

Panic Disorder in Children and Adolescents

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Panic disorder (PD) in children and adolescents is a disabling and chronic condition, which is accompanied by psychosocial and academic difficulties both during adolescence and into adulthood. In this article, the prevalence, clinical characteristics, risk factors, comorbid states, differential diagnosis, and treatment of PD are reviewed. Although PD was thought to be rare in children and adolescents, the prevalence of PD in community samples ranges between 0.5% and 5.0, and in pediatric psychiatric clinics from 0.2% to 10%. Panic attacks are reported to be equally prevalent in males and females. Clinical studies have shown that the majority of the PD pediatric patients receiving consultation in clinics are older adolescents, Caucasian, female, and middle class. Up to 90% of children and adolescents with PD have other anxiety disorders (generalized anxiety disorder/overanxious disorder, separation anxiety disorder, social phobia or agoraphobia), or mood disorders (major depressive disorder or bipolar disorder). PD patients can be misdiagnosed or having neurologic, cardiovascular, pulmonary, or gastrointestinal illness. Psychoeducation and psychosocial treatments are recommended, and it appears that selective serotonin reuptake inhibitors (SSRIs) are a safe and promising treatment for children and adolescents with PD. The clinical characteristics, long-term course, and treatment of PD in children and adolescents needs to be further assessed by well-designed studies.

Key Words: Panic disorder, anxiety disorders, children, adolescents

INTRODUCTION

According to Diagnostic and Statistical of Mental Disorders- 4th ed. (DSM-IV), a panic attack has been defined as "a discrete period of intense fear

or discomfort that has an abrupt onset, reaches a peak in 10 minutes, and it is accompanied by at least 4 of 13 somatic or cognitive symptoms".¹ The somatic symptoms include, a shortness of breath, an accelerated heart rate, chest pain, choking sensations, dizziness, tingling or numbing sensations, hot/cold flashes, sweating, trembling and nausea,¹ and the cognitive symptoms include, a fear of dying, of going crazy going crazy and of losing control.¹ In DSM-IV panic disorder (PD) is characterized by recurrent uncued panic attacks, which last at least one month, and cause persistent concern about having another panic attack, worry about the implications and consequences of a panic attack, and impaired functioning.¹

The first reports of panic symptoms in children and adolescents appeared in 1984.^{2,3} Nelles and Barlow hypothesized that children may lack the ability to catastrophically misinterpret the somatic symptoms associated with panic (thoughts of losing control, going crazy or dying), and proposed that a child's cognitive reactions are dominated by notions of external causation, and therefore, spontaneous panic attacks are rare or non existent in children.⁴ On the other hand, Mattis & Ollendick's study on children in grades 3, 6 and 9 showed that, regardless of age, children are more likely to make internal attributions concerning external attributions in response to panic imagery.⁵ Emerging evidence indicates that panic attacks and panic disorder (PD) occur in childhood and in adolescence, though it has been reported to be more common in adolescence.⁶⁻¹²

Prevalence

Retrospective studies in adults have shown that

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up to 40% of patients with PD have reported the onset of their disorders before they were 20 years old.¹² The peak prevalence for reporting PD in these studies was found to be between the ages 15 and 19, and 10% to 18% experienced their first panic attack before 10 years of age.^{13,14} Community studies using structured psychiatric interviews found that 2% to 18% of adolescents have experienced at least once a four-symptom panic attack,⁷⁻⁹ and studies using self-report questionnaires have reported much higher prevalence rates, of between 43% and 60%.¹⁵⁻¹⁸ However, it has been argued that self-report questionnaires increase the rate of false positive cases.⁹ Nevertheless, the prevalence of PD in children and adolescents is reported to range between 0.5% and 5.0%,^{7-9,12,18} and in pediatric psychiatric clinics between 0.2% and 10%.^{6,10,11}

Clinical characteristics

Panic attacks are reported to be equally prevalent in males and females,^{7,8,16} but severe panic attacks appear to be more frequent in females.^{8,15,18,19} These attacks occur in children, but these are less prevalent than in adolescents.^{15,19,20} In community samples 20% to 50% of panic attacks are reported to be uncued.^{7,15,18} As for adult studies, female and male adolescents usually experience palpitations, trembling/shaking, nausea, abdominal distress, chills, hot flushes, sweating, and dizziness.^{7,18} King et al. reported that girls had more dizziness/faintness and nausea than boys, and that cognitive symptoms (going crazy, losing control, fear of dying) were reported less frequently than somatic symptoms, but this was without any significant difference in boys and girls.¹⁵ Choking, chest pain, depersonalization and numbness were reported to be less frequent in children and adolescents than in adults with PD.¹⁴ Moreover, panic symptoms were reported to take less than 30 minutes to reach maximum intensity in adults, whereas the majority of adolescents experienced panic symptoms for 30 minutes.¹⁶ The sex or age of adolescents were not found to be significantly related to the duration of panic attacks.¹⁶ Clinical studies show that the majority of PD pediatric patients receiving consultation at clinics are older adolescents, Caucasians, females,

and middle class.^{6,10-12,21,22}

Risk factors

Negative affectivity (NA: an increased sensitivity to negative stimuli resulting in distress and fearfulness), anxiety sensitivity (AS: an increased tendency to respond fearfully to anxiety symptoms), internal attributions in response to negative events, female sex, puberty, the presence of major depressive disorder (MDD) have been shown to be associated with the onset of four DSM-IV symptoms of panic attacks.^{1,5,8,23} Family conflict and stress have been shown to be predictive of panic attacks in some adolescents,^{15,18} and female sex, MDD, high AS, and a family history of MDD and PD have also been associated with a higher prevalence of PD.^{6,10,24} Recent studies have not confirmed an association between childhood separation anxiety disorder and the development of PD during adolescence or adulthood.^{7,8,25,26} It has been reported that during 4 year of follow up 7 (%3.2) of 222 youths with life time histories of panic attacks developed PD.⁸

Behavioral inhibition in childhood has been reported to be a risk factor for the later development of anxiety disorders, and this hypothesis is supported by a number of findings, including higher rates of behavioral inhibition in the children of parents with panic disorder and agoraphobia, higher rates of childhood-onset anxiety disorders and their persistence over time in behaviorally inhibited children, and elevated rates of anxiety disorders in the families of behaviorally inhibited children, particularly those with comorbid anxiety disorders.²⁷⁻³⁰ A recent study reported that behavioral inhibition is mainly associated with social anxiety among children whose parents have had panic disorder, with or without depression.³¹ It has also been suggested that behavioral inhibition reflects a familial predisposition to major depression and PD.³² Ill health and respiratory disturbance have also been suggested to contribute to PD in children and adolescents, although they were found to have relatively little importance in the prediction of other anxiety disorders.²⁵ Craske et al. hypothesized that a neurotic temperament, of which emotional reactivity was conceptualized as one measure, could confer

vulnerability to anxiety disorders, and that emotional reactivity might confer a specific vulnerability to PDA in males.²⁵

Comorbidity

Up to 90% of children and adolescents with PD show comorbidity with other anxiety disorders (generalized anxiety disorder/overanxious disorder, separation anxiety disorder, social phobia and agoraphobia) or MDD.^{6,7,10,21,22} Up to 50% of youths with PD have been reported to have other comorbid states, including somatoform disorders, substance use disorders, conduct disorder, oppositional defiant disorder, attention deficit disorder and bipolar disorder.^{6,7,9,11,22,33} PD has also been associated with medical conditions, such as migraine and mitral valve prolapse.³⁴

The risk of suicide was reported to be high in adults with PD, but given the high comorbidity of MDD the significance of this finding is unclear.³⁴ In a non-referred sample, adolescents with a life time history of panic attacks were reported to be more likely to have expressed suicidal ideation and to have made suicidal attempts than those without a lifetime history of panic attacks.³⁵ However, Strauss et al. studied the same, clinically referred sample as used in the above study and reported no difference among nonsuicidal patients, suicidal ideators, and suicide attempters in terms of rates of anxiety disorder, either in terms of general or in specific rates of panic disorder, i.e., single or social phobia, or obsessive compulsive disorder.³⁶ Further investigations in nonreferred patients and longitudinal studies are needed.

Differential diagnosis

Patients with certain medical conditions (e.g., hyperthyroidism, hyperparathyroidism, and pheochromocytoma) may experience panic symptoms that resemble panic attacks, and which may be misdiagnosed as PD.^{34,37,38} On the other hand, given that PD is accompanied by a high incidence of somatic symptoms, patients with PD may be misdiagnosed with neurologic (e.g., syncope, seizures, night terrors, or vestibular dysfunctions), cardiovascular (e.g., arrhythmias, angina, or myo-

cardial infarction), pulmonary (e.g., asthma), or gastrointestinal illnesses (e.g., irritable bowel syndrome).^{34,37} Psychoactive substances (e.g., cocaine, or caffeine), or over-the-counter medications, may induce panic attacks upon acute withdrawal.^{34,38} PD is only diagnosable if panic attacks have occurred before or lasted long enough after substance discontinuance.^{1,34,37} Clinicians need to be aware of these conditions and should show good clinical judgment when these medical illnesses need to be ruled out.

Patients with other psychiatric diagnosis including depressive disorders, bipolar disorders, schizophrenia, or other anxiety disorders (e.g., social phobia, separation anxiety, or post traumatic stress disorder) can and frequently do experience panic attacks.^{1,34,37} A diagnosis of PD is only made if the panic attack is not explained solely by another psychiatric disorder. For example, if a socially anxious child experiences panic attacks only when he or she is exposed to potential embarrassing situations or situations in which they he or she might be evaluated, no diagnosis of PD should be made.^{19,37} A child can experience panic attacks due to exposure to real or historically threatening situations, such as sexual or physical abuse or exposure to violence. Such possibilities should be routinely explored in the clinical interview.

Treatment

Psychoeducation is suggested for any treatment modality in children and adolescents, and has been shown to be effective in depression, bipolar, and schizophrenia.³⁹ Patients and parents should be educated about the clinical characteristics, pathophysiology, course and treatment of PD.

Effective psychosocial treatment models for PD in adults largely based on cognitive and cognitive-behavioral theories. These models suggests that the insidious spiral into panic is due to catastrophic misinterpretations of otherwise normal bodily sensations.^{20,40,41} Persons with high anxiety sensitivity might be most vulnerable to the onset of panic attacks and eventual PD. Treatment according to such models consist of cognitive therapies and behavioral experiments designed to modify the faulty misrepresentations of bodily sen-

sations and their maintaining processes.⁴¹ Panic control treatment, which is based on cognitive-behavioral theory, has been shown to be effective in children with PD, in terms of eliminating panic attacks, reducing avoidance behavior, increasing self-efficacy for coping with previously avoided situations, and decreasing accompanying negative mood states.^{42,43}

No randomized controlled trial has been conducted on the treatment of childhood PD. Case reports suggest that tricyclic antidepressants (imipramine or desipramine) are effective for controlling panic disorder in children and adolescents.^{44,45} It has also been reported that three children with panic disorder and agoraphobia responded to either imipramine alone (n=1) or imipramine in combination with alprazolam (n=2),⁴⁶ and Biederman reported that three prepubertal children with panic-like symptoms responded to clonazepam.⁴⁷ In an open trial, four adolescents (aged 16 to 19 years), with panic disorder, reported a decrease in the frequency of attacks and reduced anxiety when treated with clonazepam, at 1.0 to 2.0 mg/day.⁴⁸ In a preliminary study of 12 adolescent patients, 80% of those treated with clonazepam were found to be moderately to markedly improved on the Clinical Global Impression Scale,⁴⁹ whereas only 20% of the placebo group experienced a similar change.⁵⁰ Both the frequency of panic attacks and the severity of anxiety symptoms decreased with clonazepam treatment, and the side effects were reported to be minimal, although irritability and restlessness caused one subject to withdraw from the study.⁵⁰ In children and adolescents (9-18 years old), anecdotal case reports have shown that selective serotonin reuptake inhibitors (SSRIs) are effective for treating PD.^{51,52} On the basis of adult literature, clinical experience, the results of several open studies, and the fact that SSRIs have been found effective for treating children and adolescents with other anxiety and major depressive disorders, it appears that SSRIs are a safe and promising treatment for children and adolescents with PD.⁵³⁻⁵⁵ These medications should be initiated at low doses to diminish the risk of side effects, especially in patients who are already highly sensitive to somatic symptoms, and whose parents usually also have anxiety disorder, and therefore,

may be overly sensitive about side effects.⁵² To date, no controlled clinical trial has examined the joint efficacy of psychosocial and pharmacological treatments, but case studies involving combined treatments have reported better outcomes.⁴¹

CONCLUSIONS

Panic disorder is a disabling condition that is accompanied by psychosocial, family, peer and academic difficulties,^{6,20,56} and early diagnosis is considered to be very helpful.^{20,56} Health care practitioners, other than psychiatrists, should also be aware of panic disorder due to frequent comorbidities and several medical conditions that resemble panic disorder.

Within the last decade the number of studies of children with panic attacks or panic disorder have increased, however in contrast with the adult literature few investigations have been conducted on childhood onset PD and most of these have methodological limitations. In addition, no longitudinal study of PD has been performed in children and adolescents. Preliminary evidence shows a decrease in the age of onset of PD in successive generations,⁵⁷ which indicates the need to assess the clinical characteristics (factor analysis in large samples is especially needed), long-term course, and the treatment of PD in children and adolescents using well-designed studies. More knowledge of the risk factors of PD in children and adolescents would allow us to select children for preventive and early intervention strategies. The short-term and long-term efficacies of medications in children and adolescents with PD should be determined by placebo-controlled double-blind trials.

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