



Psychogenic movement disorders in children and adolescents: an update

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Abstract

This short communication provides an update on childhood psychogenic movement disorders (PMD), focusing on descriptive studies and case reports from 2008 to 2018. Known also as functional movement/motor disorders, PMD diagnoses are relatively common in adults but less so in children. In group studies over the past decade, sample prevalence of childhood PMD ranged from 2.8 to 23.1%, with a higher percentage of girls in most studies (consistent with adult PMD literature). Common types of PMD included tremor (32.4%), dystonia (29.5%), and myoclonus (24.3%). Precipitating events for PMD onset included H1N1 influenza vaccinations, family/child stressors, anxiety/depression in the child or parent, panic attacks, behavior disorders, injury or accident, sexual abuse of the child or family member, death of a close relative, parental discord, domestic violence, school-related problems, medical illness/surgery, sleep disturbance, and participation in competitive sport or dance. The most frequently mentioned treatments were cognitive behavioral therapy, psychotherapy, relaxation techniques, and physiotherapy.

Conclusion: Although additional cases of childhood PMD have been published over the past decade, little new information has appeared. There is still no “diagnostic gold standard,” making an accurate estimate of prevalence virtually impossible and contributing to confusion among pediatricians when trying to identify children with PMD.

What is Known:

- Psychogenic movement disorders (PMD) occur in children as well as adults.
- The most common types of childhood PMD are tremor, dystonia, and myoclonus.

What is New:

- The most common childhood PMD treatments were cognitive behavioral therapy, psychotherapy, physiotherapy, and relaxation techniques (2008–2018).
 - Due to lack of a standardized definition for PMD, confusion exists as to which movement disorders to include. With the inability to reliably diagnose PMD and the ambiguity as to which movement disorders it comprises, it is difficult to determine the most effective treatments.
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Keywords Psychogenic movement disorder · Children · Functional motor disorder

Abbreviations

CBT Cognitive behavioral therapy
DSM-5 Diagnostic and Statistical Manual
of Mental Disorders, Fifth Edition

NIMHN National Institute of Mental Health
and Neurosciences
PMD Psychogenic movement disorder

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Introduction

Categorized as conversion disorders or functional neurological symptom disorders (under the umbrella category of somatic symptom and related disorders) in the 5th edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5) [2, 12], psychogenic movement disorders (PMD), known also as functional movement/motor disorders, are involuntary

disorders with a history of sudden onset and symptom variability [2] resulting from an abnormal mental condition/state rather than from an organic nervous system disorder [19]. These may present as tremor, gait disturbances, weakness, and/or paralysis with “incompatibility between the symptom and recognized neurological or medical conditions” [2].

PMD diagnoses are relatively commonplace in adults. Of 3781 patients newly referred to neurology clinics in Scotland, almost one-sixth (16%) had functional/psychological disorders [27] whereas a range of 2 to 20% has been reported in adult movement disorder clinics [6]. In children, however, PMD appear to be much less prevalent with far fewer case reports and retrospective studies.

The purpose of this communication is to provide an update on pediatric PMD, including prevalence in clinical samples, gender ratio, types of disorders, presenting characteristics, precipitating events, diagnostic evaluation, treatments employed, and symptom resolution. A secondary aim is to help practicing pediatricians recognize symptoms of PMD within patients in their clinics by summarizing the limited literature available to date.

Methods

PubMed was searched in December 2018 using the terms “psychogenic movement disorder AND children” and “functional psychogenic movement disorder AND children.”

Results

The combined terms “psychogenic movement disorder AND children” and “functional psychogenic movement disorder AND children” yielded 102 articles (1957–2018), of which 24 were review articles, 11 involved adults only, and 16 were in languages other than English. Of the remaining, most were retrospective chart reviews, case series, or case reports. There were no relevant clinical trials or clinical studies within those PubMed categories. This review will focus on papers published during the past decade (2008–2018), comprising about 63% of all articles.

Sample prevalence and gender ratios in clinical studies

In addition to a number of case reports, 10 larger studies have been published over the past decade describing demographic characteristics in clinical samples involving 159 children with PMD [1, 3, 4, 7, 9–11, 21, 24]. Although population prevalence of PMD is unavailable for either adults or children, Table 1 shows sample prevalence (2.8 to 23.1%), available from 7 of the 10 pediatric studies. Of the 8 studies that reported gender ratios, 5 showed a higher rate of girls (consistent with adult PMD literature [17]); of those that showed predominantly boys—one was from India [13] and one from the UK [1].

Table 1 Prevalence, clinical settings, and male:female ratio for psychomotor movement disorders (PMD) in children and adolescents

First author	Overall sample size (and age range)	Sample prevalence of PMD	Clinical setting (country)	Female:male ratio
Rauci et al. [21]	<i>N</i> = 256 children with acute hyperkinetic movement disorders (2 months–7 years)	6.25% (<i>n</i> = 16)	Pediatric emergency departments	Not reported
Kamble et al. [13]	<i>N</i> = 22 with PMD (8–18 years)	N/A	Neurology and psychiatry departments: NIMHN (India)	1.0:2.4
Goraya [11]	<i>N</i> = 92 with acute movement disorders (5 days–15 years)	4.3% (<i>n</i> = 4)	Tertiary hospital (India)	Not reported
Canavese et al. [3]	<i>N</i> = 14 with PMD (5–17 years)	N/A	Child neuropsychiatry foundation	1.33:1.0
Faust et al. [9]	<i>N</i> = 300 patients in a pediatric movement disorders clinic	4.3% (<i>n</i> = 13; ages 6–17 years)	Hospital for Sick Children (Canada)	3.33:1.0
Dale et al. [4]	<i>N</i> = 52 children with acute-onset movement disorders (2 months–15 years)	23.08% (<i>n</i> = 12)	Children’s hospital (Australia)	5.0:1.0
Ertan et al. [7]	<i>N</i> = 1745 patients (adults and children in a movement disorders clinic)	2.8% (<i>n</i> = 49, 4 of whom were children; ages 7–12 years)	University hospital (Turkey)	2.27:1.0 (overall sample)
Ahmed et al. [1]	<i>N</i> = 34 children with abnormal body movements	14.7% (<i>n</i> = 5; ages 7.0–15.9 years)	King George Hospital (UK)	1.0:1.5
Ferrara et al. [10]	<i>N</i> = 1722 (seen in clinic over a 20-year span)	3.1% (<i>n</i> = 54; ages 7.6–17.7 years)	Baylor College of Medicine Movement Disorders Clinic (USA)	3.5:1.0
Schwingschuh et al. [24]	<i>N</i> = 15 with PMD (ages 7–16 years)	N/A	Great Ormond Street Hospital (UK)	4.0:1.0

N/A not applicable, NIMHN National Institute of Mental Health and Neurosciences, PMD psychogenic movement disorders

Table 2 Case reports of childhood/adolescent psychogenic movement disorders (2008–2018)

First author	Age/ gender	Type(s) of movement disorder
Stanković [26]	13/F	Astasia-abasia and Ganser syndrome
Scola [25]	12/F	Dropped head, involuntary limb movements, gait disorder
Tripathy [28]	10/M	Abnormal gait (right knee extended with foot equinus and hip abduction)
Per [20]	7/M	Psychogenic torticollis
Margari [15]	12/M	Psychogenic palatal tremor (combined with essential palatal tremor)
Sauerhofer [23]	13/F	Psychogenic tremor of both wrists
Ziegler [29]	11/F	Dystonia resulting in finger flexor contractures in both hands
Ryu [22]: case 1	12/M	Mild motor weakness in lower extremities with knees buckling during walking
Ryu [22]: case 2	14/F	Weakness in left extremities with difficulty walking
Ryu [22]: case 3	12/M	Fluctuating weakness in lower extremities; extremely slow gait
Ryu [22]: case 4	12/F	Weakness in all four extremities; buckling of knees when walking
Lin [14]	7/F	Uncontrolled, intermittent hand movements; dysrhythmic movements of both lower extremities

Types of disorders in childhood PMD

Seven of the 10 studies categorized the type(s) of movement disorder presented by each child, with some children showing more than one [3, 4, 9–11, 13, 24]. The three most common were tremor (32.4%), dystonia (29.5%), and myoclonus (24.3%). Gait disturbances were seen in 9.8% of children with the remaining 3.9% showing tics, chorea, or psychogenic tetany. These figures correspond closely to adult-onset PMD with tremor and dystonia the most common [17].

In addition to these descriptive group studies (primarily retrospective chart reviews), a number of individual or small-series case reports have been published over the past decade [14, 15, 20, 22, 23, 25, 26, 28, 29] (see Table 2). In 2010, Ryu and Baik described four Korean children who developed PMD from several hours to 14 days after mass school vaccination for influenza A [22]. In 2011, Lin and colleagues reported on a Taiwanese girl who showed PMD symptoms 1 day after H1N1 vaccination [14].

Precipitating events in childhood PMD

In addition to H1N1 flu vaccination being identified as a precipitating event [14, 22], other triggers include family and/or child stressors [1, 6, 9, 10, 13, 15, 16, 24, 26], anxiety and/or depression in the child [3, 4, 10, 26] or parent [1, 4, 23], panic attacks [3], behavior disorders [15], injury or accident [3, 10, 23, 24], sexual abuse of the child [9] or a family member [29], death of a close relative [1, 13, 26], parental discord [1], domestic violence [7], school-related problems (e.g., bullying, absenteeism) [1, 9, 10, 13, 23, 24, 28], medical illness and/or surgery [10, 24, 27], sleep disturbance [1, 10], breathing

disorders (e.g., hyperventilation, breath-holding) [10], and participation in competitive sport or dance [9, 24].

Diagnostic approach/neurological examination

As proposed in DSM-5 [2], functional neurological disorders can now be diagnosed in an “inclusionary manner” by identifying signs specific to them [8]. Positive signs for PMD include poverty (e.g., weakness or slowness) or excess of movement (e.g., myoclonus, dystonia), and/or axial manifestations (e.g., functional deficits in gait, posture or balance) [8]. Sudden onset and disappearance of symptoms with distraction are clinical features suggesting a PMD diagnosis [8]. To aid in initial diagnosis, Daum and colleagues [5] identified a number of positive, reliable clinical signs for possible conversion disorders. For PMD, these include collapsing weakness, the Spinal Injuries Center test, leg dragging, and bizarre excursion of the trunk [5].

Treatments in childhood PMD

The most frequently mentioned treatments for children with PMD in the past decade were cognitive behavioral therapy (CBT) [4, 9, 16, 23–25, 29], psychotherapy [3, 4, 13–15, 20, 22, 26], physiotherapy [4, 9, 16, 23, 24, 29], and relaxation techniques [4, 23, 28]. Other behavioral therapies included positive reinforcement [18], differential reinforcement (i.e., reducing attention to psychogenic symptoms and increasing attention toward “productive” activities) [28], cognitive restructuring [28], anxiety-reducing techniques [23], and placebo therapy [22, 25]. Several authors stressed the importance of specifically

educating the child and parents about the disorder [4, 21, 28] as well as the benefits of family counseling [4, 9, 13, 26]. In a case report of bilateral psychogenic wrist tremor, an adolescent girl was treated successfully with wrist braces [23]. Drug therapies were also recommended in some instances (e.g., anti-depressants, anxiolytics, anti-psychotics) [4, 9, 13, 15, 16, 26]. The importance of providing therapy as part of a multidisciplinary team was identified [8, 9, 13, 24] as well as inclusion of family members as an integral part of the team [9].

Follow-up assessment

According to previous reports, children who experienced acute onset of PMD had shorter symptom duration and more favorable prognoses [16, 24], as did children with tremor [22]. Follow-up assessments took place for all available children ($n = 80$) in 7 of the 10 group studies [1, 3, 4, 7, 9, 13, 24] and all 9 case reports [14, 15, 20, 22, 23, 25, 26, 28, 29]. Outcomes were described as “full recovery” or “complete symptom resolution” in 33 children (41%), “clinical/substantial improvement” in 30 (37.5%), “resolution but with relapses” or “incomplete/partial resolution” in 5 (6.25%), “unresolved” in 5 (6.25%), and “chronically disabled” in 7 children (8.75%).

Discussion

In 2008, Schwingenschuh and colleagues [24] summarized clinical characteristics, treatment, and outcomes of 50 children with PMD from reports published between 1984 and 2008 (one of which was also in the current review [1]), as well as from their own case series of 15 children with PMD (also included in the current review). In their case series [24], the ratio of females to males was 4.0:1.0 whereas in the 50 previous case reports, it was 3.2:1.0. In the current review, the female:male ratio was 2.2:1.0, suggesting a relative increase in boys affected with PMD since 2008. In the case series by Schwingenschuh et al. [24], just 13% of children were under age 10 at PMD onset; in the current review, a similar percentage was found for that age group (16.7%).

Whereas the most common type of PMD reported by Schwingenschuh et al. was dystonia (47%) [24], tremor was most prevalent in the current review (32.4%) with dystonia second at 29.5%. In the review of 50 previous cases [24], gait disorders comprised 30% of all types of childhood PMD; counterpart figures were much lower for Schwingenschuh et al.’s own [24] case series (13%) and the current review (9.8%).

Although specific data were not provided, the 2008 case series and literature review led the authors to conclude that CBT and rehabilitation by a multidisciplinary

team had been shown to be helpful in most children [24]. These conclusions dovetail reasonably well with the most common treatments employed in studies over the past decade, e.g., CBT, psychotherapy, relaxation techniques, and physiotherapy. With regard to outcome, 80% in the 2008 case series [24] recovered fully or improved substantially—mirrored by 78.5% in the current review.

Limitations

This review summarized case reports and group descriptive studies published during the past decade involving childhood PMD, comparing those results to a 2008 review [24]. Although additional cases have been described [1, 3, 4, 7, 9–11, 13, 15, 20–26, 28, 29], little new information has appeared. There is still no “diagnostic gold standard” for PMD [18], making an accurate estimate of prevalence virtually impossible and contributing to confusion among pediatricians trying to identify children with PMD.

Due to lack of a reliable and standardized definition for PMD, confusion exists as to which types of movement disorders should be categorized as such. Within the pediatric literature, some authors have included tics [1, 4, 7, 9] whereas others have included them as neuropsychiatric [21] or inflammatory [11] disorders (but not as PMD). There is even disagreement as to what constitutes “the childhood years.” In one study, participants aged ≥ 15 were categorized as adults [7] whereas all other pediatric studies included participants aged ≤ 18 .

Conclusions

With the inability to reliably diagnose PMD and the ambiguity as to which movement disorders should be included and what ages constitute childhood, it is difficult to determine what treatments would likely be most effective. Ideally, these shortcomings should be addressed by a multidisciplinary group of clinical and research specialists with goals of shedding further light on the enigma of childhood PMD and easing its burden on the children and families experiencing it.

Compliance with ethical standards

Conflict of interest The author declares that she has no conflicts of interest.

Ethical approval Not applicable.

Informed consent Not applicable.

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