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Descriptive phenotype of obsessive compulsive symptoms in males with Duchenne Muscular Dystrophy

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Abstract

Increased rates of clinically significant internalizing disorders (obsessive compulsive disorder, anxiety, and depression) have been demonstrated in males with Duchenne muscular dystrophy, and a Duchenne muscular dystrophy neuropsychiatric syndrome has been suggested. While symptoms of depression are widely recognized, some of the other internalizing symptoms are less frequently identified. Through a retrospective chart review of 107 males with Duchenne muscular dystrophy, we identified 15 patients with obsessive compulsive disorder spectrum symptoms; 11 of those also had anxiety symptoms. Many of these patients received selective serotonin reuptake inhibitor treatment, commonly noting improvement in symptoms. Here we describe the clinical features of several patients in detail to facilitate early recognition and consideration for treatment for patients with Duchenne muscular dystrophy and internalizing psychiatric symptoms. The results of this cohort showed a significantly increased rate of obsessive compulsive disorder spectrum symptoms (14%) compared to the general population.

Keywords

Duchenne muscular dystrophy; internalizing disorders; OCD; anxiety; SSRIs

Introduction

Duchenne muscular dystrophy is an X-linked recessive neuromuscular disorder caused by mutations in the *DMD* gene, leading to impaired dystrophin production¹. Boys with

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Author contributions

All authors contributed to the design of the study. AJL reviewed all medical records and drafted the manuscript. All authors contributed to writing and revising the manuscript.

Declaration of conflicting interests

KDM has served on advisory boards for Sarepta and Santhera AJK and ETB declare no potential conflicts of interest with respect to research, authorship, and/or publication of this article.

Ethics Approval

This study was approved by the University of Iowa Institutional Review Board (IRB# 201705750)

Duchenne muscular dystrophy develop muscular weakness, and historically lose ambulation by mid-adolescence. Death typically occurs in young adulthood from cardiac or respiratory complications,² although modern treatment extends lifespan and improves quality of life³. Cognitive, neurobehavioral, and neuropsychiatric concerns are associated with Duchenne muscular dystrophy^{4–10}. Among the internalizing disorders, depression is reported in 17–27% of males with Duchenne muscular dystrophy^{7, 11, 12}, anxiety in 24–29%^{4, 11, 12} and obsessive compulsive disorder in 5%^{4, 8}. The rate of obsessive compulsive disorder is significantly elevated compared to the general population^{4, 8}. These internalizing disorders are clinically significant among those with Duchenne muscular dystrophy^{4, 11, 13–15}. Mood disorders affect patient quality of life, both specifically in Duchenne muscular dystrophy¹¹ and in a number of other muscle diseases¹⁶.

In the general population, childhood and adolescent anxiety has been associated with poor adjustment and coping skills, problems in the family unit and relationships, and increased chronic stress¹⁷. Childhood and adolescent anxiety and depression are risk factors for both disorders in adulthood^{17, 18}. Obsessive compulsive disorder has been characterized by the World Health Organization as one of the 10 most disabling conditions of all medical and psychiatric diagnoses in the industrialized world¹⁹. Obsessive compulsive disorder is often associated with comorbid conditions, including anxiety, depression and attention deficit hyperactivity disorder.^{20–22}

Prior studies have documented an increased prevalence of internalizing disorders in boys with Duchenne muscular dystrophy¹³, but have not described the specific clinical symptoms. While depressive symptoms are consistent with what is seen in other populations and depression screening is familiar to most clinicians, we observe that boys with Duchenne muscular dystrophy frequently have a recognizable obsessive compulsive phenotype, often with associated anxiety. Here we focus on this obsessive compulsive phenotype, its impact on patients and their families, and response to treatment, including representative case reports. Knowledge of this symptom complex will promote awareness, leading to earlier recognition and intervention.

Methods

Following University of Iowa institutional review board approval, we screened medical records of all males with Duchenne and Becker muscular dystrophy based on a pathogenic mutation in *DMD* or muscle immunohistochemistry showing absent dystrophin, who are followed at University of Iowa Hospital and Clinics, and who were seen between July 2012 and July 2017. We included for further analysis those with Duchenne muscular dystrophy, defined as requiring full time wheelchair use at <16 years of age²³, or onset of symptoms <6 years for those who were under 16 years old and still ambulatory²⁴.

Clinical neuromuscular and psychiatric notes from the most recent visit and one, three, and five years prior were reviewed for mention of any pertinent psychiatric medication and documentation of internalizing disorders. Those who did not have documentation of an internalizing disorder and who were not taking any pertinent psychiatric medication were

excluded from further review. In addition, one patient was excluded due to brain injury/trauma unrelated to Duchenne muscular dystrophy.

Of 119 patients with Duchenne and Becker muscular dystrophy seen between July 2012–July 2017, chart review identified 39 with Duchenne muscular dystrophy and indication of internalizing symptoms (Figure 1). For each of the 39 patients, the following data was collected from the medical record: current age, presenting symptoms of an internalizing disorder, progression of those symptoms, treatment modalities, and response to treatment. Given the retrospective, cross-sectional nature of this study, only descriptive analysis was possible. Summary data that included any psychiatric evaluation and diagnosis, and descriptions from patients and families regarding symptoms for each of the cases were independently reviewed by all four authors. Presence or absence of obsessive compulsive spectrum symptoms, anxiety symptoms, and depressive symptoms was recorded by each author for each patient. The rate of agreement between reviewers was determined by Cohen Kappa analysis using SPSS 2015 software. Cases identified by 3 of 4 reviewers as having internalizing disorders were considered as having significant symptoms. There were 2 cases in which reviewers evenly disagreed; those cases were counted as not having symptoms during analysis.

Results

The final study group of 39 individuals (Figure 1) with possible internalizing disorders ranged in age from 5 to 34 years and, as expected for an x-linked disease, were all male. Kappa values for obsessive compulsive disorder spectrum, anxiety, and depressive symptoms were 0.894, 0.892, and 0.892 respectively, indicating moderate to high reviewer agreement.

Of the 39 cases, 15 (38.5%) had obsessive compulsive disorder spectrum symptoms, 27 (69.2%) had anxiety symptoms, and 14 (35.9%) had depressive symptoms. Three (7.7%) cases did not have documentation that allowed reviewers confirm the presence of internalizing symptoms. Among the 107 subjects with Duchenne muscular dystrophy (after excluding those with Becker muscular dystrophy), 36 patients (33.6 %) had at least one internalizing behavior; obsessive compulsive disorder spectrum symptoms were seen in 15 patients (14.0 %), anxiety spectrum symptoms in 27 patients (25.2 %), and depressive spectrum symptoms in 14 patients (13.1%). Patients often had symptoms of more than one internalizing disorder, as shown in Figure 2.

OCD phenotype

Fifteen patients demonstrated obsessive compulsive disorder spectrum symptoms and clinical features are summarized in Table 1. These patients ranged in age from 5 to 23 years. Of the 14 patients with documented age at onset of symptoms, the mean age at onset was 12.1+/-6.0 years (range 5–23 years). Common initial symptoms included difficulty with changes in routine, repetitive behaviors, and organizational compulsions. Many patients required a very specific bedtime routine.

Of the 15 patients with obsessive compulsive disorder spectrum symptoms, 11 (73.3%) also had anxiety symptoms, and 1 (6.7%) also had depressive symptoms.

Nine of the 15 patients with symptoms on the OCD spectrum were evaluated by a psychiatrist. The remainder who agreed to treatment were treated by their primary care physician or neuromuscular specialist. Psychotherapy was recommended to all patients, with 5 of the 15 patients receiving psychotherapy. Fourteen of the 15 patients were treated with a selective serotonin reuptake inhibitor. Of these, 10 patients and their families reported a good response to treatment. Two had no response to initial therapy and treatment modification is ongoing, one has yet to follow after initial treatment was prescribed, and one died prior to follow up. Those who responded to selective serotonin reuptake inhibitor treatment reported that obsessive compulsive disorder symptoms were more manageable, but did not resolve completely.

Illustrative Cases

Patient 1—When patient 1 was 4–5 years of age, parents noticed that he would get stuck on certain topics for months, ask frequent repeated questions, and require items to be organized in a specific way (eg. toys arranged in a certain configuration, laundry basket in a specific place). They also noted hyperactivity, attention difficulties, and impulsivity. They did not note a change in any of these behaviors when he was started on a corticosteroid. Psychiatric evaluation at 6 years of age led to a diagnosis of attention deficit hyperactivity disorder and noted rigid behavior. Treatment was discussed for the latter, however parents deferred. He was started on Ritalin for attention deficit hyperactivity disorder with subsequent psychiatric notes indicating continued rigidity with difficulty tolerating change, particularly transitioning to bedtime. A selective serotonin reuptake inhibitor trial was discussed at 8 years old and deferred. He was described as having good social skills and did not meet criteria for autism spectrum disorder. As he grew older, he had worsening anxiety and required rigid routines, especially at bedtime. Clonazepam was started at bedtime when he was 12 years of age, effectively reducing bedtime anxiety, however, by 14 years old, his bedtime routine could last up to 3 hours, typically taking 1–2 hours, including a multitude of requests. For example, he had to lie a specific way in bed, his clothing needed to be adjusted in a "certain way", doors and windows had to be checked multiple times. If things were not done exactly as he required, he became very distressed. During the day, he was perseverative; at school this caused problems as he could not move on to a new subject. Teachers reported that he was overly organized, even organizing the teacher's desk without permission. Parents reported that he organized purses and bags of guests who visited the home. A formal diagnosis of obsessive compulsive disorder was made when he was 15 years old, and he was started on fluoxetine 10 mg daily. Within 6 months, he reported that he did not feel as worried or compelled to do certain things and family reported significantly decreased obsessional thinking at night.

For the next few years symptoms continued to worsen and fluoxetine was titrated with beneficial effect. He has been on 60mg fluoxetine since 18 years of age and has done well on this dose although some obsessive compulsive disorder features persist. He continues to have a very specific bedtime routine and is a meticulous hand washer. Family and patient

feel that symptoms are no longer disabling or disruptive to the family and he reports feeling less distress when things are not to his liking.

Patient 2—Parents reported that when Patient 2 was around 5 years old, he began to have difficulty with change or disruption of his routine that led to “meltdowns”. He would repeat certain phrases constantly, including “I love you” to his parents or short phrases from TV commercials. He strongly preferred to have doors closed. He developed anxiety about leaving the house. Psychiatric evaluation at 5 years of age led to a diagnosis of generalized anxiety disorder with a need to monitor for obsessive compulsive disorder features. A history of difficult social interactions in the context of aggressive behavior, stereotypic behaviors, narrow interests, and language delay was noted to be consistent with autism spectrum disorder. Medications, including clonidine 0.05mg daily and fluoxetine 4mg daily, were started, with parents subsequently reporting improvement in anxiety and rigidity. Patient 2 subsequently began to go outside the house on his own. Though he continued to prefer routines, he was better able to cope with change.

Psychiatric evaluation at 7 years noted increased anxiety in multiple situations with intermittent obsessive thoughts resulting in compulsive behaviors and a diagnosis of obsessive compulsive disorder was made. Fluoxetine was increased to 20mg daily and parents noted a “big benefit”. He currently continues to prefer routines, requiring a very specific bedtime routine to go to sleep and meals at the same time every day. His fluoxetine dose has been titrated as he has gotten older, in context of ongoing symptoms, to the current dose of 30mg daily. Recent psychiatric follow-up at 10 years of age revealed well managed obsessive compulsive disorder symptoms with continued anxiety and specifically notes that the patient does not have communication or social impairments, including deficits in nonverbal communication, lack of peer relationships, lack of social reciprocity, inability to sustain conversations, idiosyncratic use of language, and lack of imaginative play.

Patient 3—Around 6 years of age, parents started noticing that patient 3 had difficulty with changing activities that was out of the normal range. He strongly preferred routines, becoming very upset with deviations from the routine. As he grew older parents noticed behavioral problems and attention difficulties. He also developed a very specific bedtime routine. Psychiatric evaluation at age 8 led to an oppositional defiant disorder diagnosis with a need to monitor for obsessive compulsive disorder and anxiety. It is noted that he was verbal with friends, shared items of enjoyment, and had good emotional responses. A selective serotonin reuptake inhibitor trial was discussed for potential anxiety and obsessive compulsive disorder but deferred by parents who preferred to try psychotherapy, however this was limited by local resources.

At age 12, parents reported school avoidance associated with anxiety. His school aide reported that he required everything done in a certain way (e.g. placing papers in certain place). If things were not done as he preferred, he would become very distressed, having to leave the classroom. Generalized anxiety disorder was diagnosed by his psychiatrist at age 12, with a need to monitor for obsessive compulsive disorder. Several selective serotonin reuptake inhibitors were tried, each with adverse side effects (rash, GI upset, apathy, urinary urgency) and obsessive compulsive disorder symptoms continued to worsen. Furniture and

other items had to be arranged in a certain way and he had to check back to make sure they were still arranged correctly. If not, he had to fix it or he became very distressed. He developed severe anxiety about leaving the house. He had multiple panic attacks at school. Paroxetine 10mg was initiated when he was 13 years old with significant improvement. He is now happy to leave the house, willingly goes to school, and family describes decreased anxiety and rigidity.

Discussion

We describe obsessive compulsive disorder spectrum symptoms in a cohort of 15 males with Duchenne muscular dystrophy aged 5–23 years and illustrate the phenotype with case reports. These symptoms often negatively impacted daily life for patients and families, and generally responded to therapy.

Obsessive compulsive disorder spectrum symptoms in this cohort were varied. Difficulty with changes in routine, repetitive behaviors, and organizational compulsions were common among our cohort. This aligns with previous findings that those with early onset obsessive compulsive disorder (<18 yo) were more likely to report repeating rituals and ordering compulsions while those with late onset obsessive compulsive disorder were more likely to report hoarding²⁵. Patients in our cohort did not report any hoarding compulsions. Some older patients specifically noted feeling compelled to act on thoughts and compulsions, however this information was limited by the retrospective nature of the study and young age of patients.

Eleven of the 15 (73.3%) also had symptoms of anxiety. This co-occurrence of anxiety is more common in our cohort than reported in other youth with obsessive compulsive disorder, where anxiety is seen in around 50%²¹. In our study, the males with this phenotype who were formally evaluated by child psychiatrists were often diagnosed with obsessive compulsive disorder with features of anxiety, both obsessive compulsive disorder and generalized anxiety disorder, or one disorder with the need to monitor for the other. Of the 4 males who did not have comorbid anxiety, one had very recent onset of obsessive compulsive disorder symptoms and it is possible the clinical phenotype will evolve. We observed that in retrospect, symptoms started as early as 5 years of age, however, often symptoms did not become problematic or require treatment until patients were older.

The typical initial treatment for obsessive compulsive disorder includes cognitive behavioral therapy and/or a selective serotonin reuptake inhibitor^{20, 26}, while treatment for generalized anxiety disorder includes psychotherapy, a selective serotonin reuptake inhibitor, or a serotonin and norepinephrine reuptake inhibitor^{27–29}. In our series, psychotherapy was always recommended, however the initial treatment typically involved a selective serotonin reuptake inhibitor, at least in part because of limited access to psychotherapy and related resources in rural areas. Using a selective serotonin reuptake inhibitor most adequately covers both obsessive compulsive disorder and anxiety symptoms. Consistent with what has been observed in other populations^{20, 22, 30, 31}, obsessive compulsive disorder treatment did not result in complete resolution of symptoms, but most patients and families noted improvement in symptoms. The patients and families in our series found selective serotonin

reuptake inhibitors to be very helpful and greatly improved quality of life. Benefit from a selective serotonin reuptake inhibitor was also reported in a recent case report of a boy with Duchenne muscular dystrophy and comorbid obsessive compulsive disorder³².

Overall, the frequency of internalizing symptoms was higher in our series than in most reported cohorts. While frequency of symptoms was not the focus of this report, we found that of 107 males with Duchenne muscular dystrophy, 36 (33.6%) had internalizing disorders based on chart review. This is higher than recently reported by Ricotti et al who found in a prospective study that 24% of boys age 5–17 years had internalizing disorders¹³, but within the upper limit of the 95% confidence interval of 34%. One possible explanation for this increased rate in our study is the difference in ages of the study populations, as we included adults in our study population. In addition, frequency of internalizing disorders may have been overestimated due to the nature of a retrospective study, which did not always include formal psychiatric diagnoses. Internalizing symptoms in our cohort were also increased compared to rates found in children with spinal muscular atrophy (18.8%)³³.

Fourteen percent of our Duchenne muscular dystrophy cohort had obsessive compulsive disorder spectrum symptoms, which is higher than previous reports of around 5%^{4, 8}, but within the 95% confidence interval of 1.1–14.2 of Banihani et al⁴. Obsessive compulsive disorder spectrum symptoms may have been overestimated in our retrospective study. It is also possible that there is under-recognition of this symptom complex in published series. Anxiety symptoms were seen in 25% of our Duchenne muscular dystrophy cohort, agreeing with previous reports of anxiety in 24%–29% of males with Duchenne muscular dystrophy^{4, 11}. Thirteen percent of our cohort had depressive symptoms, which compares favorably with epidemiologic results Conway et al., finding depressed mood in 17% of males⁷.

We did not focus on symptoms of autism spectrum disorder in this study. Others have found increased frequency of autism spectrum disorder in Duchenne muscular dystrophy based on formal diagnoses or scoring thresholds on questionnaires, ranging from 3–32%^{4, 8, 13, 34–36}. A case report noted a boy with Duchenne muscular dystrophy and comorbid obsessive compulsive disorder and autism spectrum disorder. This child had greatly delayed age at speaking (4yo) rigidity and compulsions, which improved with selective serotonin reuptake inhibitor treatment³². Many of our patients exhibited very rigid schedules but rigidity improved significantly with selective serotonin reuptake inhibitor treatment, supporting a diagnosis of obsessive compulsive disorder over autism spectrum disorder. In some of our cases, psychiatric evaluation specifically noted the absence of autism spectrum disorder and/or good social skills. Patient 2 initially had symptoms, including difficult social interactions, narrow interests, and language delay, suggesting autism spectrum but core symptoms of autism spectrum disorder were absent on later psychiatric evaluation. Between the two psychiatry evaluations, the child started selective serotonin reuptake inhibitor treatment. This suggests that autism spectrum disorder may not have been an accurate initial diagnosis and symptoms of rigidity were due to obsessive compulsive disorder. Language delay was cited in the initial diagnosis of autism spectrum disorder in this patient, however delayed language development is common in boys with Duchenne muscular dystrophy³⁷ and may contribute to social difficulties seen when compared to same aged peers. We suspect

that in some males with Duchenne muscular dystrophy, symptoms of obsessive compulsive disorder and a verbal learning disorder (previously associated with Duchenne muscular dystrophy,^{37–39}) might meet diagnostic criteria for autism spectrum disorder, thus elevating the rates of Duchenne muscular dystrophy-associated autism spectrum disorder and underestimating the rates of obsessive compulsive disorder spectrum symptoms. We acknowledge that diagnostic uncertainty may be present, as it can be very difficult to distinguish between obsessive compulsive disorder, autism spectrum disorder, and comorbid obsessive compulsive disorder/ autism spectrum disorder. The purpose of this paper is to highlight the prevalence of obsessive-compulsive-like behaviors and the subsequent need for screening, further psychiatric evaluation, potential treatment, and symptom improvement.

While we also did not focus on attention deficit hyperactivity disorder symptoms in this study, it should be noted that rates of attention deficit hyperactivity disorder are increased in patients with Duchenne muscular dystrophy compared to the general population.^{7, 8} Attention deficit hyperactivity disorder is also a known common comorbidity of obsessive compulsive disorder^{20, 40}. Some of the boys in our cohort who had obsessive compulsive disorder spectrum symptoms also had attention deficit hyperactivity disorder. This may be due to increased rates of attention deficit hyperactivity disorder in Duchenne muscular dystrophy, as well as increased rates of attention deficit hyperactivity disorder in obsessive compulsive disorder. In our cohort attention deficit hyperactivity disorder symptoms were often treated with stimulant medications, which did not change obsessive compulsive disorder symptoms (patient 1).

Studies of the behavioral effect of steroid use in patients with Duchenne muscular dystrophy have shown mixed results. Some studies show no behavior effect of steroids in patients with Duchenne muscular dystrophy^{36, 41, 42}, while others suggest the opposite⁷. Behavior problems associated with steroid intake typically involve increased aggression, anger, and externalizing behaviors. Literature known to authors has not described an impact of steroids on obsessive-compulsive-like behaviors in Duchenne muscular dystrophy. Parents of patient 1 specifically noted no change in obsessive compulsive disorder symptoms after initiation of steroid treatment.

Psychosocial factors may play a role in the symptoms of anxiety observed in our cohort. The retrospective nature of the study limited information on psychosocial factors in our patients. Some patients did report bullying or teasing at school, however in these patients anxiety symptoms were seen in multiple contexts. A number of patients in our study were formally diagnosed with generalized anxiety disorder by psychiatrists, who would account for psychosocial factors prior to diagnoses.

Vulnerable child syndrome may also play a part in symptoms of internalizing behaviors in our cohort. Typically children with this syndrome develop a wide variety of symptoms-physical and behavioral⁴³. In this paper we comment specifically on the obsessive-compulsive-like behaviors in this population and did not focus on other somatic or behavioral symptoms. Because many of our patients with obsessive compulsive disorder spectrum symptoms underwent formal psychiatric evaluation, we suspect that though

vulnerable child syndrome may have a role in these behaviors, the behaviors were largely due to obsessive compulsive disorder.

There are limitations to our observations due to the retrospective nature of the study. We were not able to assign formal Diagnostic and Statistical Manual diagnoses or use standard measurement tools. Additionally, while multiple visits were reviewed, some of the participants did not receive formal mental health evaluations. Our results suggest that future prospective studies of neuropsychiatric disorders in Duchenne muscular dystrophy should include assessment for obsessive compulsive disorder.

Our data affirms that internalizing disorders are prevalent in the Duchenne muscular dystrophy population, warranting clinical attention and screening, as generally early diagnosis and treatment are associated with greater symptom improvement. We particularly highlight the frequency of obsessive compulsive disorder spectrum symptoms with or without symptoms of anxiety that can be disabling for patients and very disruptive for families. Others have noted that some of these symptoms are increased in Duchenne muscular dystrophy compared to the general population and have shown a relationship with specific dystrophin isoforms, suggesting a Duchenne muscular dystrophy neuropsychiatric syndrome. In our cohort, patients often responded well to selective serotonin reuptake inhibitor treatment, improving overall quality of life. Screening for internalizing disorders and recognition of the constellation of obsessive compulsive disorder and anxiety, highlighted here, is integral to appropriate management of patients with Duchenne muscular dystrophy.

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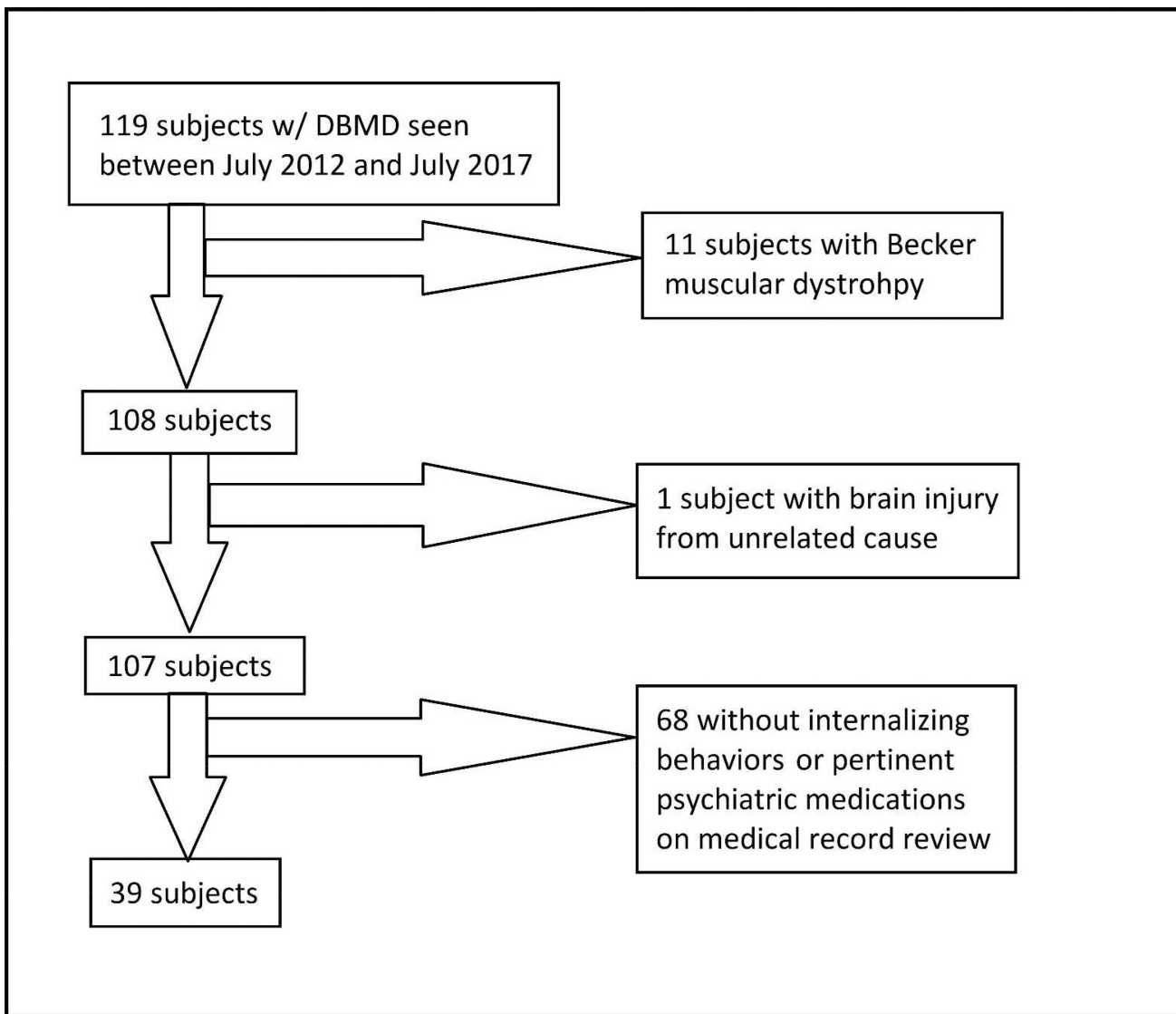


Figure 1. Case identification. DBMD- Duchenne and Becker Muscular Dystrophy.

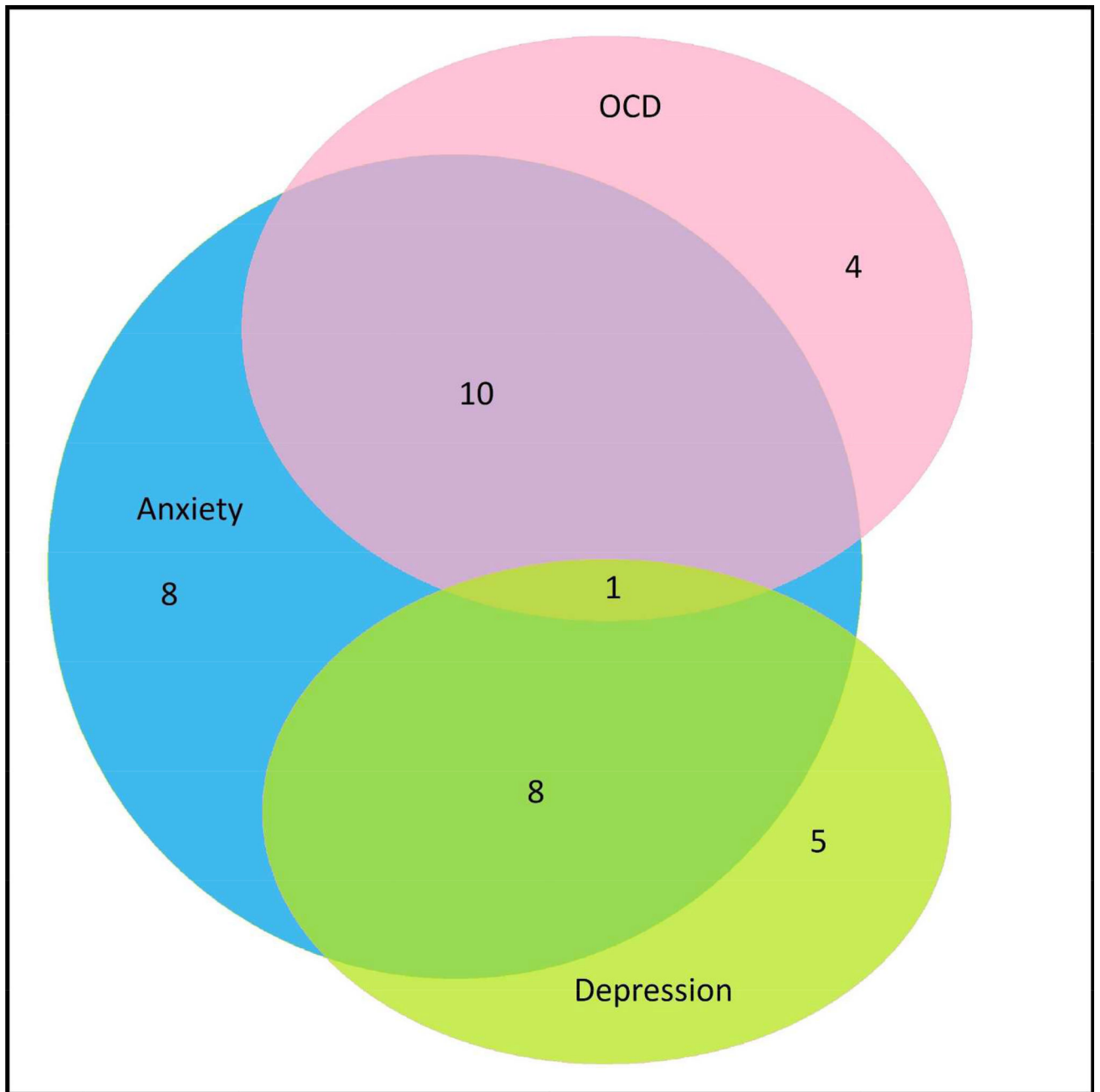


Figure 2. Distribution of internalizing disorders among boys with Duchenne Muscular Dystrophy. Numbers in each area signify the number of boys with Duchenne Muscular Dystrophy who had associated symptoms. OCD- obsessive compulsive disorder.

Table 1 Clinical features, treatment, and outcomes of patients with obsessive compulsive spectrum symptoms.

Pt #	Other internalizing disorders	Current Age (yrs) (deceased)	Age at onset (yrs)	Initial symptoms	Psychiatry evaluation?	Other Therapy	Treatment	Treatment outcome
1	A	23	5	Stuck on various topics, repeating questions, objects must be placed a certain way, overly organized, checking behaviors	Yes		Clonazepam Fluoxetine	Reduced obsessional thinking, decrease in checking behaviors, improved anxiety
2	A	10	5	Difficulty with changes to routine, repeating phrases	Yes		Fluoxetine	Improved anxiety and rigidity
3	A	14	6	Objects must be placed a certain way, Difficulty with changes to routine, specific bedtime routine	Yes	P, T	Paroxetine	Able to leave the house, improved anxiety and rigidity
4	A, D	(23)	15	Difficulty with changes to routine, very organized, anxiety, cries easily	Yes	P	Lorazepam Sertraline	Better mood, improved anxiety and rigidity
5	A	16	15	Anxiety in multiple settings, obsessive behaviors taking ~1hr/day	Yes		Sertraline	Improved obsessive compulsive behaviors, less anxious, more social
6		21	?	Obsessive compulsive behaviors, repeated questions	No		Fluoxetine	Improved obsessive compulsive behaviors
7	A	21	9	Obsessive thoughts, everything must be ordered	No	T	Fluoxetine	Little to no improvement with initial doses
8	A	24	22	Ruminating on certain thoughts	No		Fluoxetine	No f/u yet after initial dose
9	A	(24)	23	Ruminating on certain thoughts	No		Fluoxetine	Died before f/u
10	A	17	14	Objects must be placed a certain way, difficulty with routine changes, anxiety with crowds	Yes	P	Citalopram	Deals better with stress, helped overall behavior
11	A	10	8	Obsessive thoughts, repetitive questions, anxiety	Yes	P	Fluoxetine	Little to no improvement with initial dose, no f/u yet after dose increase
12	A	14	14	Intrusive obsessive thoughts, anxiety	No		Deferred by pt	
13	A	13	13	Cleans and organizes rooms, drawers, etc., anxiety	Yes	P	Escitalopram	Reduced cleaning compulsions
14		18	16	Repeated questions and phrases	No		Fluoxetine	Decreased obsessive thoughts, decreased repetition
15		5	5	Everything must be done a certain way, excessive hand washing, repetitive behaviors	Yes		Sertraline	Decrease in repetitive behaviors

A: anxiety; D: depression; P: psychotherapy; T: therapy dog; f/u: follow-up.