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ARTICLE

Clinicians' implicit and explicit attitudes about the legitimacy of functional neurological disorders correlate with referral decisions

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Abstract

Objectives: Uncertainty regarding the legitimacy of functional neurological disorder (FND) remains among some health care professionals. Despite treatment guidelines and consensus recommendations, variability in clinical practice referral decisions persists. Evidence from other conditions suggests such clinical decision making is impacted by practitioners' implicit and explicit attitudes. We aimed to identify whether health care professionals hold implicit and/or explicit attitudes about the legitimacy of FND and whether these attitudes are associated with referral decision making.

Design/Methods: We included 66 health care professionals who work with people with neurological conditions: $n = 37$ medical doctors, mainly neurologists ($n = 18$) and psychiatrists ($n = 10$), and $n = 29$ doctoral level practitioner psychologists. Participants completed an Implicit Association Test (IAT), Implicit Relational Assessment Procedure (IRAP), a referral decision-making vignette task and self-report measures of explicit attitudes on FND-legitimacy, therapeutic optimism and clinician confidence. Multiple Sclerosis (MS) was used as a comparator condition.

Results: Participants self-reported strong explicit FND-legitimate and MS-legitimate attitudes but demonstrated an implicit FND-illegitimate/MS-legitimate bias. Deeper examination provided by the IRAP data indicated pro-FND-legitimate attitudes, but no bias for or against FND-illegitimate—contrasting the pro-MS-legitimate, anti-MS-illegitimate attitudes for the comparator condition. Attitudes about FND-illegitimacy were negatively associated

with likelihood of referral to physical interventions such as physiotherapy. Medical doctors had lower treatment optimism and stronger explicit attitudes that FND is illegitimate than psychologists.

Conclusions: At an implicit level, clinicians are uncertain about the illegitimacy of FND, and such attitudes are associated with lower likelihood of referral to physiotherapy in particular. Improved education on FND among health care professionals is indicated.

KEYWORDS
bias, functional neurological disorder, implicit attitudes, referral decisions

Statement of contribution

What is already known on this topic?

- Many healthcare professionals (HCPs) state that they find FND challenging to understand and manage.
- Despite the presence of treatment guidelines, there is much variability in referral practices.

What does this study add?

- Examination of explicit and implicit attitudes shows that HCPs hold implicit uncertainty regarding whether FND is illegitimate.
- This attitude is correlated with lower likelihood of referral to physical therapy.
- This implies that HCPs should receive greater training on modern understandings of FND and treatment recommendations.

INTRODUCTION

Functional neurological disorder (FND) is characterized by neurological symptoms, such as tremor, weakness, dystonia, sensory symptoms and seizures, that are associated with alterations in brain function (Stone et al., 2020). Typically, the diagnosis of FND requires input from a neurologist, a neuropsychiatrist or stroke physician. However, people with FND are commonly seen across a wide range of health services (Williams et al., 2022).

Historically, FND was conceptualized as having psychological origins, with symptoms theorised to emerge from emotional responses to traumatic experiences, psychological conflict or illness behaviour and treatments arranged accordingly (Stone et al., 2020; Wilshire & Ward, 2016). Since the millennium, understanding of FND has evolved to incorporate a range of biopsychosocial factors (Edwards et al., 2012; Perez et al., 2021), leading to recommendations for multidisciplinary, personalized treatment approaches (Espay et al., 2018; Perez et al., 2021; Stone et al., 2020). Randomized control trials are supportive of several treatments including physiotherapy (Nielsen et al., 2017), cognitive behavioural therapy (Goldstein et al., 2020) and multidisciplinary rehabilitation (Stone et al., 2020). Thus, effective management of FND involves many different health care practitioners (HCPs) including neurologists, psychiatrists, psychologists, physiotherapists, speech and language therapists and/or occupational therapists.

Best practice guidelines and international consensus recommendations for FND care have been published (Baker et al., 2021; Nicholson et al., 2020; Nielsen et al., 2015; Scotland, 2012). However, people with FND continue to experience variability in treatment with low rates of 'better practice' indicators such as onward referral to clinical psychology, liaison psychiatry or outpatient neurology clinics (O'Neal & Dworetzky, 2016; Williams et al., 2022). Lack of adherence to best practice impacts tangibly on the care of FND (Stone et al., 2020). For example, lack of onward referral to indicated treatments is associated with increased likelihood of re-presenting for emergency care (Williams et al., 2022).

HCP attitudes towards FND

Some HCPs find FND challenging to understand and manage and hold varying, often negative, attitudes towards these conditions (Ahern et al., 2009; Evans & Evans, 2010; Kanaan et al., 2011; Marotta et al., 2021; Tinazzi et al., 2022). A recent systematic review of HCP attitudes to FND showed HCPs hold uncertainty and fear regarding diagnosis and treatment (Barnett et al., 2022). Indeed, a 2010 study showed that, among 20 common neurological presentations, a sample of neurologists rated FND as the condition they least liked to treat (Evans & Evans, 2010). A proportion of HCPs state that they doubt the legitimacy of FND, associating the condition with malingering, feigning and manipulation (Ahern et al., 2009; Barnett et al., 2022; Kanaan et al., 2011; Lehn et al., 2019; Tinazzi et al., 2022). Such attitudes might represent themselves in clinical interactions. Indeed, many people living with FND report experiencing dismissive attitudes from clinicians (Dosanjh et al., 2021).

Negative attitudes to FND perhaps reflect the limited formal training that many HCPs receive on FND management (de Liège et al., 2022; Stone et al., 2020). Yet, such attitudes are important given evidence from other health conditions that HCPs' attitudes influence clinical decision making, such as writing letters of support for patients (Drake et al., 2018) or decisions to prescribe medications or psychological therapy (Schäfer et al., 2016).

To date, all research characterizing clinician attitudes to FND has relied on designs that explore *explicit* attitudes, that is conscious and openly expressed opinions, often via qualitative interviews or surveys. This does not account for any potential *implicit* biases about FND, which involve less awareness and intentional and controlled responding (Hughes et al., 2012). Research in other medical conditions has shown that implicit attitudes influence both treatment decisions and patient health outcomes (Hall et al., 2015) and that implicit and explicit attitudes show differing patterns of relationship with treatment decisions (Sereno et al., 2022).

Measuring implicit attitudes

Explicit attitudes are typically measured using self-report questionnaires. In the present context these methods are subject to social desirability bias and may not reflect the full complexity of a person's attitude towards socially sensitive topics (Barnes-Holmes et al., 2006; Greenwald et al., 1998). To gain a more complete picture of HCPs attitudes to FND, it is important to measure both implicit and explicit attitudes.

Two frequently used computerized methods of measuring implicit attitudes in clinical settings (Drake et al., 2018; Hall et al., 2015; Vahey et al., 2015) are the Implicit Association Test (IAT; Greenwald et al., 1998) and the Implicit Relational Assessment Procedure (IRAP; Barnes-Holmes et al., 2006). The IAT requires participants to accurately sort target words into pairs of categories displayed on screen as quickly as possible. The category pairings switch such that some involve pairings thought to be consistent with pre-existing biases (e.g., 'FND' and illegitimate) while others involve pairings thought to be inconsistent with these biases (e.g., 'FND' and 'legitimate'). The difference in response times between the

consistent and inconsistent blocks is used to infer an individual's implicit attitude, with the assumption that quicker responding indicates a pairing consistent with pre-existing associations between stimuli.

However, the IAT is a relative measure and enables inferences limited to levels of bias relative to a comparison category. For example, it may reveal an FND-illegitimate/comparator condition-legitimate bias, but it cannot explore whether this response pattern is driven by bias towards FND or towards the contrasting comparator condition. In contrast, the IRAP is non-relative and so may provide a more nuanced measure of implicit attitudes. Participants complete blocks of trials in which they must quickly respond using the given response terms (e.g., 'true' or 'false') to the relationship between label stimuli (e.g., 'Functional Neurological Disorder is') and target words (e.g., 'legitimate' and 'illegitimate'). Correct responding on each block of trials is governed by pre-determined rules (e.g., Rule A: respond as if FND is illegitimate and the comparison condition is legitimate; Rule B: respond as if the comparison condition is illegitimate and FND is legitimate) which switch between the blocks. Like with the IAT, quicker responding should occur when the rule for responding coheres with an individual's pre-existing implicit relational response bias.

Research aims

There has been no empirical testing of HCPs *implicit* attitudes towards FND, nor the link between HCP attitudes and clinical decision making in FND. We aimed to explore what attitudes, both explicit and implicit, clinicians hold towards FND legitimacy and how these attitudes correlate with clinical decision making. The primary hypotheses are:

1. Clinicians hold implicit beliefs that FND is illegitimate.
2. Clinicians' implicit attitudes about the legitimacy of FND may differ from explicit attitudes.
3. Clinicians' implicit and explicit beliefs about the legitimacy of FND will correlate with referral decisions for FND patients.

There were several additional a priori research questions—Do implicit and/or explicit attitudes about the legitimacy of FND: differ between medical doctors and psychologists; correlate with therapeutic optimism; correlate with confidence in treating FND patients?

METHODS AND MATERIALS

Ethical approval was granted by the Research Ethics Committee at Queen's University Belfast (Ref: EPS 21_10), and the Health Research Authority (Ref: 21/HSC/0004). Participants gave informed consent to take part. Thus, all human and animal studies have been approved by the appropriate ethics committee and have therefore been performed in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki and its later amendments.

Participants

Registered medical doctors and doctoral level practitioner psychologists were recruited through five NHS trusts in the UK, and also via online social media campaigns, and by word of mouth. To enable recruitment of clinicians with exposure to FND, but not limit our sample to a very select group of experts, inclusion criteria were a minimum of 6 months clinical experience working with patients with neurological conditions. We also required participants to have English as a first language. A sample size of 29–37 is recommended for analysis of clinically focused IRAP effects (Vahey et al., 2015). A medium effect size of

.5 is consistent with previous research using implicit attitudes measures (Farrell & McHugh, 2020). Based on a priori research questions, G*Power 3.1 (Faul et al., 2007) calculations recommended a sample size of ≥34 (power of .8 to detect a medium effect size of .5 on one-sample *t*-tests).

Measures

Demographics and professional characteristics

Participants self-reported their gender and professional background including specialism, years qualified, consultant status, length of time and frequency of working with people with FND. Participants also rated their confidence in working with people with FND on a 7-point scale (1 = *Not at all confident*; 7 = *Fully confident*).

Implicit attitudes: IAT and IRAP

Two measures of implicit attitudes were used: the IAT (Greenwald et al., 1998) and the IRAP (Barnes-Holmes et al., 2006). MS was the contrast category to FND in these measures given similar symptom patterns, prevalence rates, associated disability and epidemiology including gender ratio (Walzl et al., 2022). An online Qualtrics-based version of the IAT, Iatgen (Carpenter et al., 2019) was used. Participants were instructed to sort target words into corresponding pairs of categories as demonstrated in Figure 1. The category pairings alter across 7 blocks. The target words used in the IAT and IRAP were generated through a three-stage process. Firstly, words relevant to the concept of legitimacy/illegitimacy were extracted from key publications on FND (Stone, 2009; Stone et al., 2013). The research team comprising neurologists, clinical neuropsychologists, and clinical psychologists excluded ambiguous terms and suggested synonyms. This shortlist of words was then ranked independently by each research team member in terms of relevance to the target population/research questions. These rankings were collated to produce the 6 most appropriate target words associated with legitimacy and 6 associated with illegitimacy displayed in Table 1.

The IRAP involved responding '*TRUE*' or '*FALSE*' in response to statements beginning with 'Functional Neurological Disorder is' or 'Multiple Sclerosis is' followed by one of the target words used in the IAT (Table 1). Participants were given a rule that specified how to respond correctly at the beginning of

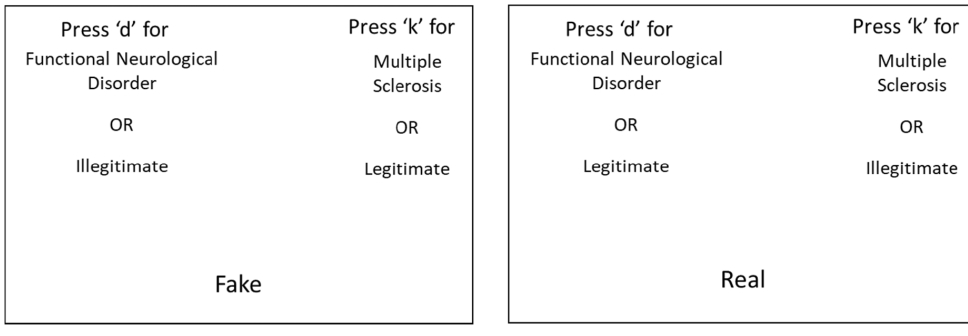

FIGURE 1 Example IAT trials configured to assess legitimate/illegitimate bias for FND/MS. Participants were presented with target words in the Centre of the screen which were sorted into the categories above by tapping the 'd' key for categories to the left and 'k' key for categories to the right. Trials assumed to be consistent with pre-existing bias (left) pair 'Functional Neurological Disorder' with 'illegitimate' and 'multiple sclerosis' with 'legitimate'. Bias-inconsistent trials (right) pair 'functional neurological disorder' with 'legitimate' and 'multiple sclerosis' with 'illegitimate'

TABLE 1 Target words for the IAT and IRAP

Legitimate words	Illegitimate words
Real	Fake
Genuine	Exaggerated
Legitimate	Illegitimate
Valid	Imagined
Believable	Feigned
Credible	Simulated

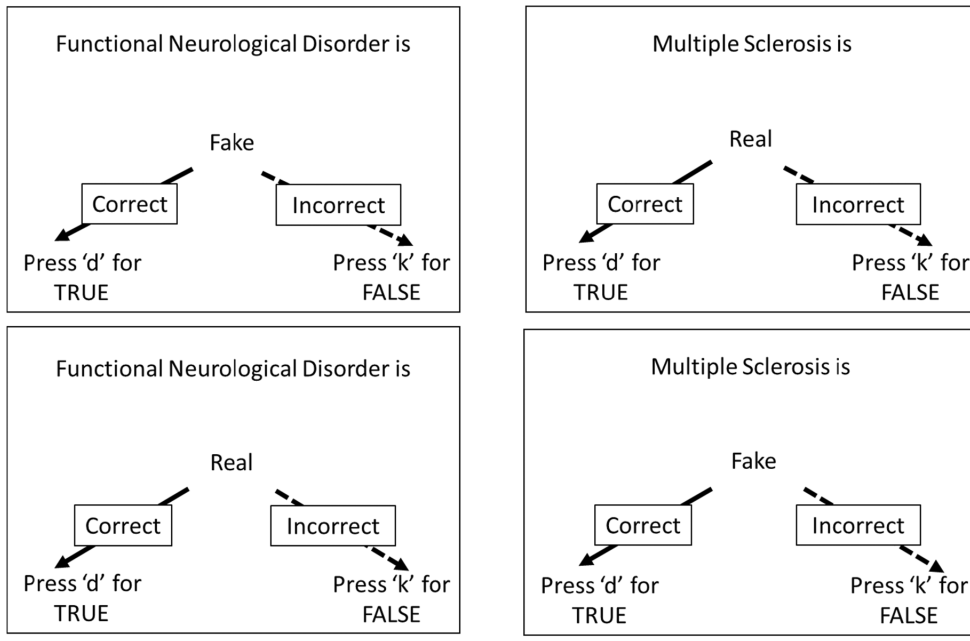

FIGURE 2 Four trial types for the IRAP configured to assess legitimacy bias in FND and MS. Rule A (top): FND is illegitimate, and MS is legitimate; Rule B (bottom): FND is legitimate, and MS is illegitimate. The arrows with superimposed text boxes did not appear on participants' screens but indicate which response options were correct and incorrect for each of the four trial types.

each trial block (Rule A or Rule B). The rule alternated between each trial block and the rule order was counterbalanced across participants. An example of each trial-type is displayed in Figure 2. A separate score is produced for each trial-type, providing insight into four distinct implicit attitudes (i.e., FND is illegitimate, FND is legitimate, MS is illegitimate, MS is legitimate). Participants had to achieve minimum accuracy (≥80%) and latency (≤2000 ms) criteria in two consecutive practice blocks before progressing to complete the 6 test blocks.

Explicit attitudes: Rating legitimacy of FND and MS

Participants rated on a 7-point Likert scale (1 = *strongly disagree*; 7 = *strongly agree*) their agreement that each of the 12 target words from the implicit measures describes FND and MS (e.g., *FND is credible*; *MS is simulated*, etc.). The order of these statements was randomized. Four mean explicit attitude scores

were produced, with acceptable internal consistency as measured by Cronbach's alpha (*FND is legitimate*, $a = .917$; *FND is illegitimate* $a = .838$; *MS is legitimate* $a = .678$; *MS is illegitimate*, $a = .702$).

Referral decisions: Clinical vignettes task

Participants read four clinical vignettes (see Supporting Information) and rated on a 7-point Likert scale (1 = *definitely would not recommend*; 7 = *definitely would recommend*) how likely they would be to recommend referral to each of four intervention options—*mental health interventions* (e.g., *talking therapies*, *medications for mood*), *physical interventions* (e.g., *physical therapy*, *rehabilitation*), *compensatory interventions* (e.g., *aids*, *adaptations*, *occupational therapy*) and *no treatment*—based on the patient's diagnosis and presentation. The research team devised the vignettes. We aimed to have two versions with excellent face validity for the condition described and differing only by diagnostic label (*see additional materials for these vignettes*): either FND or another neurological condition with similar neurological symptoms and psychosocial impacts (namely *Parkinson's disease*, *MS*, *epilepsy* and *acquired brain injury*). Participants rated their referral decisions for 2 FND and 2 non-FND cases, counterbalanced to minimize any confounding effects of order or gender. A mean referral score was calculated for each referral type for FND and non-FND patients.

Treatment optimism: ETOS-R

The Elsom Therapeutic Optimism Scale (ETOS) is a 10-item measure developed to measure therapeutic optimism originally designed for use in mental health settings. (Byrne et al., 2006). We revised the ETOS, changing the term '*mental disorders*' to '*FND*'. Scores range from 1 to 7, with higher scores indicating greater optimism. The ETOS-R had strong internal consistency ($a = .827$).

Procedure

Recruitment materials were distributed via internal hospital emails and online via social media campaigns. To avoid potentially biasing the sample, the study was described as investigating attitudes towards 'common neurological presentations' (see Supporting Information for information sheet and advertisement); FND was not specifically mentioned until debrief following completion. Participants contacted the researcher to opt-in to the study and chose online or in-person participation due to COVID considerations and proximity to the researcher.

Online participants were sent a link to a Qualtrics survey that contained all activities (with the exception of the IRAP) in the following order: demographics, clinical vignette exercise, IAT, explicit ratings, ETOS-R, clinician confidence rating. In-person participants completed the study at their place of work, usually NHS hospitals on a standard laptop computer. As no validated online version of the IRAP is available, only the in-person participants completed the IRAP, following the IAT. Participants were then unblinded to the study purpose.

Data analysis

T-tests and correlational analyses were completed via SPSS v28. In line with best practice (Vahey et al., 2015), scores on the implicit attitude measures were converted into standardized individual difference scores (*d*-scores) prior to analysis. Bonferroni corrections were applied to one-sample and paired *t*-tests resulting in adjusted alpha levels of .0125.

RESULTS

Sample characteristics

There were 66 participants (37 medical doctors; 29 practitioner psychologists), including 29 men and 37 women. Included medical specialisms were neurology ($N = 18$), psychiatry ($N = 10$), rehabilitation medicine, stroke, pain, geriatrics and general medicine (total $N = 9$). The length of time since qualifying as a doctor or psychologist ranged from 6 months to 36 years ($M = 14.11$, $SD = 9.11$); 27 participants (40.9%) held the title of consultant. Time working clinically with people with FND ranged from 6 months to 30 years ($M = 9.80$, $SD = 8.32$), with 65.2% of the sample ($N = 43$) seeing people with FND at least once per month.

Explicit attitudes

Mean explicit attitude scores are displayed in Table 2. Each attitude differed significantly from the neutral point of 4 (all $p < .0125$), with a very large effect size (all Cohen's $d > .8$). Participants explicitly reported very strong attitudes that both MS and FND are legitimate and not illegitimate. However, effect sizes were somewhat larger in relation to MS.

Implicit attitudes

A one-sample *t*-test compared IAT *d*-scores to a neutral score of 0. A significant result, $t(61) = -8.08$, $p < .001$, Cohen's $d = 1.03$ indicated that clinicians demonstrated a strong MS-legitimate/FND-illegitimate implicit bias ($M = -.34$, $SD = .33$; $N = 62$).

As presented in Figure 3, one-sample *t*-tests indicated that IRAP *d*-scores significantly differed from 0 for the MS-legitimate trial-type ($M = .32$, $SD = .50$), $t(29) = 3.50$, $p = .005$, Cohen's $d = .639$; MS-illegitimate trial-type ($M = .27$, $SD = .41$), $t(29) = 3.68$, $p < .001$, Cohen's $d = .673$; and the FND-legitimate trial-type ($M = -.23$, $SD = .41$), $t(29) = -3.08$, $p = .002$, Cohen's $d = -.562$. These results suggest a pro-MS-legitimate, anti-MS-illegitimate and pro-FND-legitimate bias. However, the FND-illegitimate trial-type ($M = -.05$, $SD = .44$) did not differ significantly from 0, $t(29) = -.622$, $p = 2.69$, Cohen's $d = -.114$, suggesting no clear implicit response bias for or against FND illegitimacy.

Referral decisions

Paired samples *t*-tests showed FND cases are more likely than non-FND cases to be referred to mental health interventions, albeit with marginal significance given the Bonferroni correction: (FND: $M = 6.39$, $SD = 1.00$; Non-FND: $M = 6.11$, $SD = 1.10$), $t(65) = 2.55$, $p = .013$, Cohen's $d = .314$, and less likely to be

TABLE 2 Results of one-sample *t*-tests for explicit attitudes ($N = 66$)

Attitude	*M* (*SD*)	*t*(65)=	*p*-Value	Cohen's *d*
FND is illegitimate	1.78 (.84)	−21.52	<.001	−2.65
FND is legitimate	6.48 (.69)	29.07	<.001	3.58
MS is illegitimate	1.32 (.52)	−41.46	<.001	−5.10
MS is legitimate	6.77 (.39)	57.19	<.001	7.04

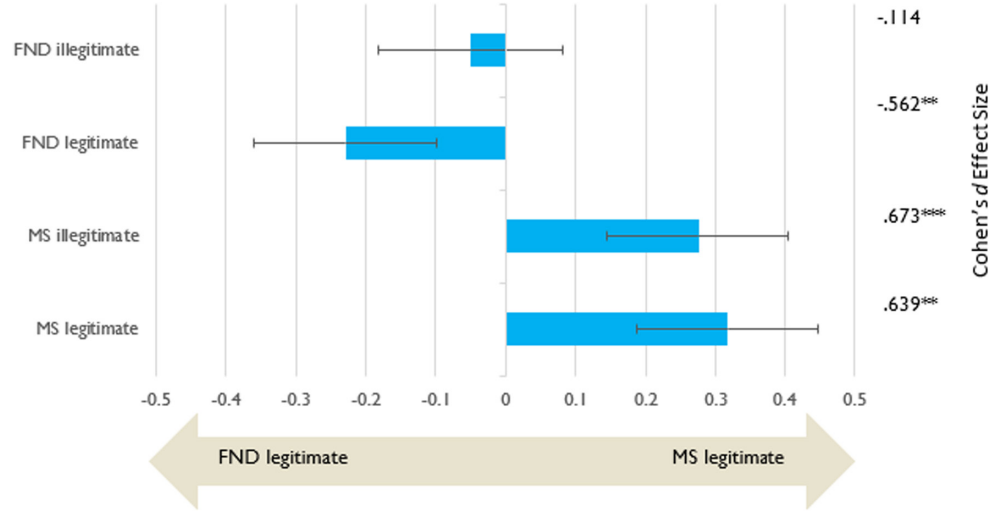

FIGURE 3 Mean *D*-IRAP scores for 4 trial types with effect sizes ($N = 30$). Error bars indicate 95% confidence interval. $^{**}p < .01$, $^{***}p < .001$. For FND-illegitimate and FND-legitimate trial types (top) negative scores signify responses consistent with a pro-FND-legitimate attitude. For MS-illegitimate and MS-legitimate trial types (bottom) positive scores signify responses consistent with a pro-MS-legitimate attitude.

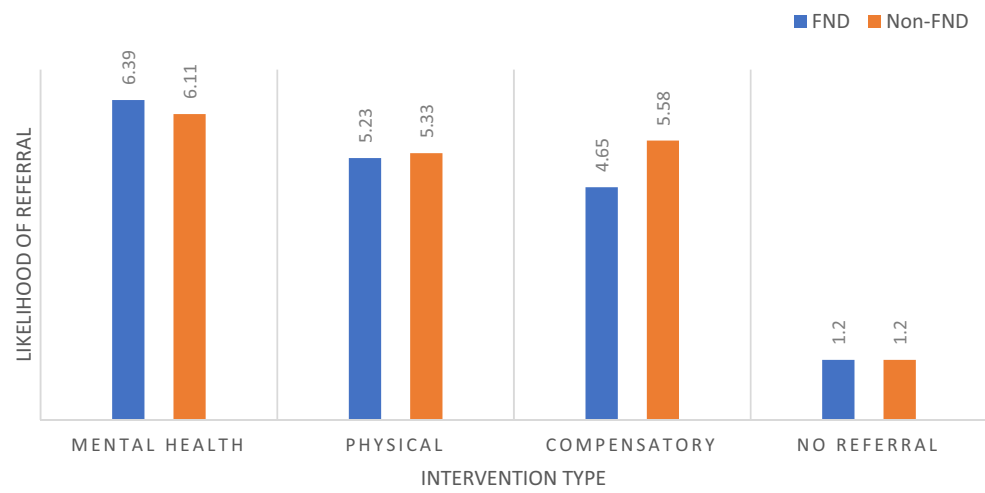

FIGURE 4 Mean likelihood of referral to each intervention type for FND and non-FND cases ($N = 66$). *Note*: Possible scores range from 1 to 7 with higher scores indicating higher likelihood of referral.

referred to compensatory interventions (FND: $M = 4.65$, $SD = 1.32$; Non-FND: $M = 5.58$, $SD = 1.20$), $t(65) = -5.50$, $p < .001$, Cohen's $d = -.676$ (see Figure 4).

Correlational analysis showed that the more clinicians explicitly agreed that FND is illegitimate, the less likely they were to recommend physical interventions $r(65) = -.275$, $p = .025$ and no referral $r(65) = -.275$, $p = .025$. Similarly, stronger implicit FND-illegitimate bias was associated with lower likelihood of physical interventions referrals for FND cases, $r(29) = -.475$, $p = .008$ (see Table 3).

TABLE 3 Correlation coefficients for each referral decision with each FND attitude measure

	Mean explicit FND legitimate	Mean explicit FND illegitimate	IAT *d*-score	*D*-IRAP FND legitimate	*D*-IRAP FND illegitimate
Mental Health	.018	−.164	−.020	.095	−.083
Physical	.230	**−.275***	.168	.146	**−.475****
Compensatory	.058	−.114	.160	−.084	−.327
No referral	.204[a]	**−.275***[,a]	.048[a]	−.179[a]	.288[a]

Note: Statistically significant correlations are highlighted in bold. *$p < .05$, **$p < .01$.

[a]Spearman's rho correlation.

TABLE 4 Correlation coefficients for treatment optimism and clinician confidence with each FND attitude measure

	Mean explicit FND legitimate	Mean explicit FND illegitimate	IAT *d*-score	*D*-IRAP FND legitimate	*D*-IRAP FND illegitimate
Treatment optimism	.043	−.030	.029	.342	−.154
Clinician confidence	.009	−.056	.120	−.014	.229

Note: There were no statistically significant correlations.

Treatment optimism and clinician confidence

The mean treatment optimism score was $M = 5.25$ ($SD = .89$); the mean clinician confidence score was $M = 4.91$ ($SD = 1.37$). Neither significantly correlated with any implicit or explicit FND attitudes (see Table 4).

Comparing professions

On the explicit attitude 'FND is illegitimate', medical doctors ($M = 1.96$, $SD = .84$) reported significantly weaker disagreement than psychologists ($M = 1.55$, $SD = .79$), $t(64) = -2.03$, $p = .046$, Cohen's $d = -.504$. Additionally, medical doctors had significantly lower treatment optimism for FND ($M = 4.92$, $SD = .87$) than did psychologists ($M = 5.67$, $SD = 7.44$), $t(64) = 3.65$, $p < .001$, Cohen's $d = .905$. There were no significant group differences on any of the other measures of implicit and explicit attitudes. Independent-sample *t*-tests comparing the neurologist group with the other medical group found no significant differences on any measure (all $p > .05$), suggesting relative homogeneity among the medical doctors who participated.

DISCUSSION

This study aimed to explore what implicit and explicit attitudes clinicians hold towards the legitimacy/illegitimacy of FND and how these attitudes correlate with clinical decision making. Our results suggest that HCPs hold uncertainty as to whether FND is illegitimate. HCPs exhibited an implicit MS-legitimate/FND-illegitimate bias on the IAT. A second more nuanced test of implicit attitudes showed that while participants were quicker to respond with 'True' than 'False' when responding to an FND-legitimate relation on the IRAP, there was less clarity in responding towards FND-illegitimate with no significant response bias detected. In comparison, implicit attitudes about the legitimacy of MS showed a strong and statistically significant attitude that MS is legitimate and not illegitimate. In terms

of *explicit* attitudes, clinicians responded that they consider both MS and FND to be legitimate and not illegitimate, although these attitudes were stronger in the case of MS.

Second, attitudes about FND's legitimacy may impact referral decision making, particularly in the case of physical interventions. In our clinical vignette referral exercise, physical intervention referrals were less likely as implicit and explicit FND-illegitimate attitudes increased, with implicit attitudes showing a qualitatively stronger correlation with this clinical decision. This is an important finding, given the growing evidence base, consensus guidelines and best practice recommendations showing physiotherapy as a key intervention in the management of some FND presentations (Nielsen et al., 2013, 2015; Scotland, 2012). Reluctance to refer to physical interventions when FND is considered illegitimate is perhaps consistent with the view expressed by some HCPs that physiotherapy is effective only as a 'face-saving' way out for people with FND (Nielsen et al., 2015).

Implications

The results suggest that patient pathways are impacted not only by availability of services but also by clinician factors. Where clinicians hold some uncertainty regarding the legitimacy of FND, they may be less likely to recommend referrals to some best practice treatments, specifically here physical interventions which are recommended for some forms of FND (e.g., motor symptoms.) This uncertainty may be reflective of the evolving understanding of FND among HCPs over recent decades, as we move from more exclusively psychogenic models to biopsychosocial conceptualisations (Perez et al., 2021; Wilshire & Ward, 2016). Additionally, this finding may reflect the limited training that many HCPs receive on FND. A recent survey reported that nearly 90% of doctors feel their training leaves them unprepared to manage FND (de Liège et al., 2022), which is incongruent with the high frequency of FND presentations in clinical practice (Stone et al., 2013). Both explanations suggest a role for greater training on FND and the potential for implicit bias among HCPs, regardless of career stage.

There were few differences between professions in the present study. However, medical doctors in our study reported lower therapeutic optimism for FND and did not explicitly refute FND-illegitimacy as strongly as psychologists. This may reflect differences between professions in the scope of practice and treatment aims. For example, psychologists offer treatments that aim specifically to improve well-being/mental health. This aim is legitimate and seen as amenable to treatment irrespective of the assumed physical or behavioural origin or aetiology of the given presentation (Graham et al., 2017). Nevertheless, given that referrals are often made by medical doctors it is particularly important to raise awareness of biases and their potential impact on clinical outcomes for people with FND among medical doctors.

Strengths and limitations

We recruited to a priori power calculations, and the sample size was within the range recommended to measure clinically relevant IRAP effects (Vahey et al., 2015)—a relatively large sample given the selective sampling and participant burden. In addition, we used conservative performance criteria to detect non-valid responding on practice blocks, to limit analysis to more robust data (Barnes-Holmes et al., 2010). A further design strength was the blinding of participants to the specifics of study purpose until tasks were completed. Alongside the a priori Bonferroni corrections applied to the t-tests, it is arguable as to whether *p*-values should have been adjusted for multiple comparisons in the correlational analyses (Nakagawa, 2004). Tables 3 and 4 provide correlations alongside an indicator of corresponding *p*-value.

There is limited guidance on strategy for selecting target stimuli for implicit attitudes measures (Sereno et al., 2022). We selected MS as the comparator condition for FND. Although it must be acknowledged that the two conditions differ in several ways, the purpose of the present study was to understand the role of legitimacy attitudes. Thus, MS was selected as a comparator among alternative neurological conditions

due to parallels including confounding factors that could impact on perceived legitimacy (gender break down, age of onset, variability in symptoms etc.; O'Keeffe et al., 2021; Walzl et al., 2022).

Observed intra-participant variability within explicit ratings of words in the same category (e.g., 'illegitimate' vs. 'exaggerated') may indicate ambiguity or variability in semantic functioning for target words in each category. However, the stimuli selection method employed in this study was careful and rigorous—particularly for the selection of target words.

While the order of trial types and questions within the different measures was counterbalanced to reduce any potential order effects, measures were presented in a fixed order. The referral decision-making task was completed first so that participants remained blind to the true purpose of the study and would not be influenced in their referral recommendations. As the main variable of interest in this study was the implicit attitudes of HCPs, it was deemed appropriate to order the implicit attitudes measures before the explicit attitudes measures so that participants' first encounter with stimuli relating to the legitimacy or illegitimacy of FND occurred during the IAT. This follows a precedent set in the literature that implicit measures precede explicit measures of attitudes (Bast et al., 2016; Farrell & McHugh, 2020). Existing implicit attitudes research suggests that order effects have minimal influence on outcomes in the context of implicit attitudes research (Nosek et al., 2005). Moreover, a recent paper on best practices for using the IAT did not recommend counterbalancing implicit and explicit measures (28), suggesting that order effects are not a concern within the literature.

The online methodology in this study was critical in enabling access to the required sample size. Results from the online-based IAT are comparable to those from laboratory-based IAT methodology (Nosek et al., 2005) and we did not find significant differences between performance on online and in-person versions. However, given that clinicians participated in different settings, it is possible that the variability in environment may have influenced performance. Thus, future research could aim to replicate the findings of this study within a more controlled single laboratory environment.

Previous research on HCP attitudes towards FND has included a wide range of professionals including neurologists, psychiatrists, GPs, psychologists, nurses and physiotherapists (Ahern et al., 2009; Barnett et al., 2020; Kanaan et al., 2011). Psychologists and medical doctors were chosen for this study as highly qualified clinicians likely to be involved in treatment and referral decision making for FND patients and pragmatically due to availability. However, they represent only a subsection of FND-facing HCPs. Further research could aim to replicate the findings with allied health professionals who regularly work with FND such as physiotherapists and occupational therapists.

Research has shown wide-ranging effects of HCPs' attitudes on clinical practice which were not measured in this study, such as patient-provider interactions—a relationship known to be both influenced by HCP implicit attitudes, and to impact health care outcomes (Hall et al., 2015). We recognize that referral decision making is only one element of clinical practice that may impact outcomes for people with FND, albeit an important one. Furthermore, a discrepancy between intention and behaviour is noted in behavioural science. Thus, responses on the clinical vignettes may differ from what occurs in routine clinical practice—indicating the need for further study in this area.

CONCLUSIONS

The results suggest that HCPs hold implicit attitudes demonstrating uncertainty as to whether FND is illegitimate. This study demonstrated that implicit and, to a lesser extent, explicit biases regarding FND illegitimacy among clinicians may influence referral decision making in clinical practice. A bias towards FND as illegitimate appears to be particularly correlated with lower likelihood of recommending a referral to physical therapy. This is in contrast to the available clinical recommendations and trial data suggesting such interventions can be helpful for some with FND. Greater training among HCPs on FND, including treatment recommendations, is indicated.

CONFLICT OF INTEREST

On behalf of all authors, the corresponding author states that there is no conflict of interest.

AUTHOR CONTRIBUTION

The research study was designed by all authors. Implementation and analysis was led by Roisin Begley. All authors contributed to the final manuscript.

DATA AVAILABILITY STATEMENT

Aspects of the data-set that support these findings are available from the authors upon reasonable request.

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SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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