Parkinsonism and Related Disorders 150 (2026) 108412

Contents lists available at ScienceDirect

Parkinsonism and Related Disorders

journal homepage: www.elsevier.com/locate/parkreldis

Short communication

Occupation and education level in functional motor disorders

Tommaso Ercoli [a], Christian Geroin [b,c,*], Enrico Marcuzzo [c], Angela Sandri [c], Serena Camozzi [c], Luigi Michele Romito [d], Roberto Eleopra [d], Alessandra Nicoletti [e], Giovanni Mostile [e,f], Donatella Contrafatto [g], Lucia Tesolin [h], Francesco de Bertoldi [i], Alessandro Magliozzi [j,k,l], Andrea Pilotto [j,k,l,m], Nicola Modugno [n], Enrica Olivola [n], Benedetta Demartini [o], Veronica Nisticò [o], Francesco Bono [p], Angelo Pascarella [q], Carlo Dallocchio [r], Rosa De Micco [s], Roberto Erro [t,u], Marcello Esposito [v], Flavia Aiello [w], Martina Petracca [x], Eleonora Del Prete [y], Sara Varanese [z], Paolo Solla [a], Laura Lutzoni [aa], Michele Tinazzi [c,**,1], Giovanni Defazio [n,ab,1]

[a] Neurological Unit, AOU Sassari, University of Sassari, Sassari, Italy
[b] Department of Surgery, Dentistry, Paediatrics and Gynaecology, University of Verona, Verona, Italy
[c] Neurology Unit, Movement Disorders Division, Department of Neurosciences, Biomedicine and Movement Sciences, University of Verona, Verona, Italy
[d] Fondazione IRCCS Istituto Neurologico Carlo Besta, Department of Clinical Neurosciences, Parkinson and Movement Disorders Unit, Milan, Italy
[e] Department G.F. Ingrassia, University of Catania, Catania, Italy
[f] Oasi Research Institute - IRCCS, Troina, Italy
[g] Neurology Unit, A.O.U. Policlinico G. Rodoilico - San Marco, Catania, Italy
[h] FND Outpatients Clinic, Neurology and Stroke Unit, General Hospital of Bolzano, Bolzano, Italy
[i] Department of Psychiatry, General Hospital of Bolzano, Bolzano, Italy
[j] Department of Clinical and Experimental Sciences, Neurology Unit, University of Brescia, Brescia, Italy
[k] Laboratory of Digital Neurology and Biosensors, University of Brescia, Brescia, Italy
[l] Neurology Unit, Department of Continuity of Care and Frailty, ASST Spedali Civili Brescia Hospital, Brescia, Italy
[m] Department of Neurobiology, Care Sciences and Society (NVS), Center for Alzheimer Research, Division of Clinical Geriatrics, Karolinska Institutet, Sweden
[n] IRCCS Neuromed, Pozzilli, Italy
[o] SC Psichiatria, Dipartimento di Salute Mentale e delle Dipendenze, Presidio San Paolo, ASST Santi Paolo e Carlo, Milano, Italy
[p] Neurology Unit, Botulinum Toxin Therapy Center, Academic Hospital, A.O.U. "R. Dulbecco", Catanzaro, Italy
[q] Department of Medical and Surgical Sciences, Magna Graecia University, Catanzaro, Italy
[r] S.C. Neurologia, Dipartimento di Area Medica Specialistica, ASST Pavia, Pavia, Italy
[s] Department of Advanced Medical and Surgical Sciences, University of Campania "Luigi Vanvitelli", Naples, Italy
[t] Department of Medicine, Surgery and Dentistry "Scuola Medica Salernitana", University of Salerno, Baronissi, SA, Italy
[u] IRCCS Synlab SDN, Naples, Italy
[v] Clinical Neurophysiology Unit, Cardarelli Hospital, Naples, Italy
[w] Department Human Neurosciences Sapienza University of Rome, Italy
[x] UOC Neurologia, Fondazione Policlinico Universitario Agostino Gemelli IRCCS, Rome, Italy
[y] Centro Clinico Malattie NeuroDegenerative-Azienda Ospedaliero Universitaria Pisana, Pisa, Italy
[z] Clinica Neurologica Ospedale di Vasto, Chieti, Italy
[aa] University Hospital AOU Cagliari, Cagliari, Italy
[ab] Department of Translational Biomedicine and Neuroscience, Aldo Moro University of Bari, Italy

ARTICLE INFO

Keywords:
Occupation
Work
Education
Schooling

ABSTRACT

Background: The role of occupational background in functional motor disorders (FMDs) remains poorly defined. Controlled data using standardized occupational classifications and information on education level are limited. *Objective:* To assess the association between occupational background and FMDs in working-age individuals and to examine the role of education level in this relationship.

* Corresponding author. Department of Surgery, Dentistry, Paediatrics and Gynaecology, University of Verona, P.le Scuro 10, 37134, Verona, Italy.
** Corresponding author. Neurology Unit, Movement Disorders Division, Department of Neurosciences, Biomedicine and Movement Sciences, University of Verona, P.le Scuro 10, 37134, Verona, Italy.
E-mail addresses: christian.geroin@univr.it (C. Geroin), michele.tinazzi@univr.it (M. Tinazzi).
[1] These authors equally contributed to this work.

https://doi.org/10.1016/j.parkreldis.2026.108412
Received 23 April 2026; Received in revised form 30 June 2026; Accepted 5 July 2026
Available online 6 July 2026

Functional motor disorders
Functional neurological disorders

Methods: We conducted a case–control study using data from the Italian Registry of Functional Motor Disorders. Patients aged 30–65 years with available occupational information were included and compared with healthy controls. Occupations were classified according to the 2021 Italian National Institute of Statistics classification. Education level was expressed as years of schooling. Multivariable logistic regression models were used to assess the association between occupational categories and FMD status after adjustment for age, sex, and years of schooling.

Results: A total of 479 patients with FMDs and 252 healthy controls were included. Patients had fewer years of schooling than controls, and the distribution of occupational categories differed between groups. In particular, qualified professions in commercial activities and services, artisans and skilled workers, and machine operators were more frequently represented among patients. In multivariable analysis, these occupational categories and years of schooling remained independently associated with FMD status. Healthcare professions did not differ between patients and controls.

Conclusions: Occupational background and education level were independently associated with FMDs in working-age individuals. These findings support the view that occupational factors may be relevant as possible precipitating or maintaining factors within the biopsychosocial model of FMDs, without implying a causal relationship.

1. Introduction

Functional motor disorders (FMDs) are a common presentation within the spectrum of functional neurological disorders and represent a frequent cause of disability in neurological practice. They are characterized by abnormal movements or weakness diagnosed on the basis of positive clinical signs, particularly internal inconsistency between voluntary and automatic motor performance, rather than by exclusion of other neurological disorders. Despite increasing recognition, the factors associated with the occurrence and expression of FMDs remain incompletely understood.

Current models emphasize the interaction between neurocognitive mechanisms, attentional processes, and psychosocial factors in shaping symptom expression [1,2]. Previous studies have explored demographic and clinical characteristics of patients with FMDs, highlighting the predominance of female sex, the frequent coexistence of psychiatric and somatic comorbidities, and the relevance of contextual factors, including psychosocial stressors, environmental influences, and occupational exposures [3,4]. However, the role of occupational background has received limited and inconsistent attention.

Employment-related factors have been discussed in the FMD literature mainly in relation to healthcare professions, based on the hypothesis that exposure to illness models [5] or work-related stress might increase vulnerability to functional symptoms. While some studies reported a higher prevalence of healthcare workers among patients with FMDs [6,7], other controlled investigations failed to confirm the association [8,9]. These discrepant findings suggest that the relationship between occupation and FMDs may depend on study design, reference population, and clinical setting.

Beyond healthcare employment, little is known about the broader distribution of occupational categories in patients with FMDs. In particular, the potential association between functional motor symptoms and occupations characterized by physical demands, or sustained attention to bodily performance has not been systematically investigated. Most available studies relied on descriptive data, heterogeneous occupational classifications, or lacked appropriate control groups, limiting the interpretability of their findings [10].

Education level represents an additional factor of interest, given its close relationship with occupational trajectories and its potential role as a proxy for cognitive and psychosocial resources. Data on education in patients with FMDs are limited, and available findings suggest that observed differences may vary depending on the reference population and age range examined [3].

Large, well-characterized cohorts combined with appropriate control groups are required to explore occupational patterns in FMDs using standardized classifications. In this context, we conducted a case–control study comparing the distribution of occupational activities between patients with FMDs and healthy controls matched for age range and sex. Focusing on individuals of working age with functional motor symptoms, we aimed to assess whether occupational background is associated with the presence of FMDs and to clarify the role of education level in this relationship.

2. Methods

Data were obtained from the Italian Registry of Functional Motor Disorders (IRFMD), a multicenter initiative that includes 25 Italian centers, managed by the Department of Neurosciences, Biomedicine and Movement Sciences, University of Verona, and by the Italian Academy for the Study of Parkinson's Disease and Other Movement Disorders (Accademia LIMPE DISMOV RADAC project) and Fondazione LIMPE. Approval was obtained from the Institutional Ethics Committee of the Coordinating Centre (University of Verona, Azienda Ospedaliera Universitaria Integrata Verona, Prog. 1757CESC) and confirmed by the Committees of each participating center. All patients were informed about the nature of the study and gave their written consent to participate. Data were collected between September 1, 2018 and August 2019, involving the 410 FMD patients already described in other studies and phase two of the IRFMD performed between January 1, 2020, and December 31, 2022. The full methodology of IRFMD has been described elsewhere [4].

In the original registry cohort (n = 860), occupational information was available for 763 patients, while 97 patients were excluded because this information was not available. Among patients with occupational information, 479 individuals aged 30–65 years were included in the present analysis, whereas 284 were excluded because they were outside this predefined age range. This age range was selected to focus on working-age individuals and to reduce the influence of ongoing education and retirement.

Healthy controls were recruited among relatives of neurological outpatients with conditions other than FMD and were not related to FMD cases included in the study. Controls were frequency-matched to cases by 5-year age stratum, sex, and referral center. Potential controls were excluded if they had received treatment with drugs known to induce movement disorders or were related to a case in the study. Both cases and controls were unaware of the study hypothesis.

One section of the IRFMD examined patients' job. Patients were asked about their main lifetime occupation (the occupation they performed the longest throughout their life) and the information was categorized according to the 2021 Classification of Occupation from the Italian National Institute of Statistics (ISTAT) [Italian National Institute of Statistics (ISTAT) - https://professioni.istat.it/sistemainformativoprofessioni/cp/]. The classification of occupation 2021 (CP2021) includes nine categories: legislators, entrepreneurs, and top management (leadership class); intellectual, scientific, and highly specialized professions; technical professions; executive office professions; qualified professions in commercial activities and services; artisans, trades workers and agricultural workers; machine operators and vehicle

drivers; unskilled professions; and armed forces. Examples of occupations within these categories include managers and entrepreneurs in the leadership class; teachers, lawyers, and engineers among intellectual and highly specialized professions; nurses, accountants, and programmers among technical professions; secretaries and administrative employees among executive office professions; sales and personal service workers among qualified professions in commercial activities and services; artisans and agricultural workers among artisans and trades workers; drivers and machine operators among machine operators and vehicle drivers; cleaners and warehouse workers among unskilled professions; and police officers and firefighters among armed forces. In addition, healthcare workers were considered as a separate category for analytical purposes, including medical doctors, nurses, midwives, and related health professions. Each patient was assigned to the corresponding ISTAT category by a specialist in occupational medicine.

2.1. Statistical analysis

Statistical analyses were performed using SPSS statistical software (version 25; IBM-SPSS, Armonk, NY, USA). Data were expressed as mean ± standard deviation for continuous variables and counts and percentages for categorical variables. For group comparisons, we used the unpaired *t*-test for continuous variables and the chi-squared test or Fisher's test for categorical variables. Univariable and multivariable logistic regression models compared occupational categories in patients and controls. Odds ratios (ORs) and corresponding 95% confidence intervals (CIs) were estimated using logistic regression models adjusted for age and sex. Multivariable analysis included all study variables in the initial model; thereafter, variables were iteratively removed based on p-value significance and changes in ORs, resulting in a main-effects model. Years of schooling were analyzed as a continuous variable. Significance was set at the 0.05 level. Given the exploratory nature of the study and the use of predefined occupational categories, no correction for multiple comparisons was applied.

3. Results

Among patients enrolled in the IRFMD, 479 individuals aged 30–65 years with available occupational information were included in the analysis, together with 252 healthy controls. FMD patients included 149 men and 330 women. Age at FMD onset was 44.5 ± 10.5 years, while mean disease duration was 5.2 ± 7.2 years. With regard to body distribution of FMDs, 295 patients had involvement of the upper limb, alone or associated to other body parts, whereas in the remaining 184 patients motor disturbances affected body parts other than the upper limbs. Patients with and without upper limb involvement were similar for the main demographic and clinical variables (data not shown).

Demographic and occupational characteristics of case and control subjects are summarized in Table 1. Sex distribution did not differ between groups (p = 0.94). Patients with FMDs were younger and reported fewer years of schooling than controls. The distribution of occupational categories differed between groups. Executive office professions were less frequent among patients with FMDs compared with controls. In contrast, qualified professions in commercial activities and services were more frequently represented among patients, as were artisans, skilled workers and agricultural workers, and machine operators and vehicle drivers. Healthcare professions did not differ significantly between patients and controls (Table 1).

On multivariable logistic regression analysis adjusted for age and sex, the main effects model included years of schooling, qualified professions in commercial activities and services, artisans, skilled workers and agricultural workers, and machine operators and vehicle drivers were independently associated with FMD status (Table 2). Because some of the occupational categories associated with FMD may involve manual or repetitive activities, we performed a secondary analysis according to upper limb involvement to assess whether these associations were mainly driven by patients with upper limb symptoms. FMD patients with and without upper limb involvement did not significantly differ for frequency of qualified professions in commercial activities and services (14.2% vs. 16.8%), artisans, trades workers and agricultural workers (14.9% vs. 12.5%), and machine operators and vehicle drivers (2.4% vs. 3.3%).

Table 1
Demographic and occupational characteristics of patients with functional motor disorders and healthy controls.

	FMD patients in working age (n.479)	Controls (n. 252)	P
Sex (Men/women)	149/330	79/173	0.94
Age, yrs, ±SD	49.3 ± 8.4	55 ± 5.2	<0.0001
Schooling, yrs, ±SD	12 ± 3.7	13.2 ± 3.3	<0.0001
Leadership class, n (%)	20 (4.2)	6 (2.4)	0.21
Intellectual, scientific, and highly specialized professions, n (%)	53 (11.1)	41 (16.3)	0.46
Technical professions, n (%)	34 (7.1)	25 (9.9)	0.38
Executive office professions, n (%)	101 (21.1)	87 (34.5)	<0.001
Qualified professions in commercial activities and services, n (%)	73 (15.2)	19 (7.5)	0.003
Artisans, trades workers and agricultural workers, n (%)	67 (14)	12 (4.8)	<0.001
Machine operators and vehicle drivers, n (%)	13 (2.3)	1 (0.4)	0.03
Unskilled professions, n (%)	105 (21.9)	57 (22.6)	0.83
Armed forces, n (%)	13 (2.7)	4 (1.6)	0.11
Healthcare professions, n (%)	32 (6.7)	22 (8.7)	0.31

Table 2
Multivariable logistic regression analysis of occupational categories associated with functional motor disorders.

	Odds ratio (adjusted by age and sex)	95% confidence interval	P
Years of schooling	**0.91**	**0.8–0.9**	**<0.001**
Qualified professions in commercial activities and services	**1.9**	**1.1–3.4**	**0.03**
Artisans, trades workers and agricultural workers	**2.6**	**1.3–5.2**	**0.006**
Machine operators and vehicle drivers	**8.8**	**1.1–74.8**	**0.045**

4. Discussion

This case-control study suggests that occupational background may be associated with FMDs in individuals of working age. On multivariable analysis, occupational categories characterized by higher physical demands and manual activity, including qualified professions in commercial activities and services, artisans, trades workers and agricultural workers, and machine operators and vehicle drivers, were significantly more frequent among patients with FMDs, even after adjustment for potentially confounding variables.

Current models of FMDs emphasize abnormal attentional focus on bodily sensations and altered integration between expectations and motor control within a predictive coding framework [1,2,11]. In this model, symptom expression reflects an imbalance between top-down predictions and bottom-up sensory signals, reinforced by attention and emotional salience [11,12]. Occupations like qualified professions in commercial activities and services, artisans, trades workers and agricultural workers, as well as machine operators and vehicle drivers, may require sustained motor performance, repetitive movements, and/or

continuous monitoring of body position, thus increasing attentional focus on motor output and bodily signals from several body parts [11]. In addition, physically demanding occupations may be associated with chronic or recurrent pain and with minor work-related injuries, which may further increase attention to bodily sensations and contribute to symptom expression in susceptible individuals. Accordingly, occupation activities that were significantly associated to FMDs were similarly frequent in patients with and without upper limb involvement. In this context, occupational demands may potentially strengthen maladaptive predictive models in susceptible individuals, and be therefore relevant to symptom expression, without implying a causal role.

Healthcare professions were not significantly associated with FMDs in this study. This finding is in line with controlled investigations that did not confirm an over-representation of healthcare workers among patients with functional motor disorders [8,9]. Variability across studies may be related to differences in study design, selection of control groups, and sociodemographic characteristics of the populations examined [7].

Education level differed between patients with FMDs and healthy controls and was independently associated with case status. Adjustment for education level did not eliminate the observed occupational associations, indicating that education level and occupational background reflect partially distinct characteristics. A previous IRFMD-based study reported a higher proportion of secondary and tertiary education levels in patients with FMDs compared with the Italian general population [4]. In the present study, which included working-age individuals, patients with FMDs had fewer years of schooling than controls. Taken together, these findings suggest that education level in FMD may vary according to the reference population and age range considered.

This study has limitations. First, the case-control design does not allow conclusions about temporal relationships between occupational background and the onset of FMDs. Occupational data referred to the main lifetime occupation, defined as the job performed for the longest period. Therefore, we could not establish whether this occupation coincided with that performed at FMD onset, and information on the duration of employment was not available. Moreover, information on full-time or part-time employment, temporary or permanent disability, and changes in work activity after symptom onset was not systematically collected. Although analyses were adjusted for age and sex, residual confounding cannot be excluded. In particular, information on urban versus rural residence, socioeconomic status, and local occupational opportunities was not available, although these factors may influence both education level and occupational trajectories. In addition, healthy controls were recruited among relatives of neurological outpatients and may not fully represent the general population. Finally, as occupational structures and job distribution may vary across countries, the generalizability of our findings outside the Italian context may be limited.

In conclusion, occupational background was associated with FMDs in working-age individuals, independently of age, sex, and years of schooling. Within the biopsychosocial model of FMDs, these findings suggest that occupational factors may be relevant to the clinical manifestation of FMDs, possibly as precipitating or maintaining factors, without implying a causal role.

Ethical compliance statement

The study was conducted according to the Declaration of Helsinki and to principles of good clinical practice. Approval was obtained from the Institutional Ethics Committee of the Coordinating Centre (University of Verona, Azienda Ospedaliera Universitaria Integrata Verona, Prog. 1757CESC) and confirmed by the Committees of each participating center. All patients (or their guardians) were informed about the nature of the study and gave their written consent to participate. 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

No specific funding was received for this work. The authors declare that there are no conflicts of interest relevant to this work.

CRediT authorship contribution statement

Tommaso Ercoli: Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Project administration, Writing – original draft, Writing – review & editing. **Christian Geroin:** Conceptualization, Data curation, Investigation, Methodology, Project administration, Writing – original draft, Writing – review & editing. **Enrico Marcuzzo:** Conceptualization, Data curation, Investigation, Methodology, Project administration, Writing – original draft, Writing – review & editing. **Angela Sandri:** Data curation, Investigation, Methodology, Project administration, Supervision, Writing – review & editing. **Serena Camozzi:** Data curation, Investigation, Methodology, Project administration, Writing – review & editing. **Luigi Michele Romito:** Data curation, Investigation, Methodology, Project administration, Supervision, Writing – review & editing. **Roberto Eleopra:** Data curation, Investigation, Methodology, Project administration, Supervision, Writing – review & editing. **Alessandra Nicoletti:** Data curation, Investigation, Methodology, Project administration, Supervision, Writing – review & editing. **Giovanni Mostile:** Data curation, Investigation, Methodology, Project administration, Supervision, Writing – review & editing. **Donatella Contrafatto:** Data curation, Investigation, Methodology, Project administration, Supervision, Writing – review & editing. **Lucia Tesolin:** Data curation, Investigation, Methodology, Project administration, Supervision, Writing – review & editing. **Francesco de Bertoldi:** Data curation, Investigation, Methodology, Supervision, Writing – review & editing. **Alessandro Magliozzi:** Data curation, Investigation, Methodology, Project administration, Supervision, Writing – review & editing. **Andrea Pilotto:** Data curation, Investigation, Methodology, Project administration, Supervision, Writing – review & editing. **Nicola Modugno:** Data curation, Investigation, Methodology, Project administration, Supervision, Writing – review & editing. **Enrica Olivola:** Data curation, Investigation, Methodology, Project administration, Supervision, Writing – review & editing. **Benedetta Demartini:** Data curation, Investigation, Methodology, Project administration, Supervision, Writing – review & editing. **Veronica Nisticò:** Data curation, Investigation, Methodology, Project administration, Supervision, Writing – review & editing. **Francesco Bono:** Data curation, Investigation, Methodology, Project administration, Supervision, Writing – review & editing. **Angelo Pascarella:** Data curation, Investigation, Methodology, Project administration, Supervision, Writing – review & editing. **Carlo Dallocchio:** Data curation, Investigation, Methodology, Project administration, Supervision, Writing – review & editing. **Rosa De Micco:** Data curation, Investigation, Methodology, Project administration, Supervision, Writing – review & editing. **Roberto Erro:** Data curation, Investigation, Methodology, Project administration, Supervision, Writing – review & editing. **Marcello Esposito:** Data curation, Investigation, Methodology, Project administration, Supervision, Writing – review & editing. **Flavia Aiello:** Data curation, Investigation, Methodology, Project administration, Supervision, Writing – review & editing. **Martina Petracca:** Data curation, Investigation, Methodology, Project administration, Supervision, Writing – review & editing. **Eleonora Del Prete:** Data curation, Investigation, Methodology, Project administration, Supervision, Writing – review & editing. **Sara Varanese:** Data curation, Investigation, Methodology, Project administration, Supervision, Writing – review & editing. **Paolo Solla:** Data curation, Investigation, Methodology, Project administration, Supervision, Writing – review & editing. **Laura Lutzoni:** Data curation, Investigation, Methodology, Project administration, Supervision, Writing – review & editing. **Michele Tinazzi:** Data curation, Investigation, Methodology, Project administration, Supervision, Writing – review & editing. **Giovanni Defazio:** Data curation,

Investigation, Methodology, Project administration, Supervision, Writing – review & editing.

Declaration of competing interest

The authors declare that there are no conflicts of interest relevant to this work.

Acknowledgement

We thank Dr. Anna Castagna, MD, IRCCS Fondazione Don Carlo Gnocchi Onlus, Milan, Italy, for the assistance with data collection.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.parkreldis.2026.108412.

References

[1] J. Stone, C. Warlow, I. Deary, M. Sharpe, Predisposing risk factors for functional limb weakness: a case-control study, J. Neuropsychiatry Clin. Neurosci. 32 (2020) 50–57, https://doi.org/10.1176/appi.neuropsych.19050109.

[2] T.J. Lagrand, J.M. Gelauff, M. Brusse-Keizer, A.C. Lehn, M.A.J. Tijssen, Other individuals of the TASMAN study group, positive signs from the history as an aid for early diagnosis in functional movement disorders: the prospective TASMAN study, Eur. J. Neurol. 32 (2025) e16525, https://doi.org/10.1111/ene.16525.

[3] N. O'Connell, T.R. Nicholson, S. Wessely, A.S. David, Characteristics of patients with motor functional neurological disorder in a large UK mental health service: a case-control study, Psychol. Med. 50 (2020) 446–455, https://doi.org/10.1017/S0033291719000266.

[4] M. Tinazzi, F. Morgante, E. Marcuzzo, R. Erro, P. Barone, R. Ceravolo, S. Mazzucchi, A. Pilotto, A. Padovani, L.M. Romito, R. Eleopra, M. Zappia, A. Nicoletti, C. Dallocchio, C. Arbasino, F. Bono, A. Pascarella, B. Demartini, O. Gambini, N. Modugno, E. Olivola, V. Di Stefano, A. Albanese, G. Ferrazzano, A. Tessitore, M. Zibetti, G. Calandra-Buonaura, M. Petracca, M. Esposito, A. Pisani, P. Manganotti, F. Stocchi, M. Coletti Moja, A. Antonini, G. Defazio, C. Geroin, Clinical correlates of functional motor disorders: an Italian multicenter study, Mov. Disord. Clin. Pract. 7 (2020) 920–929, https://doi.org/10.1002/mdc3.13077.

[5] R. Pellicciari, M. Superbo, A.F. Gigante, P. Livrea, G. Defazio, Disease modeling in functional movement disorders, Parkinsonism Relat. Disorders 20 (2014) 1287–1289, https://doi.org/10.1016/j.parkreldis.2014.09.017.

[6] R. McCormack, J. Moriarty, J.D. Mellers, P. Shotbolt, R. Pastena, N. Landes, L. Goldstein, S. Fleminger, A.S. David, Specialist inpatient treatment for severe motor conversion disorder: a retrospective comparative study, J. Neurol. Neurosurg. Psychiatr. 85 (2014) 895–900, https://doi.org/10.1136/jnnp-2013-305716.

[7] G. Vanini, J. Bühler, S. Weber, M. Steinauer, S. Aybek, Healthcare employment as a risk factor for functional neurological disorder: a case–control study, Eur. J. Neurol. 31 (2023) e16056, https://doi.org/10.1111/ene.16056.

[8] C. Kenney, A. Diamond, N. Mejia, A. Davidson, C. Hunter, J. Jankovic, Distinguishing psychogenic and essential tremor, J. Neurol. Sci. 263 (2007) 94–99, https://doi.org/10.1016/j.jns.2007.06.008.

[9] C.G. Perry, K.G. Holmes, A.L. Gruber-Baldini, K.E. Anderson, L.M. Shulman, W. J. Weiner, S.G. Reich, Are patients with psychogenic movement disorders more likely to be healthcare workers? Mov. Disord. Clin. Pract. 4 (2017) 62–67, https://doi.org/10.1002/mdc3.12351.

[10] C. Delgado, M. Kurtis, B. Martin, P. Rada, L. Martinez, M. Sanz, B. Borda, C. Vicente, M. Garcia, O. Franch, I. Pareés, Clinical and demographic characteristics of patients with functional movement disorders: a consecutive cohort study from a specialized clinic, Acta Neurol. Belg. 122 (2022) 97–103, https://doi.org/10.1007/s13760-021-01648-8.

[11] M. Hallett, S. Aybek, B.A. Dworetzky, L. McWhirter, J.P. Staab, J. Stone, Functional neurological disorder: new subtypes and shared mechanisms, Lancet Neurol. 21 (2022) 537–550, https://doi.org/10.1016/S1474-4422(21)00422-1.

[12] M.J. Edwards, R.A. Adams, H. Brown, I. Parees, K.J. Friston, A Bayesian account of "hysteria,", Brain (2012).