Clinical Characteristics and Psychiatric Comorbidity of Pyromania

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Background: There have been few systematic studies of individuals with pyromania, and this paucity of research has hindered our understanding and treatment of this disorder. This study details the demographic and phenomenological features of individuals with DSM-IV lifetime pyromania.

Method: Twenty-one adult and adolescent subjects (recruited from inpatient and outpatient studies of impulse-control disorders) with lifetime DSM-IV pyromania were administered a semi-structured interview to elicit demographic data and information on the phenomenology, age at onset, and associated features of the disorder. Data were collected from October 2003 to September 2006.

Results: Twenty-one subjects (10 female [47.6%]) with lifetime pyromania (mean ± SD age = 26.1 ± 11.8 years; range, 15–49 years) were studied. The mean ± SD age at onset for pyromania was 18.1 ± 5.8 years. Eighteen subjects (85.7%) reported urges to set fires. Subjects reported a mean ± SD frequency of setting 1 fire every 5.9 ± 3.8 weeks. Much of the fire setting did not meet the legal definition of arson. Thirteen (61.9%) had a current comorbid Axis I mood disorder, and 10 (47.6%) met criteria for a current impulse-control disorder.

Conclusion: Pyromania appears to be associated with high rates of psychiatric comorbidity. Research is needed to optimize patient care for individuals with this disorder.

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Pyromania is characterized in DSM-IV by the following diagnostic criteria: (A) deliberate and purposeful fire setting on more than 1 occasion; (B) tension or affective arousal before the act; (C) fascination with, interest in, curiosity about, or attraction to fire and its situational contexts; (D) pleasure, gratification, or relief when setting fires or when witnessing or participating in their aftermath; and (E) the fire setting is not done for monetary gain or criminal purposes, out of anger, or (F) due to other psychiatric or mental conditions.[1] Although fire setting has been examined in the medical literature for the last 200 years,[2–4] there has been only limited research concerning the unique clinical characteristics of pyromania.

Pyromania is considered by some to be a rare disorder.[1,5] In one study suggesting the rare nature of pyromania, the authors found that only 3 (3.3%) of 90 arson recidivists had pure pyromania and that an additional 9 subjects met DSM-IV-TR criteria for pyromania only when intoxicated at the time of the fire setting.[5] Several studies of clinical, noncriminal samples, however, have found that pyromania may not be uncommon. One study of 107 patients with depression found that 3 (2.8%) met current DSM-IV criteria for pyromania.[6] A recent study of 204 psychiatric inpatients revealed that 3.4% (N = 7) endorsed current symptoms and 5.9% (N = 12) had lifetime symptoms meeting DSM-IV criteria for pyromania.[7] Small studies of individuals with compulsive buying (N = 20) and kleptomania (N = 20) have also found rates of 10% (N = 2) and 15% (N = 3), respectively, for lifetime pyromania.[8,9] Although adolescent fire setting may be a symptom of various psychiatric disorders, a recent study of 102 adolescent psychiatric inpatients found that after excluding those patients who set fires due to conduct disorder, substance use disorders, bipolar disorder, psychotic disorders, or developmental disorders, 7 (6.9%) met criteria for current pyromania.[10]

Research involving pyromania has largely focused on criminal populations of convicted arsonists[11,12] with little attention given to clinical samples of individuals who meet DSM-IV criteria for pyromania. Although state statutes may differ on the explicit language, arson is generally defined as a crime of maliciously, voluntarily, and willfully setting fire to a building or other property of another person or burning one's own property for an improper purpose (e.g., insurance fraud). *Arson*, therefore, is defined

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by an intent (i.e., an improper purpose) different from that seen in pyromania (i.e., reduction of tension or affective arousal). A person meeting DSM-IV criteria for pyromania may also meet the legal definition of arson, but the DSM-IV criteria for pyromania do not require that a person ever set fire to another person's property. Because there have been no systematic studies of a series of rigorously diagnosed individuals with pyromania, the present study's purpose was to construct a detailed demographic and phenomenological picture of individuals meeting DSM-IV lifetime criteria for pyromania. An understanding of the characteristics of individuals with pyromania may have clinical importance.

METHOD

Subjects were recruited from an adult inpatient study of impulse-control disorders (N = 12),[7] an adolescent inpatient study of impulse-control disorders (N = 7),[10] and an ongoing outpatient study concerning the longitudinal course of impulse-control disorders (N = 2).[13] Subjects in all studies were screened for impulse-control disorders using the Minnesota Impulse Disorders Interview (MIDI), a screening instrument that has demonstrated excellent classification accuracy in both adults and adolescents with impulse-control disorders.[7,10] Those screening positive for DSM-IV pyromania were evaluated with a structured diagnostic module for pyromania to confirm the screening results.[7] All subjects with a DSM-IV lifetime diagnosis of pyromania were included in this sample. A diagnosis of pyromania was not given if the subject met criteria for conduct disorder, bipolar disorder, psychotic disorders, or developmental disorders or if the fire setting was performed while under the influence of alcohol and drugs. The institutional review boards of Butler Hospital and the University of Minnesota approved the studies and consent statements. After complete description of the studies to the subjects, written informed consent was obtained. In the case of adolescents, subjects' assent was obtained after their parents provided written informed consent.

Subjects were individually and privately interviewed regarding fire setting behavior and clinical features of pyromania (e.g., triggers to fire setting, legal problems, family history, social history) using a semistructured interview. Admission diagnoses were taken from inpatient charts and verified by clinical interview. For the subjects in the outpatient study, comorbidity was assessed using the Structured Clinical Interview for DSM-IV (SCID).[14] Co-occurring impulse-control disorders for all subjects were assessed with proposed diagnostic criteria for compulsive buying[8] and compulsive sexual behavior[15] and SCID-compatible modules for pathological gambling, kleptomania, trichotillomania, and intermittent explosive disorder.[7,16,17] Clinical interview assessed each subject for antisocial and borderline personality disorders. In the case of adolescent subjects, parents or legal guardians underwent a thorough assessment that included developmental history and prior psychiatric hospitalizations of the subject. Data were collected from October 2003 to September 2006.

All subjects sought treatment voluntarily. Only 2 subjects, however, sought treatment for pyromania. The other subjects reported seeking treatment for a comorbid disorder, most commonly depression or a substance use disorder. Only 2 subjects had ever disclosed their difficulties with fire setting, although in the case of the 7 adolescents, parents of 3 of the adolescents reported their child as preoccupied with fire.

RESULTS

Demographic Characteristics

Twenty-one consecutive subjects (10 female [47.6%]) with lifetime DSM-IV pyromania were studied. The sample included 7 adolescents and 14 adults. Sixteen (76.2%; 8 female [50.0%]) met DSM-IV criteria for current (past 12 months) pyromania. Of those 16 subjects with current pyromania, 9 were adults and 7 were adolescents. At the time of presentation, the age of the 21 subjects ranged from 15 to 49 years (mean ± SD = 26.1 ± 11.8). The sample included 18 white (85.7%), 1 African American (4.8%), 1 Latina (4.8%), and 1 Native American (4.8%) subjects.

Of the 14 adults with lifetime pyromania, 8 (57.1%) were high school graduates, 3 (21.4%) had some college education, and 3 (21.4%) had college degrees. Of the 14 adults, 9 (64.3%) were single, 4 (28.6%) were married, and 1 (7.1%) was divorced. Ten of the 14 adults (71.4%) were employed (2 worked as firefighters). All 7 of the adolescents were still attending high school and were single.

Five (23.8%) of the 21 subjects alleged histories of being sexually abused, and 7 (33.3%) reported histories of physical abuse. Three of the 5 subjects with sexual abuse histories and 3 of the 7 with physical abuse histories reported that the sexual or physical abuse preceded the onset of fire setting.

There was a significant gender difference between adolescents and adults with pyromania. Of the 14 adults, only 3 (21.4%) were female, whereas all 7 (100.0%) of the adolescents were female ($\chi^2 = 11.55$, df = 1, $p < .001$). There were no other significant demographic differences between adolescents and adults with pyromania.

Clinical Characteristics

The reported mean ± SD age at onset of pyromania was 18.1 ± 5.8 (range, 12–33) years. The mean ± SD duration of pyromania for all subjects was 5.6 ± 4.5 (range, 1–17) years. The 5 subjects who currently did not meet

Table 1. Triggers to Setting Fires in 21 Individuals With Pyromania[a]

Trigger	N	%
Stress	14	66.7
Boredom	13	61.9
Feelings of inadequacy	8	38.1
Interpersonal conflict	7	33.3
Feeling down or sad	6	28.6
None	6	28.6
Having seen fires on television	5	23.8
Having a desire to feel important or powerful	4	19.0

[a]Subjects may have reported multiple triggers to their behavior.

DSM-IV criteria for pyromania reported a mean ± SD of 8.2 ± 0.8 years' duration of pyromania symptoms (range, 7–9 years). Of those who no longer met criteria for pyromania, all 5 reported that the fire setting appeared to stop when they began some other impulsive or compulsive behavior: 2 reported onset of compulsive buying, 1 began abusing alcohol, 1 started gambling, and 1 began abusing narcotics.

Subjects reported setting 1 fire a mean ± SD of every 5.9 ± 3.8 weeks (range, every 2–16 weeks). Much of the fire setting did not meet the legal definition of arson. The majority of subjects (N = 12; 57.1%) reported that they set what they considered "controlled" fires in dumpsters, their bathrooms, backyards, or vacant lots. Nine (42.9%) reported primarily setting fire to empty buildings (e.g., sheds, garages, doghouses, barns) or empty fields. Fourteen (66.7%) described planning the fires, buying utensils to set the fires, and planning what items would burn well and would burn most intensely. Seven (33.3%) reported that they generally set fires without planning. Twelve (57.1%) reported watching fires, even fires they did not set, and 8 subjects (38.1%) reported traveling to fires when they heard fire engines. Although all subjects reported a "rush" when watching or setting fires, no subject reported a sexual feeling associated with setting fires. Sixteen subjects (76.2%) reported that the frequency of behavior increased over the course of the illness, with less time between fires, and that the intensity of the fires also increased over time.

Eighteen of the 21 subjects (85.7%) reported urges to set fires. When asked about the degree of control over the urges, subjects reported being able to resist the urge a mean ± SD of 64.5% ± 15.5% (range, 33.3%–90.0%) of the time. Of the 9 subjects who set fires to buildings, all 9 reported being able to resist the urge long enough to check for the safety of people and animals before setting the fires. Triggers to set fires are listed in Table 1.

Although 16 subjects (76.2%) reported pleasure and 5 (23.8%) reported feelings of relief when setting fires, 19 subjects (90.5%) reported feeling severe distress after setting fires. Eight (38.1%) had thought of suicide as a means of controlling their fire setting. Seven (33.3%) reported significant social or occupational impairment when setting fires—being late for school or missing social or family events. All 7 reported that the time they spent setting fires was too much—some spending up to 7 hours planning, setting, and watching the fires to the exclusion of other responsibilities. Only 2 (9.5%) had been arrested for setting fires, and 1 of the 2 voluntarily turned himself in as a means of stopping his behavior. There were no significant clinical differences between adolescents and adults with pyromania.

Table 2. Psychiatric Comorbidity in 21 Individuals With Lifetime Pyromania

	Current		Lifetime	
Diagnosis	N	%	N	%
Mood disorders				
Major depressive disorder	10	47.6	10	47.6
Bipolar I disorder	1	4.8	1	4.8
Bipolar II disorder	2	9.5	2	9.5
Any affective disorder	13	61.9	13	61.9
Anxiety disorders				
Social phobia	0	0	0	0
Generalized anxiety disorder	2	9.5	2	9.5
Panic disorder	0	0	1	4.8
Posttraumatic stress disorder	1	4.8	3	14.3
Obsessive-compulsive disorder	1	4.8	1	4.8
Any anxiety disorder	4	19.0	7	33.3
Substance use disorders				
Alcohol abuse/dependence	3	14.3	4	19.0
Drug abuse/dependence	4	19.0	4	19.0
Any substance use disorder	7	33.3	7	33.3
Any eating disorder	0	0	0	0
Any somatoform disorder	0	0	0	0
Any psychotic disorder	0	0	0	0
Adjustment disorder	1	4.8	1	4.8
Attention-deficit/hyperactivity disorder	0	0	0	0
Impulse-control disorders				
Pathological gambling	2	9.5	2	9.5
Kleptomania	3	14.3	5	23.8
Trichotillomania	1	4.8	1	4.8
Intermittent explosive disorder	1	4.8	2	9.5
Compulsive buying	4	19.0	4	19.0
Compulsive sexual behavior	1	4.8	2	9.5
Pathologic skin picking	2	9.5	2	9.5
Any impulse-control disorder	10	47.6	14	66.7

Comorbidity

Table 2 summarizes comorbidity results for Axis I disorders. Nineteen subjects (90.5%) reported symptoms consistent with a current Axis I disorder, and 20 (95.2%) reported at least 1 lifetime Axis I disorder. Thirteen subjects (61.9%) had a current comorbid Axis I mood disorder, 10 (47.6%) met criteria for a current impulse-control disorder, and 7 (33.3%) had a current substance use disorder. Seven of the 10 subjects (70.0%) with current major depressive disorder and 7 of the 7 subjects (100.0%) with a current substance use disorder reported that the symptoms of pyromania preceded the other disorders. These subjects felt that the mood symptoms and substance abuse were responses to the distress over setting fires. Of the 5 subjects who no longer met criteria for pyromania, all reported that symptoms of another impulse-control or

substance use disorder had started since they stopped setting fires. No subject met criteria for antisocial personality disorder. Two subjects (9.5%) met criteria for borderline personality disorder. Rates of comorbid disorders did not differ significantly between adolescents and adults with pyromania.

Treatment Response

Of the 21 subjects, 14 had previously received psychiatric treatment, although only 2 had received treatment specifically for pyromania. Of the 14, eight had received psychotherapy (7 for their comorbid conditions) with only 1 reporting a reduction in their pyromania symptoms (the one who responded to cognitive behavioral therapy was the only one who told his therapist about having problems with fire setting). Of the 14, all had received trials of psychotropic medications, but only 2 had medications prescribed specifically for pyromania symptoms. Six of the 14 reported partial or complete remission of pyromania urges or behavior. Psychotropic medications that resulted in partial or complete remission included topiramate, escitalopram (2 subjects), sertraline, fluoxetine, and lithium. In 3 of these subjects, pyromania symptoms recurred when medication was discontinued. Of the 8 subjects who reported that their pyromania symptoms did not respond to psychopharmacology, a variety of medications had been tried: fluoxetine, valproic acid, lithium, sertraline, olanzapine, escitalopram, citalopram, and clonazepam.

DISCUSSION

To our knowledge, this is the first study to examine the clinical characteristics and psychiatric comorbidity in a sample of individuals with pyromania. The results demonstrate that pyromania is a pathologic behavior that results in significant distress and functional impairment. The disorder most often begins in late adolescence or early adulthood, and for most people with pyromania, it appears to be chronic if left untreated. For those subjects who no longer met criteria for pyromania, they appear to have instead switched to some other addictive or impulsive behavior. This switching of impulsive behaviors, as well as the high rates of co-occurring impulsive and addictive disorders in pyromania, raises the question of whether a similar neuropathology underlies multiple behaviors that are largely characterized by reward-seeking.

Pyromania is currently classified in DSM-IV-TR as an "impulse-control disorder not elsewhere classified" along with pathological gambling, kleptomania, intermittent explosive disorder, and trichotillomania.[1] Although some controversy exists regarding the most precise categorization of these disorders, this study supports a phenomenological link between pyromania and other impulse-control disorders, particularly kleptomania and pathological gambling. For example, a majority of pyromania subjects reported an urge or craving state prior to setting fires, as do individuals with kleptomania and pathological gambling prior to shoplifting or gambling.[18,19] A majority of subjects in this study also reported pleasure from setting fires with intense shame and distress following the acts. These features are similar to what have been described as the core features of impulse-control disorders: (1) repetitive or compulsive engagement in the behavior despite adverse consequences, (2) diminished control over the problematic behavior, (3) an appetitive urge or craving state prior to engagement in the problematic behavior, and (4) a hedonic quality during the performance of the problematic behavior.[20] Additionally, the fire setting in pyromania appeared to decrease anxiety in some subjects as shoplifting or gambling often do, for example, in kleptomania or pathological gambling.[18–21] Finally, the majority of pyromania subjects reported that the time between episodes of fire setting decreased and the intensity of the fires increased over the course of the illness. This element, reminiscent of tolerance in substance use disorders, has also been reported in cases of kleptomania and pathological gambling.[18,21] Although phenomenological similarities exist between pyromania and other impulse-control disorders, ultimately an assessment of pyromania's relationship to established impulse-control disorders needs to consider the respective etiologies. Unfortunately, knowledge of these psychiatric disorders, particularly pyromania, is not yet advanced enough to answer this question.

Interestingly, a slight majority of people with pyromania had not committed acts of arson. Instead, they set fires in their homes or yards in arguably a controlled setting. The DSM-IV does not require that other people's property be set on fire. Instead, DSM-IV merely requires that there is "deliberate and purposeful fire setting."[1(p669)] Given that much of the literature on pyromania comes from research on arsonists,[2,11,12,22] the question arises as to whether pyromania may be more common than initially thought and whether there may be differing severity levels of pyromania, with only some giving rise to arson. The majority of people in this study who were performing these controlled fires were fascinated by and found great pleasure in setting fires, regardless of what they were burning. They were also aware of the significant amount of time they spent on the behavior.[23] In that respect, pyromania for many individuals appears to share more phenomenological similarities with other impulse-control disorders than with the antisocial behavior seen in arsonists.

One public health concern with these subjects, however, is that the longitudinal course of pyromania remains unknown. Therefore, the possibility that these controlled fires will develop into arson remains a real possibility. In fact, many of the subjects who did commit arson reported that their fire setting behavior had initially been more controlled but that the intensity and frequency of their

behavior had increased over time. In such a small sample, however, a thorough understanding of the course of fire setting is not possible.

The lack of knowledge concerning the longitudinal course of pyromania also makes it difficult to interpret findings of pyromania in adolescents. Destructive fire setting behaviors, including those resulting in arrests for arson, appear particularly common in children and adolescents as compared with adults, and children playing with fire results in hundreds of deaths and hundreds of millions of dollars in damages annually in the United States alone.[24] Given the high rates of abuse histories in these subjects and the elevated rates of mood disorders, pyromania might reflect a mixture of impulsive and planned thrill seeking to alleviate dysphoric states and may not be an independent disorder with a unique neurobiology. These findings emphasize the importance of studying pyromania and its relationships with other psychiatric disorders in youth in order to optimize prevention and treatment strategies.

Comorbidity among individuals with pyromania in this study was high. In fact, the vast majority reported both current and lifetime comorbid disorders, particularly elevated rates of current and lifetime comorbid mood disorders, impulse-control disorders, and substance use disorders. These findings suggest that pyromania may be associated with impaired impulse control over a wide range of activities. These comorbidity data may suggest that more intensive treatment for a wide range of impulsive behaviors is needed for people who set fires. Also, because mood symptoms and some substance abuse seem to have worsened in response to the pyromania and even after stopping fire setting behavior, early treatment targeting pyromania may prevent further psychiatric difficulties.

This study suffers from several limitations. First, this study relied on self-reported fire setting history, and therefore the extent of both fire setting and legal problems may have been underreported. Second, individuals with pyromania who voluntarily admit to the behavior may differ from individuals who do not admit to setting fires or have a more severe form of pathology. The extent to which these results generalize to the larger population of people with pyromania warrants future study. Larger, longitudinal samples of individuals with pyromania are needed. Third, the study sample consisted of adolescents as well as adults. Developmentally, adolescence is a period of increased risk taking,[25–27] and there is some controversy about how frequently impulsively deviant fire setting behavior in adolescence will continue into adulthood.[28] Given that pyromania was only diagnosed in these adolescents if all other behavioral disorders were excluded (i.e., conduct disorder, substance use disorders, mania, developmental disorders, psychotic disorders), our results may reasonably generalize to most individuals with pyromania, although large epidemiologic surveys are needed to confirm this.

Large prevalence studies are needed to elucidate the course of pyromania and its relationship to other psychiatric disorders—is this an obsessive-compulsive disorder, an addictive disorder, a symptom of personality pathology, or merely a form of antisocial behavior? Just as research has provided greater information on the neurobiology and treatment of other impulse-control disorders,[2] neuroimaging, genetics, and clinical trials will be needed to identify the pathophysiology of and treatment for this disorder.

Drug names: citalopram (Celexa and others), clonazepam (Klonopin and others), escitalopram (Lexapro and others), fluoxetine (Prozac and others), lithium (Eskalith, Lithobid, and others), olanzapine (Zyprexa), sertraline (Zoloft and others), topiramate (Topamax and others), valproic acid (Depakene and others).

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