

# EPIDEMIOLOGY OF ANXIETY DISORDERS IN CHILDREN: A REVIEW

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## INTRODUCTION

Epidemiology is a science dealing with the distribution and determinants of health states in a population (Gould, Wunsch-Hitzig, & Dohrenwend, 1981; MacMahon & Pugh, 1970). On the one hand it is a descriptive science, in that it seeks to record the occurrence of diseases and disorders. On the other hand it is a predictive science, concerning itself with the determinants of and risk factors for disorders, as well as the control, management, and prevention of disease states. Epidemiologic data also provide the information necessary for the planning and evaluation of service and treatment programs by obtaining estimates of the prevalence and incidence of disorders.

Incidence is a measure of the new occurrence of a disorder while prevalence is a measure of the number of individuals who have a particular disorder. Prevalence therefore is a function of incidence and duration. Estimates of prevalence are useful for those concerned with the extent to which a disorder is present in the population at a given time, but incidence data are more valuable for identifying causal factors.

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### ISSUES OF SAMPLING BIAS

True estimates of the prevalence of a disorder can only be obtained by measuring the extent to which the disorder is present in the total population at risk for the disorder. Sampling from the population at risk is important, since many investigators attempt to measure prevalence from treated populations alone. Measures based on treated cases are biased for several reasons. For a variety of disorders the majority of individuals affected never seek treatment. Those who do seek treatment are often of higher socioeconomic status or may represent the most severe or disabled cases. For cases involving child psychiatric disorders, the initiation of a treatment referral is almost never the child. Therefore, biases in treated child samples often involve the degree to which the child's behavior is an irritant to those around him or her. Children who act out in school are far more likely to be referred by a teacher for treatment or evaluation than are children who are quiet or withdrawn.

Not only is the prevalence estimate of a disorder likely to be biased and inaccurate if based on treated cases, but the investigator's perspective of the expression of a disorder may also be affected. For example, most observations about the differing ages of onset for various anxiety disorders are drawn from clinical samples. These observations may be expressions of when parents become alarmed enough to seek treatment for children rather than when the disorder first appeared. Frequent observations of researchers of childhood depression provide another example. Reports indicate that for childhood depression the diagnosis is more prevalent in boys than girls; acting-out behavior is found in about half the sample; for children under the age of 8, about 75% also manifest separation anxiety as a concomitant symptom of the depressive disorder. These observations have been based on clinically referred cases of childhood depression, but they have not yet been substantiated by epidemiologic investigation. In fact, it is highly likely that selection biases are determining treatment referral. Boys may be more likely to act out when emotionally distressed than girls. This acting out behavior precipitates a rereferral, which then increases the likelihood that the underlying depression is detected. Similarly, symptoms of separation anxiety are likely to be an irritant to parents, who are then more likely to seek treatment for their child. Children (and adults) with two disorders are more likely to become a treated case than are those with

one disorder (Berkson, 1946). All of these factors may lead to biased views on the expression of a disorder in the population when these views are based on an examination of treated cases alone.

## PROBLEMS OF CASE DEFINITION

Given that the study of treated populations alone result in biased estimates of the prevalence of psychiatric disorders as well as distorted views of their expression, epidemiologic data must be derived from both treated and untreated samples of the population. Estimating the population prevalence of a disorder also necessitates a clear delineation of the criteria used to define a case. In adult psychiatry early epidemiologic studies concentrated on measures of overall emotional distress (Langner, 1962; Leighton, Harding, & Macklin, 1963; Srole, Langner, & Michael, 1962). This practice avoided the problem of unreliability of psychiatric diagnoses and case definition while reflecting the unitary concept of mental health at the time (Weissman & Klerman, 1978). Subsequently, advances in the field of adult psychopathology began to emerge. These achievements included improved concepts, definitions, and criteria for adult psychiatric disorders such as the Feighner Criteria (Feighner *et al.*, 1972), the Research Diagnostic Criteria (RDC) (Spitzer, Endicott, & Robins, 1978), and more recently the DSM-III criteria (American Psychiatric Association, 1980). Improvements were also made in the techniques used for symptomatic, behavioral, and diagnostic assessments. These structured and semistructured assessment tools include the Present State Exam (PSE) (Wing, Cooper, & Sartorius, 1974), the Schedule for Affective Disorders and Schizophrenia (SADS) (Spitzer & Endicott, 1978), and the Diagnostic Interview Schedule (DIS) (Robins, Helzer, Croughan, & Ratcliff, 1981). Such advances in case definition and assessment have accelerated research in adult psychiatric epidemiology by reducing the problems of criteria and information variance in assessment and improving the reliability of psychiatric diagnosis (Endicott & Spitzer, 1978).

In child psychiatry, case definition has been particularly problematic because of the lack of consensus on the classification of childhood psychiatric disorders, as well as the unavailability of reliable instrumentation to assess these disorders. However, the advent of the DSM-III criteria and recent development in assessment techniques for

use with children are beginning to provide the tools necessary for obtaining epidemiologic data (Orvaschel, Sholomskas, & Weissman, 1980a, 1980b). To date, knowledge about the rates and distribution of specific child psychiatric disorders based on probability samples of children in the general population is extremely limited. This chapter provides an overview of the epidemiology of anxiety disorders in children. We review the available literature on these disorders and discuss the methodologic differences that make comparability across studies difficult.

### ESTIMATES OF PREVALENCE

DSM-III (American Psychiatric Association, 1980) refers to anxiety disorders as a group of disorders in which anxiety is the most prominent disturbance. For children, the disorders included in this category are separation anxiety, avoidant disorder, overanxious disorder, phobic disorder, panic disorder, and obsessive-compulsive disorder. Each of these diagnostic categories is defined with a specific set of criteria and, for many, a specification of impaired functioning. The availability of these prespecified criteria now provide an essential element for the implementation of studies of community children. Such epidemiologic research would provide estimates of the population prevalence of specific anxiety disorders in children. However, because of the recency of the DSM-III, no such population studies have as yet been undertaken. Our knowledge of the prevalence of anxiety disorders in children therefore is based on studies that preceded DSM-III.

Studies that provide data on the epidemiology of childhood anxiety disorders vary in almost all aspects of methodology and design. These variations include the assessment measures used, the source of information about the child, the sampling frame, the age of children studied, and the definition and criteria of caseness. The studies do, however, provide an overview of the nature of the problem in the population at risk and demonstrate the importance of classification issues in epidemiologic research. For example, the now-classic epidemiologic study by Lapouse and Monk (1958) examined the frequency and intensity of a wide range of child behaviors and characteristics. They randomly selected 482 households in which children between the ages of 6-12 years were living. Children were

selected by the Kish grid method, and mothers were used as the informants. The child sample consisted of 49% boys and 51% girls, with 50% aged 6-8 years and 50% aged 9-12 years. Interviews of approximately 1½ hours in length covered areas of interpersonal, social, and intellectual behaviors, as well as general adjustment and functioning and questions on fears, worries, and a variety of additional symptoms. Behaviors were rated for their presence or absence, frequency, and intensity.

Lapouse and Monk (1958) reported that the children in their study had a 43% prevalence rate of "many fears and worries" (defined as seven or more fears and worries). Fifty percent of the girls had seven or more fears and worries compared with 36% of the boys and 48% of the 6- to 8-year-olds had "many fears and worries" compared to 37% of the 9- to 12-year-olds. Black children had more fears and worries (63%) than white children (44%), and low socioeconomic children had more fears and worries (50%) than higher socioeconomic children (36%). Forty-one percent of the children had a fear of "anyone in the family getting sick, having an accident or dying" (Lapouse & Monk, 1959, p. 808), which may be viewed as an item related to separation anxiety.

Test-retest reliability of mothers' ratings ranged from 52% to 98% and was best for behaviors that were concrete, observable, and high in nuisance value. An additional clinical sample of 193 children were interviewed directly, and their responses were compared with those of their mothers. Agreement between mothers and children varied according to the items involved, averaging about 54% for fears and worries. However, the instance of fears and worries for which the mother said "yes" and the child said "no" was 5%, while the instance for which the child said "yes" and the mother said "no" was 40%. Lapouse and Monk (1958) suggested that "... mothers underestimate these concerns in their children and that very likely the mother is a poor source of information regarding this area of the child's experience" (p. 1143).

Lapouse and Monk (1959) also attempted to evaluate the relationship between the children's symptoms and other characteristics of their adjustment. They did not find the presence of fears and worries in children to be related to other forms of pathological behavior and stated that they "... do not know if the fears and worries are indicative of maladjustment, personality deviation or emotional disturbance or if they are a concomitant of the wide range of developmental phenomena in essentially normal children" (Lapouse & Monk, 1959, p. 817).

Based on the Lapouse and Monk study (1958, 1959), it would appear that "fears and worries" are common in children and are not necessarily prognostic or indicative of psychopathology. The prevalence rates decreased as the child got older, and the symptoms were not correlated with alternative indicators of psychopathology.

Additional information of the prevalence of fears or phobias and their relationship to age was provided by Agras, Sylvester, and Oliveau (1969). They conducted a two-stage epidemiologic study of fears and phobias in a random sample of 325 adults and children. They interviewed directly respondents aged 14 and over and obtained information from mothers for respondents under the age of 14. Unfortunately, data were not presented separately for the children in the sample, but estimates of prevalence, course, and treatment of common fears provided interesting insights into the development and expression of phobias across the life span. Information was obtained by an interview that listed 40 common fears and ascertained their presence, absence, intensity, duration, treatment, and any resultant avoidant behavior. A separate questionnaire including 21 items was used for children under the age of 14. A psychiatrist examined the information obtained on the questionnaire and identified those respondents believed to be phobic or possibly phobic. Another psychiatrist then conducted blind interviews with a selected number of respondents identified in cases, as well as with a number of controls.

Agras *et al.* (1969) noted three categories of fears with differing pattern of onset and chronicity. One category included fears of doctors, injections, darkness, and strangers. This category generally began in childhood, showed a sharply declining prevalence, and was often of limited duration. The second category of phobias included fears of animals, heights, storms, enclosed places, and social situations. The onset for these fears ranged from childhood to early adulthood, with a slowly declining prevalence indicative of a persistent course. The third category of fears included crowds, death, injury and illness, and separation. These fears tended to onset in adulthood, with the greatest prevalence in middle age.

The prevalence for all phobias was 7.7%. Phobias were reported to be mildly disabling in 74.7% of cases and severely disabling in 0.2% of cases. Less than 0.1% of respondents were in treatment for a phobia at the time of the interview, and only 5.7% had ever been in treatment for a phobia. The authors reported that psychiatrists were likely to see only a small proportion of individuals with a phobia, and then generally those with the most severe disabilities. Phobias were viewed

as running a long-term, mildly disabling course, with a high incidence in childhood and a decline in adolescence and early adulthood, except for fears of crowds, death, injury, and illness.

A somewhat different relationship between anxiety and age was reported by Werry and Quay (1971). They studied 1753 children in kindergarten through second grade, in order to obtain prevalence data on 52 behavior problems found to be common in child guidance clinic populations. They obtained teacher ratings on a behavior problem checklist for 926 boys and 827 girls aged 5-8 years. The overall prevalence for anxiety/fearfulness was reported to be 16% for boys and 17% for girls; for tension, 23.1% for boys and 12.3% for girls; for nervousness, 21.9% for boys and 15.5% for girls. Werry and Quay found that anxiety symptoms showed a steady decline from the ages of 5 to 7 years, with an increase in frequency at the age of 8 years for boys. It is unclear, however, whether the sudden increase in symptomatology at age 8 for boys represents a true increase in the prevalence of anxiety or whether this increase is a reflection of higher rates of other behavioral disturbance, which are reported by teachers in a kind of reverse halo effect.

While the previous three studies reported on the prevalence of fears and worries and their expression across the age span, the following two studies investigated several areas of behavioral disturbance in a preschool age group and provide data suggesting a relationship between fears and worries and overall psychopathology.

Richman, Stevenson, and Graham (1975) examined the prevalence of behavior problems in 3-year-olds in a random sample of 705 children. Trained interviewers conducted a semistructured interview with mothers on their child's health, development, and behaviors such as eating, sleeping, peer relations, activity, concentration, worries and fears, and the like. They found that approximately 7% of the total population of 3-year-olds had a moderate to severe behavior problem, 15% had mild behavior problems, and boys tended to show slightly higher rates of overall problems than girls. In reporting the prevalence of several fears and worries, however, they found 2.5% of the boys and 2.6% of the girls were identified as worriers (2.6% total prevalence). The prevalence of fears in the sample was 8.0% for boys and 17.2% for girls (12.8% total prevalence).

Richman *et al.* (1975) also examined the relationship between fears and worries and children's overall scores of behavior pathology.

They found that in their problem behavior group, the prevalence of worries was 3.5% for boys and 9.5% for girls (7.1% total), and the prevalence of fears was 14.0% for boys and 85.7% for girls (44.4% total). In a subsequent study Stevenson and Richman (1978) reinterviewed part of the original sample and included a new group of language delayed (LD) children. The LD children had a higher rate of fears (20.8%) than the general population, although the rate was still lower than that of the behavior problem group. The prevalence of worries in the LD group was zero, since parents were unable to get verbalizations from their language-impaired children on these concerns.

Using assessment procedures similar to the Richman *et al.* (1975) study, Earls (1980) examined the prevalence of behavior problems in 100 3-year-old children in the United States. He, too, found approximately 7% of the children to have moderate to severe behavior problems. He reports the prevalence of several worries and fear to be 7.5% for boys and 8.6% for girls (8.0% total) for worries, and 3.7% for boys and 25.5% for girls (14.0% total) for fears. Earls also reports a higher frequency of worries in the problem behavior group than in the total sample of 3-year-olds. As a final note, however, Richman *et al.* (1975) caution against equating the findings of problem behaviors with the presence of a mental disorder in a child.

Additional information on the prevalence of anxiety symptoms in children is provided by Kastrup (1976) and Abe and Masui (1981). Kastrup reported on a cross-sectional survey of preschool children from two Danish municipalities. Using parents (mostly mothers) as informants, he obtained information on family and social background, pre- and perinatal development, disease, abilities, and behavioral and emotional symptoms for 95 boys and 80 girls between the ages of 5 and 6 years. Kastrup reported the prevalence of nightmares was 11% for boys and 5% for girls; fears, 3% for boys and 5% for girls; and fear of separation, 12% for boys and 16% for girls. About 15% of the children were reported to have "psychic disorder," which was defined as deviant behavior when the child was compared with his or her age group, and which involved distress and caused concern to parents. No information on the relationship between anxiety symptoms and other behavioral disturbances are reported.

Abe and Masui (1981) reported the results of their pilot study in Japan on sex differences in the prevalence of fears and anxiety symptoms in respondents aged 11-23 years. They administered a



questionnaire to 2500 individuals (1290 boys and 1210 girls) concerning fears of lightning, going out of doors, blushing, being looked at, and talking, as well as anxiety symptoms of frequency of micturition, trembling hands, hypochondriasis, fainting spells, lump in throat, and feelings of impending death. The authors did not find persistent sex differences in anxiety symptoms, with the exception of frequency of micturition, which was more common for boys. All of the fears were found to be more prevalent in girls, with the exception of fear of talking, which was more frequently reported by boys. Fear of blushing and being looked at had their greatest prevalence in middle adolescence, as did most of the anxiety symptoms.

Specific prevalence estimates were not reported by Abe and Masui (1981). However, we extrapolated approximations of prevalence rates from the published figures provided in their paper. The prevalence of fears ranged from 2% for boys and 7% for girls for "going out of doors alone" to 38% for boys and 43% for girls for "being looked at." The frequency of anxiety symptoms ranged from 5% for boys and 4% for girls for "feeling of impending death" to 33% for boys and 31% for girls for hypochondriasis. No information is provided on the prevalence of multiple fears or combination of anxiety symptoms, and no data are reported on levels of functioning or impairment in relation to fears and anxiety.

## COMPARING ACROSS STUDIES

Table 3.1 summarizes the seven studies reviewed and allows a comparison of the reported prevalence rates. Examining the studies in table format makes clear the difficulties encountered in trying to obtain a composite picture of the epidemiology of anxiety in children. Four of the seven studies were done in the United States, one in England, one in Denmark, and one in Japan. The age of the children studied ranged from 3 to 23 years; the Agras *et al.* (1969) study included adults but did not provide data separately for adults and children. Informants varied across studies, and all the investigators used different instruments and methods of assessment.

Compounding the problems already mentioned are the differences across studies in the types of anxiety behaviors studied, the definition of caseness used, and presentation of the data. Some studies tried to determine the relationship between anxiety symptoms and

TABLE 3.1. Studies Reporting Prevalence of Anxiety in Children

Study	Lapouse & Monk (1958)	Agras, Sylvester, & Oliveau (1969)	Werry & Quay (1971)	Richman, Stevenson, & Graham (1975)	Earls (1980)	Kastrup (1976)	Abe & Masui (1981)
Design							
Location	US	US	US	UK	US	Denmark	Japan
Sample source	Community	Community	School	Community	Community	Community	Community
Sample size	482	325	1753	705	100	175	2500
Age of sample	6-12 years	Children and adults	5-8 years	3 years	3 years	5-6 years	11-12 years
Informants	Mother	Subject or mother	Teacher	Mother	Mother	Parent	Subject
Results							
Fears and/or worries	43%	7.7%	16.5%	12.8% (fears) 2.6% (worries)	14.0% (fears) 8.0% (worries)	4.0%	2%-43% (fears) 4%-33% (worries)
Separation concerns	41%					13.7%	
Other anxieties			18.0% (tension) 18.0% (nerves)			8.0% (nightmares)	

alternative measures of psychiatric status while other studies did not. For the studies that did examine this relationship, one found no association and two found an association. Even these disagreements are unclear, since the studies involved included samples of very different ages and used different methods of assessment for both anxiety and other indicators of psychopathology. Interestingly, the studies by Richman *et al.* (1975) and Earls (1980) produced results most comparable to each other. These two studies also shared a common methodology and assessment procedure.

### RELATIONSHIP WITH ADULT PSYCHOPATHOLOGY

According to the results of the studies reviewed thus far, the relationship between anxiety symptoms and overall psychopathology in children is unclear or, at best contradictory. Lapouse and Monk (1958, 1959) did not find a correspondence between childhood fears and alternative indicators of psychopathology. Richman *et al.* (1975) did find childhood anxiety symptoms to be associated with other measures of behavioral disturbances. These discrepant findings leave unresolved the question of whether the disturbances being measured are clinically insignificant symptoms or actual indicators of psychopathology manifested by various anxiety states.

The relationship between childhood anxiety and adult disorder is also unclear, since no prospective data on this relationship are available. Some investigators have reported that about 50% of adult patients with agoraphobia and panic disorder have childhood histories of fearfulness, dependency, separation anxiety, school adjustment difficulties, and phobia (Gittelman-Klein & Klein, 1973). Additional support for this relationship is provided from retrospective studies of age of onset in adult patients. Sheehan, Sheehan, and Minichiello (1981), in a study of 62 adult patients treated for agoraphobia, found that 31% had an onset in their first decade, and 55% had an onset by age 20. Similarly, Buglass, Clarke, Henderson, Kreitman, and Presley (1977) found a wide range of onsets downward to age 10 in a study of 30 agoraphobic housewives aged 35-53 years.

The childhood history of adult anxiety disorders has been studied more systematically to determine if childhood anxiety symptoms are specific to adult anxiety disorders or neurotic disorders, in general. The results are equivocal. Berg, Marks, McGuire, and Lipsedge (1974) used

a questionnaire survey of 786 women who were members of an agoraphobia correspondence club to learn about the frequency of past school phobias. When these women were compared with 58 nonagoraphobic women who were psychiatric outpatients with a neurotic disorder, few differences were found between the groups. A history of school phobia was equally common in both groups (about 22%). The authors concluded that childhood school phobia was related to adult neurotic illness rather than specifically to agoraphobia. However, the diagnostic criteria for neurotic illness in this early study were unclear. It is also unclear how many of these nonagoraphobic women might be suffering from other anxiety or depressive disorders. In a subsequent report, Berg (1976) stated that agoraphobic women with a childhood history of school phobia have an earlier age of onset of agoraphobia, more severe symptoms, and tend to have more school phobic children than agoraphobic women without such a childhood history.

Tyrer and Tyrer (1974) interviewed 60 phobic, 60 anxious, and 120 depressed adult patients as compared with 120 age- and sex-matched orthopedic and dental patients, about problems of childhood school attendance due to refusal or truancy. They found that school refusal, but not truancy, occurred more frequently among psychiatric patients. There was a nonsignificant tendency for childhood school refusal to be higher in phobic patients. These authors concluded, in agreement with Berg, that there is a link between childhood school refusal and adult neurotic illness. Tyrer and Tyrer also stated that while epidemiologic data suggest that most school refusers become normal adults, childhood school refusers are at higher risk for adult neurotic difficulties than nonrefusers and that the risk of school refusal for adult disorder was higher in females than males.

Another study to examine the long-term implications of childhood fears was reported by Abe (1972), who compared the prevalence of a number of fears and anxiety symptoms in adult women with the retrospectively reported prevalence of the same symptoms in childhood. Abe interviewed 243 women about current symptoms and fears and obtained similar information about the presence of these symptoms when the women were children by obtaining reports from their mothers.

While the methodology of this study is somewhat error prone, some interesting findings regarding chronicity are reported. Thirty-six percent of the women had a fear of thunder, animals, or injections

when they were between 6-15 years of age; 35% of these women had the fear as adults (at the time of the interview), compared with a rate of 17% in the adult sample. Seven percent had a fear of crowded places at age 6-15; 6.0% of this group had the fear as an adult compared with 0.8% of the total adult sample. Fourteen percent had the fear of going out alone as a child; 6.0% still had the fear as an adult compared with 2.1% of the adult sample. Anxiety symptoms such as headaches, insomnia over worries, indecision, and hypochondriasis were also much more common in adult women if they had the symptom as a child. The author concluded that childhood nervousness was predictive of anxiety symptoms in adulthood and that phobic adults were likely to have had some phobias in childhood. However, many childhood phobias and anxiety symptoms do disappear with age.

The studies reviewed and the available data suggest a relationship between some childhood and adult anxiety disorders. However, without truly prospective longitudinal data on children with anxiety disorders, no definitive conclusions can be drawn.

## CONCLUSIONS

The review of the literature of anxiety states of childhood provides a confusing epidemiologic picture. No epidemiologic data are available regarding anxiety disorders in children. Therefore we were limited to a review of existing data on symptom prevalence. On the basis of past studies, it would appear that anxiety symptoms of all types are quite prevalent. This is true for children of all ages and for both sexes. Although a determination of risk factors from the available data would be premature and was generally not addressed, there was some suggestive information reported. On the whole, anxiety symptoms are more prevalent in girls than boys, although there is considerable variation as a function of the type of anxiety and the age of the child. Anxiety symptoms show a general decline with age, although some types of phobias have onset in early adult or later adult life. There was also some indication that anxiety symptoms were more prevalent in black children than white children and more prevalent in lower than higher socioeconomic children. Finally, the significance of these childhood anxieties is unclear. The evidence regarding the relationship between anxiety symptoms and other indicators of child psychopathology are contradictory. Even less is known about the long-term

significance of anxiety symptoms of childhood. Future epidemiologic research must address these unanswered questions.

True epidemiologic data on childhood anxiety disorders can provide a more veridical picture of the expression of these disorders, the risk factors associated with their development, their distribution in the child population, their association with other forms of behavioral disturbance and functional impairment, and their implications for the prediction of adult psychiatric status.

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