

Myths and facts about functional neurological disorders: a cross-sectional study of knowledge and awareness among medical students and healthcare professionals in Iraq

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ABSTRACT

Background Functional neurological disorder (FND) is a complex condition with neurological symptoms but no clear structural or biochemical explanation. Myths and misconceptions about FND can lead to misdiagnosis and inappropriate treatment. This study aimed to assess knowledge and common myths about FND among medical students and practitioners.

Methods Data were collected from 324 participants using a structured questionnaire. The questionnaire included demographic, general information about FND and myths about FND. Data were analysed using non-parametric tests and Spearman's *r* for correlations.

Results The majority of participants were clinical-years medical students (65.1%) and female (59.6%). Overall, knowledge about FND was limited, with a mean score of 42.3% of correct answers. Common myths included the belief that FND is a psychological disorder and that patients feign symptoms. Knowledge scores differed significantly among different grades/experience levels, with postgraduate practitioners having the highest scores. There was a positive correlation between knowledge scores and confidence in managing FND.

Conclusion This study highlights the prevalence of myths and misconceptions about FND among medical students and practitioners, emphasising the need for accurate education to improve diagnosis and management. Healthcare professionals should take a biopsychosocial approach to FND, considering the complex interplay between biological, psychological and social factors. Efforts to increase awareness and reduce stigma associated with FND are crucial for promoting better care. Targeted educational interventions may be beneficial to improve the understanding and management of FND among medical professionals.

INTRODUCTION

Conducted within the context of Iraq among students and healthcare providers, this study explores myths about functional neurological disorder (FND), a condition that presents with neurological symptoms, such as weakness, tremors and sensory disturbances, in the

WHAT IS ALREADY KNOWN ON THIS TOPIC

⇒ Prior to this study, there was limited comprehensive understanding of the extent of misconceptions about functional neurological disorder (FND) among students and healthcare professionals in Iraq. Existing research lacked a comprehensive overview of the prevailing knowledge gap in this context.

WHAT THIS STUDY ADDS

⇒ This study introduces new findings to the existing literature by providing an in-depth analysis of the prevalent myths surrounding FND among both students and practitioners in Iraq. The study offers fresh insights into the specific misconceptions that persist within this population, shedding light on the areas that need targeted educational interventions.

HOW THIS STUDY MIGHT AFFECT RESEARCH, PRACTICE OR POLICY

⇒ The findings of this study have significant implications for multiple domains. In the realm of research, the study underscores the importance of advancing our understanding of FND-related misconceptions and their impact on healthcare practice. For clinical practice, the study highlights the urgent need for tailored educational efforts to bridge knowledge gaps, ultimately enhancing accurate diagnosis and effective management of FND cases. Additionally, at the policy level, the study's outcomes might contribute to shaping medical education curricula and fostering awareness-driven policy changes aimed at improving FND-related healthcare practices and patient outcomes in Iraq.

absence of a clear structural or biochemical explanation.¹ Also referred to as functional neurological symptom disorder, psychosomatic disorder and conversion disorder, FND has a prevalence ranging from 7 to 30 cases per 100 000 population.^{2 3} It affects individuals of all ages and genders, and the onset is usually in early adulthood.⁴ FND is often associated with psychological factors, such as

stress, trauma and anxiety, which may contribute to the development of symptoms.⁵

The diverse clinical presentation of FND encompasses a wide range of neurological symptoms affecting various parts of the nervous system.⁶ Some of the most common symptoms include weakness or paralysis, tremors, gait disturbances, sensory loss, seizures and visual disturbances.⁷ The challenging nature of FND diagnosis arises from its potential to mimic other neurological disorders such as Parkinson's disease, multiple sclerosis and epilepsy.⁸ The diagnostic criteria set forth by the Diagnostic and Statistical Manual of Mental Disorders-5 (DSM-5) have evolved, eliminating the obligation to pinpoint triggering psychological stressors, as their identification is often elusive, although recent and past stressors tend to be more prevalent in individuals with FND. The cornerstone of this approach lies in the importance of positive signs to establish the diagnosis.⁵ Early diagnosis and appropriate management of FND can help reduce disability and improve patients' quality of life.⁹

FND is a complex disorder that is often misunderstood and surrounded by several myths and misconceptions. These misconceptions, such as the belief that FND is a purely psychological rather than a physical disorder or those patients are feigning symptoms, can lead to misdiagnosis and inappropriate treatment. It is essential to acknowledge that individuals with FND genuinely experience physical symptoms and are not feigning their condition. While it is widely accepted among experts that the disorder is influenced by psychological factors to some extent, it is crucial to recognise its multifaceted nature, wherein physiological and even possible genetic aspects also play significant roles.⁹ The stigma associated with FND can make it difficult for patients to seek help, and it can affect the attitudes and behaviours of healthcare professionals towards these patients.⁴ Therefore, it is essential for healthcare professionals to be aware of these misconceptions and to take a biopsychosocial approach to the diagnosis and treatment of FND. This approach involves understanding the complex interplay between biological, psychological and social factors in the development and maintenance of FND symptoms.⁵

This study aimed at assessing the knowledge of students about the myths surrounding FND and comparing it with healthcare practitioners in Iraq. These findings are poised to contribute to more comprehensive education strategies that, in turn, are expected to translate into improved management of patients with FND.

METHODOLOGY

Educational system

The undergraduate medical education in Iraq follows a British curriculum spanning 6 years. This educational approach is characterised by its cost-free nature, enabling students to access lectures, textbooks and clinical resources without financial constraints. English is the language of instruction. Traditional teaching methods,

including lectures, basic science laboratories and clinical-based teaching, prevail throughout the curriculum. The assessment framework combines written examinations in the initial 3 years (preclinical years) with a blend of written and oral examinations in the final 3 years (clinical years).¹⁰

On graduation, physicians undergo a year-long clinical clerkship in major medical disciplines, transitioning from theoretical learning to practical exposure. Subsequently, a mandatory 2-year period of service in remote and rural areas provides hands-on experience in challenging healthcare settings. Following this, physicians opt for specialised postgraduate training. A 2-year foundational training is a prerequisite before embarking on a 4-year medical specialty residency or a 5-year surgical specialty programme.¹⁰

Participants

The study recruited participants from three groups: preclinical-years medical students (first 3 years studying basic sciences), clinical-years (last 3 years) medical students and postgraduate practitioners. Students from the University of Baghdad, College of Medicine were invited to participate through official social media platforms, including a Telegram channel and a Facebook group for each grade, both of which have high levels of activity and almost all students are members. Practitioners were invited through a Facebook group with over 23890 members of various specialties, genders and years of experience. This Facebook group was specifically selected because its members are verified physicians employed in Iraqi health institutions. To incentivise participation, a US\$20 gift card was given to three randomly selected participants.

Instrument

The study used a structured questionnaire consisting of three main parts: demographics, general information about FND and myths about FND. The demographic section included questions about age, gender and grade/experience level. The second part comprised questions about the different terminologies used to describe FND, sources of information about FND, the number of taught hours in medical school dealing with FND, and respondents' confidence levels in managing patients with FND. The third part included 20 statements, reduced to 16 after a piloting phase (10 myths and 6 facts), derived from Lidstone *et al*¹¹ that outlined ten myths about FND (a fact and a myth were constructed from each myth in the paper). Respondents were asked to identify whether each statement was a 'fact', a 'myth' or 'unknown', and the percentage of correct answers was calculated. The survey was administered in English, owing to the use of English as the teaching language in medical education within Iraq (online supplemental questionnaire).

To ensure statement accuracy and comprehensibility, the questionnaire underwent a rigorous review process. Five neurologists with varying levels of experience

(ranging from 3 to 15 years) who practised and taught neurology at pregraduate and postgraduate levels reviewed the questionnaire. The questionnaire was then piloted on a sample of 30 pregraduate and postgraduate students, and any necessary revisions to the statement wording were made based on the results of the pilot test.

Data analysis

The data analysis was performed using the Statistical Package for the Social Sciences (SPSS) V.26. To calculate the scores, only the correct answers were considered and expressed as a percentage of the total questions. The normality of the data was assessed using the Shapiro-Wilk test, with gender and grade/level of experience (preclinical-years students, clinical-years students and practitioners) as groups of analysis. As the scores were non-normally distributed in all groups, non-parametric tests were conducted. The Mann-Whitney U-test was used to compare the total scores of correct answers between genders, while the Kruskal-Wallis test was employed to compare the scores among different grades/experience. Additionally, Spearman's r was used to investigate the correlation between grade/level of experience, teaching hours, confidence in managing the condition, the total number of terms of FND known by participants and the total score. The alpha level of significance was set at 0.05.

RESULTS

In this study, a total of 324 participants completed the questionnaire, with a mean age of 22.4 years ($SD=3.5$). Notably, the majority of respondents were clinical-years undergraduates, comprising 65.1% of the sample, while undergraduates in preclinical-years accounted for only 14.2% of participants. In addition, more than half of the respondents were female, representing 59.6% of the sample (online supplemental table 1).

FND terms

About 80.3% of respondents knew the outdated term hysteria followed by FND (58%), psychogenic disorder (53.3%), conversion disorder (44.5%) and psychosomatic disorder (30.4%). The majority of respondents knew at least one term (98.5%), with 25.3% knowing two terms, 23.8% knowing only one term and 22.2% knowing three terms. Only a small percentage of respondents (1.5%) did not know any of the terms, while 12.7% knew all five terms and 14.5% knew four terms.

The total number of terms known did not differ significantly between genders ($U=12423.5$, $p>0.05$), but it did differ significantly with grade/level of experience ($H=22.5$, $p<0.001$). Post hoc analysis revealed that clinical-years students and postgraduate practitioners knew more terms than preclinical-years students ($p<0.05$). Furthermore, the number of terms known was positively correlated with teaching hours ($r=0.355$, $p<0.001$), but not with confidence in managing FND ($p>0.05$).

Source of information

Almost half of respondents (44.4%) reported that their main source of information about FND was medical school, followed by social media (26.9%) and work experience through interactions with colleagues (18.2%). No significant association was found between the source of information and gender ($p>0.05$); however, a significant association was found with grade/level of experience ($\chi^2=49.9$, $df=8$, $p<0.001$). Specifically, preclinical-years undergraduates were more likely to obtain information about FND through social media, while clinical-years undergraduates were more likely to obtain it through their college. Moreover, postgraduates were more likely than the former two groups to obtain information through work experience and interactions with colleagues or mentors.

FND teaching hours

Over half of the respondents (55.6%) reported that they received no teaching about FND, while 28.4% reported receiving less than 1 hour of teaching. Of the remainder, 11.7% received between 1 and 3 hours of teaching, while only 4.3% reported over 3 hours of education on FND. There was a statistically significant difference in the number of teaching hours reported between genders ($U=10823.5$, $p<0.05$), with males reporting a higher number of teaching hours than females. Moreover, there was a positive correlation between the number of teaching hours and confidence in managing FND ($r=0.334$, $p<0.001$).

Confidence in managing FND

The majority of respondents (44.1%) expressed neutrality in their confidence to manage FND, while 34% of respondents reported diffidence (26.9%) or extreme diffidence (7.1%) in their ability to manage FND. In contrast, only 8% of respondents reported feeling very confident in managing FND.

A significant difference in confidence levels existed between genders, with males reporting higher confidence levels than females ($U=8926.5$, $p<0.001$). Furthermore, a significant difference was observed in confidence levels across grades/level of experience ($H=16.5$, $p<0.05$). Post hoc analysis indicated that postgraduate practitioners expressed greater confidence in managing FND compared with preclinical-years or clinical-years students ($p<0.001$).

Myths about FND

The least recognised myth was 'a diagnosis of exclusion' with only 7.4% identifying it correctly, followed by 'false diagnosis with conversion disorder is more likely than a false diagnosis of another neurological disorder', with only 7.7% identifying it as a myth. In contrast, 'a history of adverse life experience and psychological comorbidities are necessary for the diagnosis' was correctly identified as a myth by the majority (67.3%) (online supplemental table 2).

Regarding facts, 'FND treatment is individualised and involves a combination of physical and psychological rehabilitation' was correctly identified by 77.5% of respondents, while the least recognised fact was 'FND commonly co-occurs with other neurological disorders', with only 3.4% considering it as a fact. The mean score for correct answers was 30.4% (SD=14.4), with no statistically significant difference between genders ($p>0.05$) or grade/level of experience ($p>0.05$). However, it showed a positive correlation with the number of terms ($r=0.206$, $p<0.001$), teaching hours ($r=0.229$, $p<0.001$) and confidence in managing the condition ($r=0.151$, $p<0.001$). Additionally, the score differed significantly with regard to the source of information regarding FND ($H=14.5$, $p<0.001$). Post hoc analysis showed that respondents who reported college as the main source had higher scores than others.

DISCUSSION

FND, historically known as conversion disorder or hysteria, is a disorder that presents with motor and/or sensory symptoms that have no structural origin. Multiple variants of this disorder exist with the most common variants being functional seizure disorder (psychogenic non-epileptic seizures), functional movement disorder and functional cognitive disorder. FND remains one of the most common reasons for neurological disabilities.⁵ FND incidence varies from 7 to 30 cases per 100 000 population per year, with women being affected more than men.³

This study found that the mean score of correct answers regarding FND was 30.4%, indicating a notable gap in knowledge. This deficit is particularly concerning given the expectation that healthcare practitioners possess a more comprehensive understanding of FND compared with undergraduates. Notably, this discrepancy in knowledge acquisition mirrors the educational gap observed in the educational system. During their preclinical years, students are exposed to extensive theoretical knowledge through lectures and readings, with minimal interactive engagement such as seminars. However, a shift occurs during clinical clerkships and residencies, where physicians transition to experiential learning, immersing themselves in authentic patient challenges that markedly diverge from the theoretical framework of their preclinical training.¹² This transformation highlights the pressing need to bridge the gap between theoretical understanding and practical application.

Additionally, the assessment of medical students' perception of their training aligns with this finding as shown in a study where 2% of students rated their medical training as excellent, with a majority considering it fair (44%) or poor (15%). Moreover, 54% of students acknowledged that faculty knowledge and dedication to teaching is lacking. These findings emphasise the need for substantial enhancements in medical education and align with the imperative for a comprehensive revision of teaching

methodologies and curricular approaches, addressing the prevailing challenges in medical education.¹³

Differences in clinical practice might explain these results. General practitioners might not recognise FND cases as readily or may see fewer patients with FND than neurologists or psychiatrists. A cross-sectional study conducted by Lehn *et al* in Australia showed that neurologists had significantly greater knowledge of FND than other practitioners did, with only 14% of general practitioners reporting good knowledge of FND.¹⁴ Additionally, participants who acquired their knowledge through medical schools had a significantly higher score than those who obtained it from other sources, indicating that the quality of the taught material is high and requires only more time allocation. This is supported by the finding that teaching hours of FND positively correlated with the score of correct answers. The significance of these findings reverberates within the broader context of medical education. Students in Saleh's *et al* study highlighted various priorities for enhancing teaching methods within medical college. These recommendations encompassed a spectrum of measures, including the implementation of small group teaching across study years, improvements in infrastructure and teaching facilities, continuous training of teaching staff to stay abreast of updated pedagogical methods, granting students a more active role in the learning process, and an increased emphasis on practical and clinical sessions.¹² This collective call for reform underscores the pivotal role of effective teaching methodologies in bridging the gap between theoretical knowledge and practical application. The findings from these studies also explain the low confidence levels reported by participants and the recognition of the outdated term hysteria instead of FND.

The myth that 'FND is a diagnosis of exclusion' was found to be the least recognised among the statements, with only 7.4% of respondents correctly identifying it as a myth. A cross-sectional study assessing the knowledge of neurologists found that 51.5% of respondents viewed FND as a diagnosis of exclusion.¹⁵ While the DSM-4 required the exclusion of other diseases and the presence of a psychological factor to establish a diagnosis of FND, the most recent DSM-5 has focused on a positive diagnosis and removed the criterion of the presence of a psychological factor as a prerequisite.² Diagnosis can be made based on positive signs found only in FND or internal inconsistency of signs and symptoms, such as Hoover's sign and tremor entrainment.⁵ Believing in the outdated notion that FND is a diagnosis of exclusion may lead to delays in treatment, as physicians may spend extensive time excluding other neurological diseases, potentially causing harm to patients' physical and psychological health, and negatively impacting their quality of life.

The statement 'FND is exclusively a psychological problem caused by psychological factors' is a myth that was considered by 51.2% as a fact while only 13% of respondents correctly identified it as such. This misperception may be largely influenced by the use of the outdated

term 'hysteria', which 80.3% of respondents identified as an alternative term for FND. In a survey of UK neurologists, Kanaan *et al* found that 47% of participants considered 'subconscious behaviour' as an aetiological factor of conversion disorder.¹⁶ Similarly, Lehn *et al*'s study in Australia found that 56% of participants considered FND to be a primary psychiatric or psychological problem.¹⁴ However, a study from the Netherlands revealed that more than half of participating neurologists and psychiatrists viewed the aetiology of FND as a combination of disordered brain functioning and psychogenic factors.¹⁷ Additionally, Pun *et al*'s article studying the psychological profiles of patients diagnosed with FND found that while 73.3% of patients had a comorbid mental health condition, 14.9% of patients did not have an established mental health diagnosis.¹⁸ This supports the theory that psychological factors are not necessary for a diagnosis of FND. Furthermore, the DSM-5 removed the criterion of psychological stress as a prerequisite to diagnose FND.² However, the statement 'A history of adverse life experience and psychological comorbidities is necessary for the diagnosis' was the most recognised myth, with 67.3% of respondents identifying it as such.

This study found that the statement 'FND treatment is individualised and involves careful explanation and combinations of physical and psychological rehabilitation' was recognised as a fact by 77.5% of the respondents, making it the most correctly identified statement. This finding is consistent with the results of a survey conducted among neurologists in the Netherlands, which reported that 55% of the participants preferred a combined approach for the management of patients with FND, including an explanation of the diagnosis, physiotherapy and psychotherapy.¹⁷

In a survey of members of the Movement Disorder Society from different countries, which aimed to evaluate their opinions and practices regarding psychogenic movement disorders, the most important factors for predicting the prognosis were the acceptance of the diagnosis and educating the patient.¹⁹ These findings highlight the importance of providing patients with a clear understanding of their diagnosis and involving them in their treatment plan.

Moreover, sharing the physical signs of FND with patients, such as Hoover's sign, has been suggested as an effective way to improve treatment outcomes. Stone *et al* noted that demonstrating the basis of the diagnosis of functional motor symptoms to patients can help to persuade them that their symptoms are not due to another cause, and increase their confidence in their physician's diagnosis. Overall, these findings emphasise the importance of individualised and multidisciplinary approaches to FND treatment that involve both physical and psychological rehabilitation, as well as clear communication and education of patients.²⁰ Finally, exploring diverse avenues holds promise for the enhancement of Iraqi medical education. A trajectory towards globalised training opens up the possibility of forging partnerships

and linkages between medical institutions in economically advanced nations and those in Iraq. Notably, the adoption of a common curriculum delivered in English confers a notable advantage, potentially facilitating cross-border collaboration in education.¹³

This study has several limitations that warrant consideration. First, the participants were predominantly drawn from a single medical college and healthcare practitioners from a specific online group, which could potentially limit the generalisability of the findings to a broader cross-section of healthcare professionals in Iraq. Moreover, the study did not analyse or compare the specialties or subspecialties of the practitioners, which might influence their level of exposure to and understanding of FND. Additionally, the relatively modest sample size could impact the representativeness of the results. Despite these limitations, this study provides valuable insights into the prevailing knowledge gaps and misconceptions surrounding FND among students and healthcare practitioners, thus offering a foundation for future investigations and interventions to enhance awareness and education in this area.

CONCLUSION

In conclusion, the study identified some common misperceptions about myths and facts regarding FND among healthcare professionals. The findings highlight the need for more education and awareness about FND, as the mean score for correct answers was relatively low. The study also found that the number of terms, teaching hours and confidence in managing the condition were positively correlated with the score, emphasising the importance of continuous education and training. Additionally, the source of information regarding FND had a significant impact on the score, indicating the need for accurate and up-to-date information from reliable sources. Overall, the study sheds light on the knowledge gaps and misconceptions surrounding FND, and provides insight into how healthcare professionals can improve their understanding and management of this complex condition.

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