

Impact of the COVID-19 pandemic on the incidence of patients with functional neurological disorder seen in a neurological emergency department

doi:10.1111/pcn.13459

The coronavirus disease (COVID-19) pandemic is a global stressor.¹ It is well documented that higher levels of anxiety and depression in patients with functional neurological disorder (FND) are related to aggravation of symptoms, relapse of previous symptoms, and *de novo* appearance of symptoms in some cases.¹⁻³ Also, FND patients had an altered emotional processing, which is associated with symptom severity, poorer outcomes, diminished quality of life, reduced resilience and poorer prognosis.⁴

The objective of the present study is to determine the impact of the COVID-19 pandemic on the demand of emergency care (EC) for FND in a tertiary neurology hospital in Mexico during the lockdown, in comparison to care provided in the previous 2 years.

This was a single-center, retrospective, cross-sectional study. The study was approved by the ethics and research committee. We included all

patients that attended the EC clinic (first time or subsequent) diagnosed with FND after neurological or neuropsychiatric evaluation between January 2018 and March 2021. The medical records of each patient were reviewed to integrate a database that included sociodemographic characteristics and comorbidities and to corroborate that the diagnosis was made based on the presence of positive signs of FND. Patients admitted to the neurology department whose diagnosis was changed to FND after psychiatric assessment were also included. The FND subtypes were recorded as present/absent (functional seizures, sensory disturbances, speech disturbances, paresis/weakness, mixed presentation, or other FND subtypes). Descriptive statistics were obtained for FND in 2018, 2019, 2020, and in the first trimester of 2021, and then compared using a chi-squared non-parametric test. To calculate the odds ratio, we used independent logistic regressions for binary dependent variables; $P < 0.05$ was considered statistically significant. The analyses were performed using SPSS version 26 (SPSS Inc., 2020). A separate analysis was performed to correlate the incidence of FND with the epidemiological phases of the COVID-19 pandemic in Mexico, including the start of lockdown and social distancing measures. The description of the COVID-19 phases and social distancing measures in Mexico are shown in online supplementary Table S3 and Figure S2.

During the study period, 28 715 medical consultations were provided at the EC clinic in our center; from 2167 complete records, 449 were eligible as related to patients with FND diagnosis. The average age of the patients was 33.44 ± 13.7 years; and 81.9% ($N = 368$) were female. Functional seizures ($N = 33$ 273.9%) were the most common subtype, followed by paresis or weakness ($N = 14$ 131.4%). Almost one half of patients ($N = 204$, 45%) identified a specific stressor as the precipitating event.

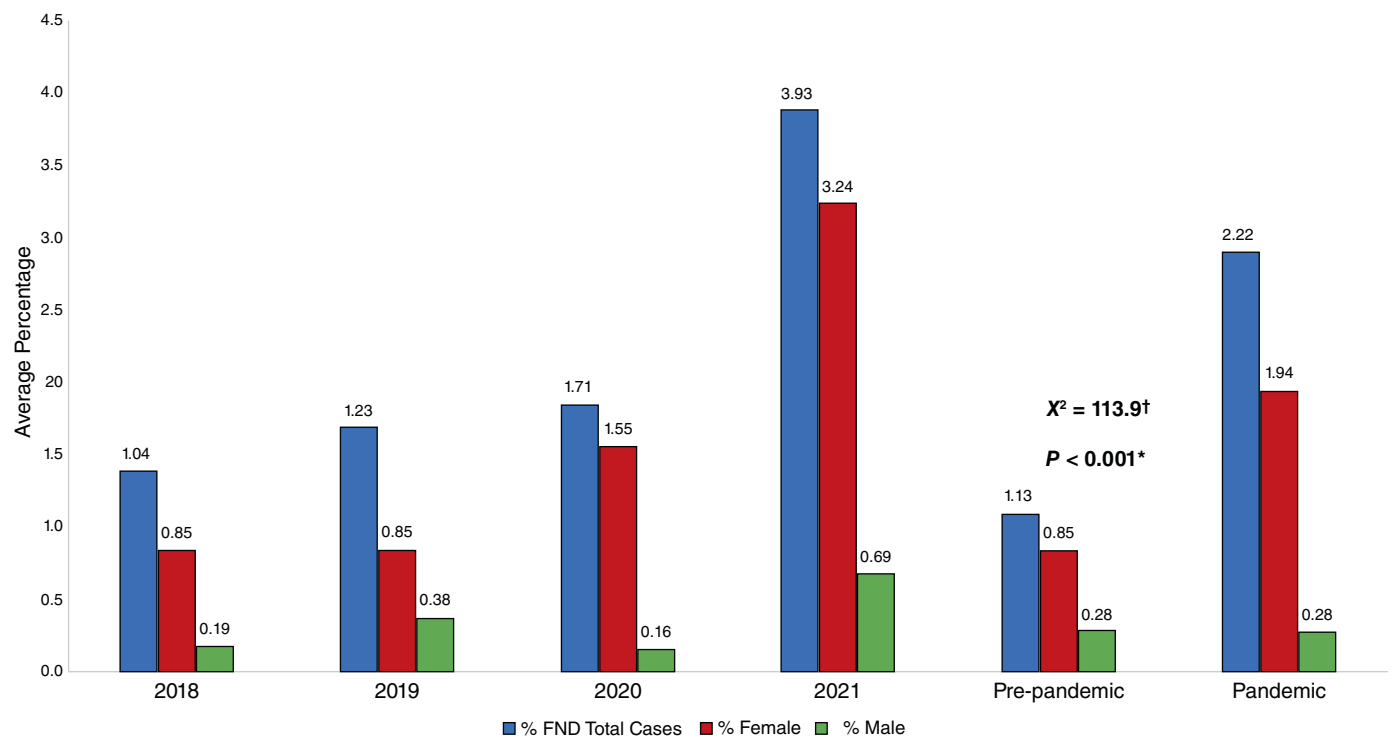


Fig. 1 Percentage of emergency care patients with FND diagnosis before and during the COVID-19 pandemic at the National Institute of Neurology and Neurosurgery.

Before the pandemic (2018–2019), an average of 8.92 patients were treated for FND monthly, which increased during the pandemic to 19.25 patients per month ($\chi^2 = 20.26$, $P < 0.001$); overall, first trimester consultations increased significantly ($\chi^2 = 41.26$, $P < 0.001$). The pandemic to pre-pandemic FND case ratio was 3:1. (Fig 1).

During the pandemic period studied (2020 to first quarter 2021), a total of 9252 emergency care consultations were registered, 231 of which were due to FND. Each pandemic phase was associated with increased FND cases, and phase 1 showed higher odds (OR = 5.2, 95% CI: 3.1–8.9, $P < 0.001$). During the pandemic, FND occurrence was predominant in females (201 vs. 167, $P = 0.003$). Patients were more prone to identify triggering stressors during than before the pandemic (115 vs. 80, $P = 0.003$); the main stressor identified was academic stressors (7 vs. 0, $P = 0.006$), followed by pandemic-related stressors (7 vs. 0, $P = 0.006$). Neurological comorbidities gained importance during the pandemic (111 vs. 41, $P = 0.0031$), as they became more prevalent in patients seeking medical attention due to FND when compared to the pre-pandemic period.

The COVID-19 pandemic and the resulting social isolation measures have proven to be significant stressors for the general population and have a negative impact on the mental health of the global population.^{5–7} Our study demonstrates that the ratio of patients receiving emergency care has increased significantly since the beginning of the COVID-19 pandemic at our center, whether evaluated by month, trimester, or year. In addition, this study analyzed the risk of presenting to the ED with FND symptoms during each phase of the pandemic. The increase in number corresponds to the peak in confirmed cases and may be associated with social distancing, mobility restrictions, and the lockdown, which is consistent with the increase in the incidence of anxiety disorders and moderate to severe depressive disorder in the same period reported in a previous study.⁸ While Hull *et al.* (2021), reported a 60.1% increase in diagnoses of FND motor subtype.³ Other studies have reported a stable course of the FND symptoms during the pandemic in patients with a diagnosis established previous to the pandemic which could be attributed to the role of the social context in this disease.^{9,10}

In conclusion, the demand for EC from patients suffering from FND during the pandemic has increased in a 3:1 ratio in Mexico. The peaks and valleys in the seeking of medical attention at our center by patients with FND coincided with the different phases of the pandemic as experienced in Mexico, with the implementation of social distancing measures, particularly with the lockdown and highest transmission of the virus. It remains important to track the collateral and post-pandemic impacts on patients who experience FND.

Disclosure statement

None declared.

References

1. Valente KD, Alessi R, Baroni G, Marin R, Dos Santos B, Palmmini A. The COVID-19 outbreak and PNES: The impact of a ubiquitously felt stressor. *Epilepsy Behav.* 2021; **117**: 107852.
2. Nisticò V, Goeta D, Gambini O, Demartini B. The psychological impact of COVID-19 among a sample of Italian patients with functional neurological disorders: A preliminary study. *Parkinsonism Relat. Disord.* 2020; **78**: 79–81.
3. Hull M, Parnes M, Jankovic J. Increased incidence of functional (psycho-genic) movement disorders in children and adults amidst the COVID-19 pandemic: A cross-sectional study. *Neurol. Clin. Pract.* 2021; **11**: e686–e690.

4. Pick S, Goldstein LH, Perez DL, Nicholson TR. Emotional processing in functional neurological disorder: A review, biopsychosocial model and research agenda. *J. Neurol. Neurosurg. Psychiatry* 2019; **90**: 704–711.
5. Wang C, Pan R, Wan X *et al.* Immediate psychological responses and associated factors during the initial stage of the 2019 coronavirus disease (COVID-19) epidemic among the general population in China. *Int. J. Environ. Res. Public Health* 2020; **17**: 1729.
6. Morrison J. *DSM-5® Guía para el diagnóstico clínico*. Editorial El Manual Moderno, Mexico, 2015.
7. Hassett AL, Cone JD, Patella SJ, Sigal LH. The role of catastrophizing in the pain and depression of women with fibromyalgia syndrome. *Arthritis Rheum.* 2000; **43**: 2493–2500.
8. Vázquez OG, Orozco MR, Muñoz RC, Contreras LAM, Ruiz GC, García AM. Síntomas de ansiedad, depresión y conductas de autocuidado durante la pandemia de COVID-19 en la población general. *Gac. Med. Mex.* 2020; **156**: 298–305.
9. Sandri A, Di Vico IA, Riello M, Marotta A, Tinazzi M. The impact of recurrent Covid-19 waves on patients with functional movement disorders: A follow-up study. *Clin. Parkinsonism Relat. Disord.* 2022; **6**: 100139.
10. Kanaan RA, Chen G, Olver J. How has the COVID pandemic affected functional neurological disorder? A mixed-methods analysis. *Gen. Hosp. Psychiatry* 2021; **69**: 129–130.

Supporting information

Additional Supporting Information may be found in the online version of this article at the publisher's web-site:


Figure S1 This graph shows the impact of the number of COVID-19 cases and the status of the epidemiological traffic light.

Figure S2 The traffic light shows the measures adopted during the pandemic by the population depending on the risk of contagion in Mexico City.

Table S1 Sociodemographic description and clinical variables of the studied population with FND (N=449).

Table S2 Emergency care per year and per quarter of each year.

Table S3 Emergency care during phases of the pandemic in 2020.

Reinhard Janssen-Aguilar, MD,^{1,2,3} Juan Pablo Galíndez-de la Portilla, MD,¹ Ricardo Gómez-Alcorta, MD,¹ Mariel Hernández-Palestina, MD,¹ Nina Mendez-Dominguez, MD,² Angel Ruiz-Chow, MSc¹ and Daniel Crail-Meléndez, MSc ^{1,3}

¹Department of Psychiatry, Manuel Velasco Suárez National Institute of Neurology and Neurosurgery, ²Hospital Regional de Alta Especialidad de la Península de Yucatán (HRAEPY). Vicedirection of Research and Learning, and ³Faculty of Medicine, Universidad Nacional Autónoma de México (UNAM), Mexico City, Mexico
Email: edgar.crail@innn.edu.mx

Received 24 March 2022; revised 10 July 2022; accepted 27 July 2022.