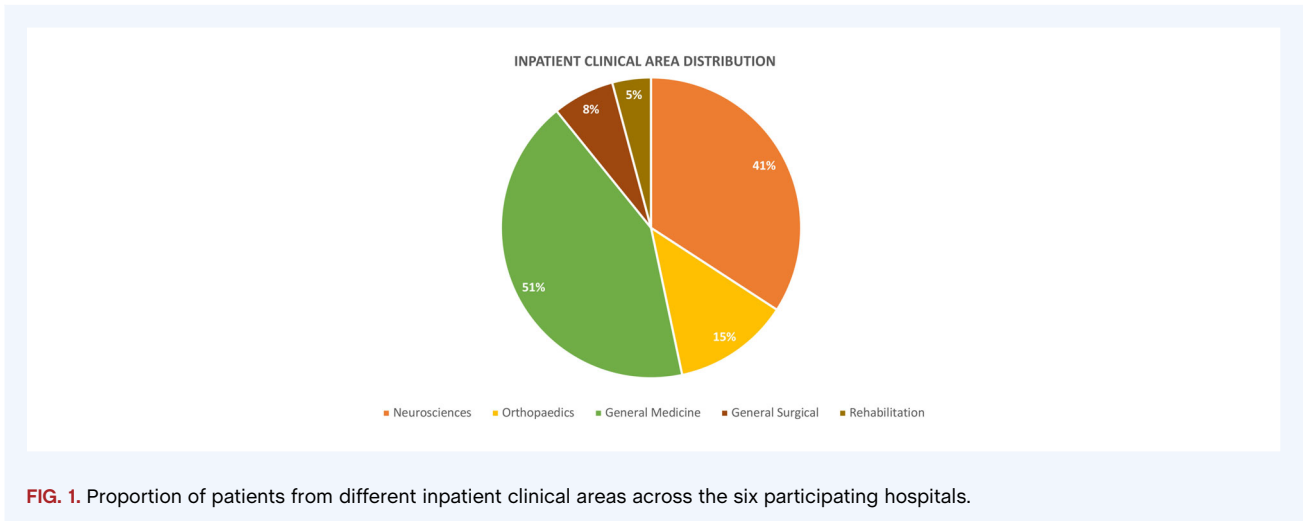


FIG. 1. Proportion of patients from different inpatient clinical areas across the six participating hospitals.

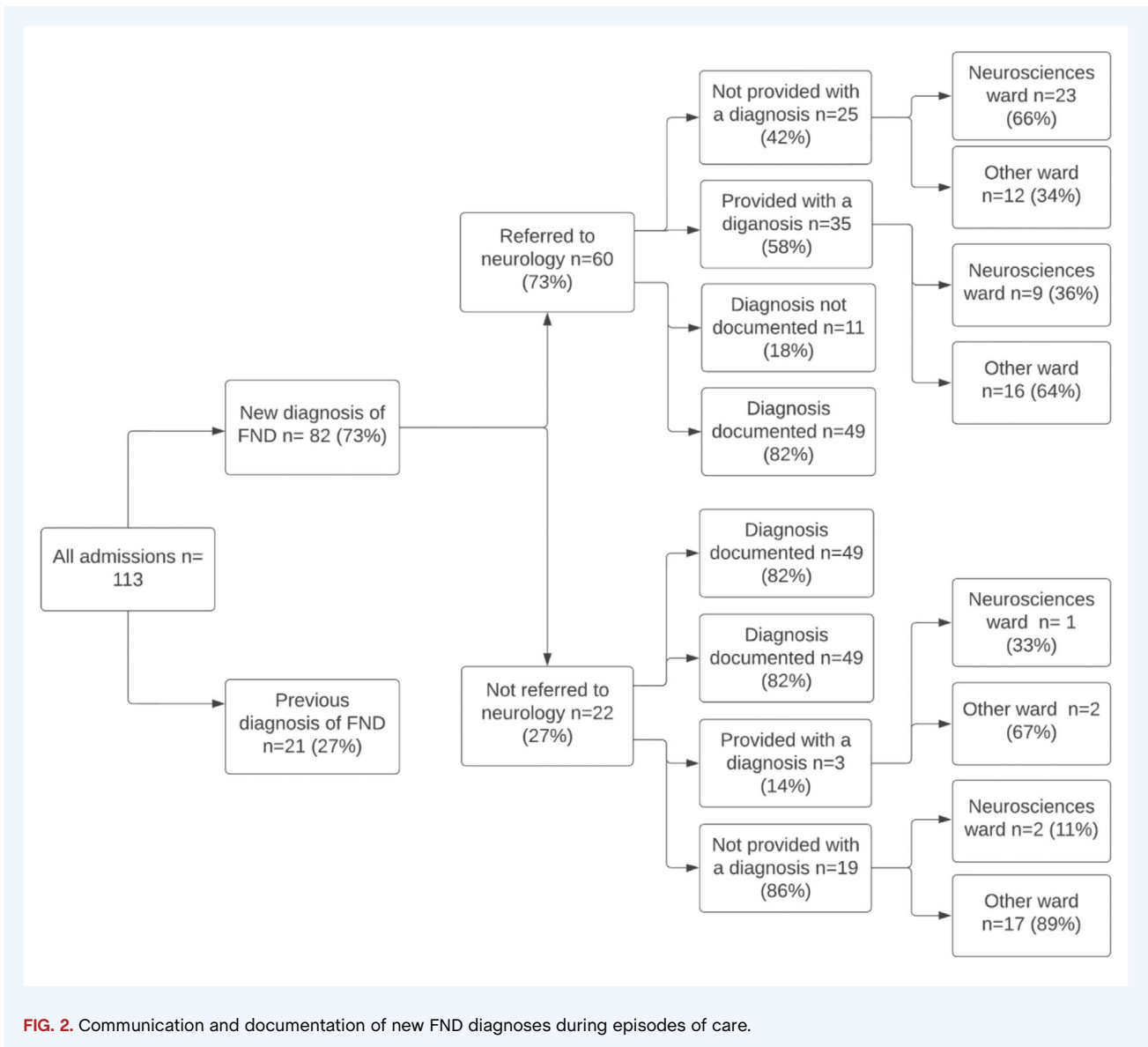


FIG. 2. Communication and documentation of new FND diagnoses during episodes of care.

**TABLE 1** Number of multidisciplinary referrals and type of follow up community services arranged on hospital discharge

Follow-up model of care	Neurology, No. (%)	Psychology, No. (%)	Psychiatry, No. (%)	Physiotherapy, No. (%)
Total referrals for community services:	51 (45)	36 (32)	14 (12)	57 (50)
Private OPD	3 (3)	19 (17)	5 (4)	12 (11)
Public OPD	48 (42)	17 (15)	9 (8)	40 (35)
NDIS	0	0	0	1 (2)

Abbreviations: OPD, outpatient department; NDIS, National Disability Insurance Scheme.

AUD\$3,444,235.20 (average \$30,479.96 per episode) and total cost of ED presentations within 28 days was AUD\$56,297.05.

## Multidisciplinary Management in Hospital and After Discharge

Eighty-one admissions (72%) included an inpatient referral to neurology, 29 (26%) to psychology, 27(24%) to psychiatry, and 100 (88%) to physiotherapy. Table 1 outlines the ongoing referrals for community follow-up following hospital discharge.

## Discharge Planning

Most admissions (100, 88%) ended with discharge directly home. At the end of the study data collection period, 3 (3%) patients remained an inpatient. The remaining were discharged to interim care, residential aged care facilities or transferred to another hospital for ongoing management.

## Phenotypes and Diagnostic Rationale

Table 2 presents the FND phenotypes grouped. Most diagnoses were made using Positive Signs (85, 75%), 21 (19%) using

**TABLE 2** FND phenotype groups

Motor + sensory	29
Seizure + sensory	0
Motor + seizure	8
Mixed (>2)	41
PNES only	9
Motor only	12
Sensory only	1
Motor + swallow/speech	6
Other	5
Total	111

Abbreviations: FND, functional neurological disorder; PNES, psychogenic non-epileptic seizures.

Medical Investigations, and seven (6%) were unclear. Two (2%) were managed as having FND, but symptoms were likely because of another neurological condition.

## Exploration of Relationships Between Variables

Table 3 presents a comparison of FND diagnosis, specialty follow up, ED presentations, and inpatient admission to a neurosciences ward. There was no relationship between diagnostic status and presentation to ED after hospital discharge. There was a significant relationship between diagnostic status and management on a neurosciences ward—the proportion of patients who had received a diagnosis of FND on the neurosciences ward (32 of 41, 78%) was higher than those with a diagnosis on another type of ward (37 of 72, 51%;  $P < 0.01$ ).

Presentation to ED after hospital discharge and management on the neurosciences ward were not related to outpatient referral rates (see Table 3), with the exception of outpatient referrals to neurology—more patients managed on a neurosciences ward (27 of 40, 68%) were referred compared with those managed on another type of ward (24 of 71, 33%;  $P < 0.01$ ).

## Discussion

This study provides a unique hospital-wide view of inpatient management of FND, in contrast to the majority of existing publications, which have focused on targeted inpatient rehabilitation programs.<sup>9</sup> Half of newly diagnosed patients in our study had not had the diagnosis of FND communicated to them. Although 88% of admissions were referred to physiotherapy, only 26% were referred to psychology. These findings demonstrate that patients with FND in Australian hospitals are frequently not receiving appropriate care according to the NHS guidelines and ongoing emerging evidence.<sup>26,27</sup>

Despite evidence to suggest that misdiagnosis of FND negatively impacts overall prognosis,<sup>28</sup> our findings indicate that this crucial first step, communicating the diagnosis to the patient, remains a challenge. This may be because of several reasons: most health professionals have received little or no education about the diagnosis and management of FND and the self-reported

**TABLE 3** Comparison of provision of diagnosis, specialty follow up, emergency department presentation, and management on a neurosciences ward

	ED presentation <28 days of hospital discharge			Managed on neurosciences ward		
	Yes (n = 35)	No (n = 76)	P-value	Yes (n = 41)	No (n = 72)	P-value
Provided with FND diagnosis (3 categories)						
Previous diagnosis given	15 (43%)	16 (21%)		8 (20%)	23 (32%)	
New diagnosis during admission	8 (23%)	30 (39%)		24 (59%)	14 (19%)	
No diagnosis given during admission	12 (34%)	30 (39%)		9 (22%)	35 (49%)	
Provided with FND diagnosis (2 categories)						
Previous diagnosis given or new diagnosis during admission	23 (69%)	46 (60%)		32 (78%)	37 (51%)	
No diagnosis given during admission	12 (31%)	30 (39%)	0.6	9 (22%)	35 (49%)	<0.01
Neurology follow up						
Yes	19 (54%)	32 (42%)		27 (68%) <sup>a</sup>	24 (33%) <sup>b</sup>	
No	16 (46%)	44 (58%)	0.23	13 (32%) <sup>a</sup>	47 (67%) <sup>b</sup>	<0.01
Psychology follow up						
Yes	9 (26%)	27 (36%)		15 (38%) <sup>a</sup>	21 (30%) <sup>b</sup>	
No	26 (74%)	49 (64%)	0.31	25 (62%) <sup>a</sup>	50 (70%) <sup>b</sup>	0.39
Psychiatry follow up						
Yes	7 (20%)	7 (9%)		3 (8%) <sup>a</sup>	11 (15%) <sup>b</sup>	
No	28 (80%)	69 (91%)	0.11	37 (92%) <sup>a</sup>	60 (85%) <sup>b</sup>	0.22
Physiotherapy follow up						
Yes	17 (49%)	40 (53%)		22 (55%) <sup>a</sup>	35 (49%) <sup>b</sup>	
No	18 (51%)	36 (47%)	0.69	18 (45%) <sup>a</sup>	36 (51%) <sup>b</sup>	0.56
Managed on neurosciences ward						
Yes	13 (37%)	27 (36%)				
No	22 (63%)	49 (64%)	0.86			

<sup>a</sup>Denominator is n = 40.<sup>b</sup>Denominator is n = 71.

Abbreviations: FND, functional neurological disorder; ED, emergency department.

knowledge base is poor.<sup>11</sup> Additionally, negative attitudes toward patients with FND are common among health professionals and many feel uncomfortable explaining FND as a possible diagnosis.<sup>11</sup> This is confounded by a gray area created with modifying diagnostic disclosure based on patient receptivity.<sup>29</sup> This imposes limitations to open and ethical communication, which can perpetuate chronicity of symptoms and increase barriers for delivery of effective multidisciplinary intervention.<sup>24</sup>

Reduced communication of FND through medical record documentation may be linked to the ongoing confusion or reduced confidence about defining and diagnosing FND. Other potential drivers reported in the literature include doctors still incorrectly treating FND as a diagnosis of exclusion,<sup>30</sup> continuing to fear misdiagnosis,<sup>12</sup> and holding FND to a higher diagnostic threshold than other neurological disorders.<sup>31</sup> There are

ethical implications of withholding a diagnosis and limitations to capturing the required services to manage FND.

Health professionals' general uncertainty regarding the condition may also be attributed to the evolution of understanding FND as a diagnosis, as reflected by the variety of terminology used to describe it. The alternative terms extracted from medical charts in this study do not reflect our current understanding of FND (ie, as a psychogenic disorder), or they describe what the condition is not (ie, non-organic). Using the term "functional" provides a platform toward discussing the accepted and current understanding of neurobiological mechanisms.<sup>32,33</sup> In addition, FND is accepted by clinicians and the public, in contrast with other terms that are viewed as offensive.<sup>34</sup> Even among experts, terms such as "dissociation", "psychogenic non-epileptic seizures", and "functional seizures" are used interchangeably to

describe the same phenomenon. Successfully delivering FND as a diagnosis with the appropriate terminology can provide patients with validation of their condition and facilitate the rationale for tailored multidisciplinary management.<sup>12</sup>

The impact of limited inpatient multidisciplinary team accessibility was highlighted in our study. Except for neurology coverage at three sites, none of the included hospitals had adequate staffing levels for each discipline to appropriately manage these patients. A total of 86% of patients managed without neurology input were not provided with a diagnosis indicating there are significant barriers to communicating this diagnosis by non-neurologists. The rate of receiving a diagnosis of FND on the neurosciences ward was significantly higher than for non-neurosciences wards. Given the number of admissions to non-neurosciences wards, and the non-involvement of neurology and psychiatry in many admissions, all medical sub-specialties need to be aware of FND and how to deliver a diagnosis. Education does vary widely among medical sub-specialties and across hospital wards and future investigation is required to explore factors that may influence confidence and capacity to deliver a FND diagnosis.

Although it was a challenge for patients with FND to access the required specialist services as an inpatient, our study demonstrates that few patients were also referred for ongoing therapies after discharge. Community referrals for specialist services after hospital discharge occurred for 46% and 13% of admissions for neurology and psychiatry, respectively. This may reflect the lack of subacute and community services available to this population. Furthermore, referrals to directly allied health post hospital discharge are imperative to continue rehabilitation while awaiting follow-up appointment with neurology. Our low referral rate to psychology and psychiatry is also similar to previous studies reporting low referral rates on hospital discharge.<sup>7,35</sup> However, further recommendations are required on the role of psychology in an inpatient setting to optimize allied health therapies and coordinate a plan post hospital discharge.

Over a 4-month period, the approximate cost of FND in our study was just over AUD\$3.5 million across only six Australian hospitals. Data collated from Australia-wide does not exist and therefore, a thorough analysis of the economic impact of FND is required to estimate the magnitude and impact of care in Australian hospitals and communities.

## Limitations

Our methodology was chosen to overcome the limitations of local hospital coding services where the application of The International Classification of Diseases (ICD)-10 code is used to classify FND. The 2010 ICD-10 code for FND used in our health service is “Dissociative [Conversion] Disorders” (F44.4).<sup>36</sup> Despite this, our findings reporting inpatient incidence of FND and hospitalization costs should be interpreted with caution as we predict it to be much higher than what our study captured. Participant recruitment was dependent on entire physiotherapy teams across hospitals being both aware of the study and proactive with notifying their local physiotherapy representative of

potential participants. Data extraction methods for identifying when participants had been diagnosed and provided with the diagnosis relied on clinical documentation as well as interpersonal communication, which are prone to human error. Furthermore, although patients were managed as having FND, it was not always clear on chart review that all included patients were diagnosed based on positive signs. We also did not collect data regarding involvement of other valuable multidisciplinary professions such as social work and occupational therapy. Furthermore, data collection occurred during the coronavirus disease 2019 pandemic, which may have reduced the number of people presenting to hospital. We suspect this as selected hospitals were on admission bypass to accommodate for the pandemic.

Furthermore, although our study included all phenotypes of FND, including dissociative attacks, data were not extracted regarding chronicity and co-morbidity to compare to existing studies exploring inpatient models of care for the management of FND.

## Where To From Here?

Despite the prevalence and complexity of FND, there are currently only a few specialized public services in Australia. The data collected in this study provides preliminary evidence to understand the cost and complexity of managing FND in the inpatient hospital setting, and hence, supports the need to develop appropriately resourced and specialized services. The key steps in developing these specialized services are improving education of health care professionals and developing targeted clinical pathways.<sup>32,37</sup> These may lead to improved access to coordinated multidisciplinary management and likely subsequently reduce stigma and disability through improving patient outcomes.<sup>31,32,37</sup>

Education and training is not yet embedded in health professionals' university programs and neurology subspecialty interest remains limited<sup>11,32</sup> despite the high incidence<sup>28</sup> and associated health care costs with FND. Patients and doctors have both highlighted this lack of training as a barrier to communicating a diagnosis of FND.<sup>38</sup> As communication is a practical skill that requires ongoing development, to change practice, both didactic and experiential learning is required. Although didactic training can be achieved by embedding FND in university programs, practical exposure can be challenging with the complexity of this population. However, there are low-cost training options specific to FND reported in the literature such as multidisciplinary collaboration, peer supervision, and simulation-based training.<sup>37</sup>

A recent study has shown that nearly 20% of patients who are admitted to hospital with acute onset FND required inpatient rehabilitation.<sup>6</sup> Although further research is required to investigate the appropriate triaging of limited resources,<sup>9</sup> an integrated model of care delivering a targeted clinical pathway from ED to community services should be adopted by healthcare services. By increasing multidisciplinary staffing ratios and increasing assessment times, there is potential to improve clinician attitudes, reduce healthcare costs associated with FND,<sup>31</sup> improve communication between the treating team and the patient and improve efficiency of care delivery.<sup>39</sup> Our findings show that patients

were better managed when they were admitted to neurosciences wards and had access to neurology. Although not all hospitals can physically accommodate dedicated neurosciences wards, as mentioned, further FND training among all medical subspecialties including Emergency Medicine is required to better triage these patients for ongoing inpatient management.<sup>40</sup> Improved access to neurology across Australia is ideal to provide a diagnosis of FND, however, the reality is in many regional sites in Australia the absence of a neurologist should not mean withholding a definitive diagnosis to the patient by other specialties.

Further research is required on duration and intensity of inpatient rehabilitation,<sup>9</sup> however, existing FND inpatient models focused on rehabilitation have produced significant functional improvements<sup>16,17,19</sup> alongside multidisciplinary FND outpatient models of care.<sup>41,42</sup> Existing research trials have not yet identified whether inpatient or outpatient models of care are the most appropriate, the suitable patient subtypes for each model, or the optimal frequency and intensity for treatment,<sup>43,44</sup> however, outpatient-based treatment can provide an alternative to costlier inpatient programs.<sup>42</sup> Developing appropriately resourced and specialized services may overcome neurologists and other specialists barriers to communicate a diagnosis of FND, as some may feel hesitant to provide a diagnosis without subsequently being able to provide a referral for further management.

This study has captured preliminary data to pilot specialized services in Australia, while highlighting current gaps in service provision. Gaps include reduced communication of a diagnosis of FND, limited and varied access to inpatient multidisciplinary teams, and limited outpatient follow up to support patients after hospital discharge. Specialized services are required to improve communication, healthcare outcomes, reduce stigma, and unnecessary healthcare costs. Ensuring FND is embedded in healthcare professional university programs and the development targeted clinical pathways is required to support this.

## Acknowledgments

The authors thank Associate Investigators Lauren Lambie (Townsville University Hospital), Lorraine Den-Kaat (Redland Hospital), and Jacinta Forbes (The Prince Charles Hospital) for their involvement throughout this project, the Queensland Rehabilitation Physiotherapy Network for endorsing this research and their ongoing commitment to advocate for improved management of patients with a functional neurological disorder and the Directors of Physiotherapy Services Queensland for providing funding to assist with completing this research.

## Author Roles

(1) Research project: A. Conception, B. Organization, C. Execution; (2) Statistical Analysis: A. Design, B. Execution, C. Review and Critique; (3) Manuscript Preparation: A. Writing of the First Draft, B. Review and Critique.

D.P.: 1A, 1B, 1C, 2A, 2B, 2C, 3A, 3B  
 A.L.: 1A, 1B, 2A, 2B, 2C, 3A, 3B  
 J.B.: 1C, 2B, 2C, 3A, 3B  
 A.H.: 2C, 3A, 3B  
 K.R.: 1C, 3A, 3B  
 S.F.: 1C, 3B  
 E.G.: 1A, 1B, 2A, 2B, 2C, 3A, 3B.

## Disclosures

**Ethical Compliance Statement:** Ethics approval was granted by the Institutional Human Research Ethics Board (HREC/2020/QMS/62910). A waiver of consent was obtained for the use of clinical data for research purposes. We confirm that we have read the Journal's position on issues involved in ethical publication and affirm that this work is consistent with those guidelines.

**Funding Sources and Conflicts of Interest:** None.

**Financial Disclosures for the Previous 12 Months:** None. ■

## References

- Hallett M, Aybek S, Dwoertzky B, et al. Functional neurological disorder: new subtypes and shared mechanisms. *Lancet Neurol* 2022;21(6):537–550. [https://doi.org/10.1016/S1474-4422\(21\)00422-1](https://doi.org/10.1016/S1474-4422(21)00422-1).
- Gelauff J, Stone J, Edwards M, et al. The prognosis of functional (psychogenic) motor symptoms: a systematic review. *J Neurol Neurosurg* 2014;85:220–226.
- Adjei M, Coebergh J. A audit of the diagnosis and costs associated with inpatients with functional neurological symptoms in a district general hospital. *J Neurol Neurosurg* 2014;85e3.
- Birmingham SL, Cohen A, Hague J, Parsonage M. The cost of somatisation among the working-age population in England for year 2008–2009. *Ment Health Fam Med* 2010;7:71–84.
- Barsky AJ, Orav EJ, Bates DW. Somatization increases medical utilization and costs independent of psychiatric and medical comorbidity. *Arch Gen Psychiatry* 2005;62(8):903–910.
- Stephan CD, Fung V, Lungu CI, Espay AJ. Assessment of emergency department and inpatient use and costs in adult and pediatric functional neurological disorders. *JAMA Neurol* 2020;78(1):88–101.
- Behary J, Palmer D, Wu T, et al. Functional neurological disorders presenting as emergencies to secondary care. *Eur Neurol* 2021;28(5):1441–1445.
- Aybek S, Perez DL. Diagnosis and management of functional neurological disorder. *BMJ* 2022;376:64.
- Gilmour GS, Jenkins JD. Inpatient treatment of functional neurological disorder: a scoping review. *Can J Neurol Sci* 2021;48(2):204–217.
- Garcin B. Motor functional neurological disorders: an update. *Rev Neurol* 2018;174(4):203–211.
- Lehn A, Bullock-Saxton J, Newcombe P, Carson A, Stone J. Survey of the perceptions of health practitioners regarding functional neurological disorders in Australia. *J Clin Neurosci* 2019;67:114–123.
- Espay AJ, Aybek S, Carson A, et al. Current concepts in diagnosis and treatment of functional neurological disorders. *JAMA Neurol* 2018;75(9):1132–1141.
- Butler M, Shipston-Sharman O, Seynaeve M, et al. International online survey of 1048 individuals with functional neurological disorder. *Eur J Neurol* 2021;28(11):3591–3602.
- Faul L, Knight LK, Espay AJ, Depue BE, LaFaver K. Neural activity in functional movement disorders after inpatient rehabilitation. *Psychiatry Res Neuroimaging* 2020;303.



15. Jordbru AA, Smedstad LV, Klungsoyr O, Martinsen EW. Psychogenic gait disorder: a randomized controlled trial of physical rehabilitation with one-year follow-up. *J Rehab Med* 2014;46(2):181–187.
16. Czarnecki K, Thompson JM, Seime R, Geda YE, Duffy JR, Ahlskog JE. Functional movement disorders: successful treatment with a physical therapy rehabilitation protocol. *Parkinsonism Relat Disord* 2012;18(3):247–251.
17. Saifee TA, Kassavetis P, Pareés I, et al. Inpatient treatment of functional motor symptoms: a long-term follow-up study. *J Neurol* 2012;259(9):1958–1963.
18. Jacob AE, Kaelin DL, Roach AR, Ziegler CH, LaFaver K. Motor retraining (MoRe) for functional movement disorders: outcomes from a 1-week multidisciplinary rehabilitation program. *Arch Phys Med Rehabil* 2018;10(11):1164–1172.
19. Demartini B, Batla A, Petrochilos P, Fisher L, Edwards MJ, Joyce E. Multidisciplinary treatment for functional neurological symptoms: a prospective study. *J Neurol* 2014;261(12):2370–2377.
20. McCormack R, Moriarty J, Mellers JD, et al. Specialist inpatient treatment for severe motor conversion disorder: a retrospective comparative study. *J Neurol Neurosurg Psych* 2014;85(8):895–900.
21. Gill K. *Consumer and Carer Experiences of FND in Australia: the Silent Crisis. A Report Commissioned by the National Mental Health Commission*. Sydney: National Mental Health Commission 2019; 2000.
22. Nielsen G, Buszewicz M, Edwards MJ, Stevenson F. A qualitative study of the experiences and perceptions of patients with functional motor disorder. *Disabil Rehabil* 2020;42(14):2043–2048.
23. Robson C, Lian OS. “Blaming, shaming, humiliation”: Stigmatising medical interactions among people with non-epileptic seizures. *Wellcome Open Res* 2017;2:55.
24. Barnett C, Davis R, Mitchell C, Tyson S. The vicious cycle of functional neurological disorders: a synthesis of healthcare professionals’ views on working with patients with functional neurological disorder. *Disabil Rehabil* 2020;24:1–10.
25. Martiros M, Myers L. *In Our Own Words: Stories of Those Living with, Learning from and Overcoming the Challenges of Psychogenic Non-Epileptic Seizures (PNES)*. CreateSpace Independent Publishing Platform; 2015.
26. Health Improvement Scotland. *Stepped Care for Functional Neurological Disorders*. Scotland; 2012.
27. Perez DL, Edwards MJ, Nielsen G, Kozłowska K, Hallett M, LaFrance C. Decade of progress in motor functional neurological disorder: continuing the momentum. *J Neurol Neurosurg*. 2021;92:668–677.
28. Carson A, Lehn A. Epidemiology. *Handb Clin Neurol* 2016;139:47.
29. Kanaan R, Armstrong D, Wessely S. Limits to truth-telling: Neurologists’ communication in conversion disorder. *Patient Educ Couns* 2009;77(2):296–301.
30. McKee K, Glass S, Adams C. The inpatient assessment and Management of Motor Functional Neurological Disorders: an interdisciplinary perspective. *Psychosomatics* 2018;59(4):358–368.
31. Herbert LD, Kim R, Hassan AA, Wilkinson-Smith A, Waugh JL. When neurologists diagnose functional neurological disorder, why don’t they code for it? *CNS Spectr* 2021;15:1–30.
32. Ahmad O, Ahmad KE. Functional neurological disorders in outpatient practice: an Australian cohort. *J Clin Neurosci* 2016;28:93–96.
33. American Psychiatric Association. *Diagnostic and statistical manual of mental disorders 5th ed., text rev. 2022*. doi:<https://doi.org/10.1176/appi.books.9780890425787>
34. Ding JM, Kanaan RAA. Conversion disorder: a systematic review of current terminology. *Gen Hosp Psychiat* 2017;45:51–55.
35. Williams S, Southall C, Haley S, et al. To the emergency room and back again: circular healthcare pathways for acute functional neurological disorders. *J Neurol Sci* 2022;437:120251.
36. World Health Organization. *The ICD-10 classification of Mental and Behavioural disorders*. 2010 World Health Organization. Retrieved from: <https://icd.who.int/browse10/2010/en>
37. Lehn A, Navaratnam D, Broughton M, et al. Functional neurological disorders: effective teaching for health professionals. *BMJ Neurol Open* 2020;2:e000065.
38. Hutchinson G, Linden SC. The challenge of functional neurological disorder - views of patients, doctors and medical students. *J Ment Health Train Educ Prac* 2021;16(2):123–138.
39. Lidstone SC, MacGillivray L, Lang AE. Integrated therapy for functional movement disorders: time for a change. *Mov Disord Clin Pract* 2020;7(2):169–174.
40. Anderson JR, Nakhate V, Stephen CD, Perez DL. Functional (psychogenic) neurological disorders: assessment and acute Management in the Emergency Department. *Semin Neurol* 2019;39(1):102–114.
41. Nielsen G, Buszewicz M, Stevenson F, et al. Randomised feasibility study of physiotherapy for patients with functional motor symptoms. *J Neurol Neurosurg* 2017;88:484–490.
42. Petrochilos P, Elmalem MS, Patel D, Louissaint H, Hayward K, Ranu J, Selai C. Outcomes of a 5-week individualised MDT outpatient (day-patient) treatment programme for functional neurological symptom disorder (FNSD). *J Neurol* 2020;267:2655–2666.
43. Gilmour GS, Nielsen G, Teodoro T, et al. Management of functional neurological disorder. *J Neurol* 2020;267(7):2164–2172.
44. Saxena A, Godena E, Maggio J, Perez DL. Towards an outpatient model of Care for Motor Functional Neurological Disorders: a neuropsychiatric perspective. *Neuropsych Dis Treat* 2020;16:2119–2134.

## Supporting Information

Supporting information may be found in the online version of this article.

**Table S1.** Participating site profile.

**Table S2.** Data extraction tool.