
Diagnosing Pediatric Depression

Neal D. Ryan

This review examines current instrumentation for making clinical and research diagnoses of depressive disorders in children and adolescents. Reliable assessment of depression in children requires gathering information from both the parent and child, as well as from all other available information. The methodology for obtaining information from the child must be adapted to reword and better obtain information in those domains that are inherently difficult for children, including questions about internal affect state and questions requiring judgment. Because child depression is highly comorbid with other psychiatric disorders, including anxiety, attention-deficit/hyperactivity disorder (ADHD), and conduct disorder (CD), it is imperative that these and other psychiatric disorders be simultaneously assessed. A number of structured and semistructured instruments address this task well. More work is needed to decrease the time burden and cost of reliable assessment of child depression. Biol Psychiatry 2001;49:1050–1054 © 2001 Society of Biological Psychiatry

Key Words: Depression, diagnosis, children, adolescents, review

Introduction

Major depressive disorder (MDD) has a point prevalence of about 2% in school-age children and 4% in adolescents (see review in Fleming and Offord 1990). There is a one-to-one gender ratio before puberty and a female excess after puberty; this increase in depression appears specifically related to puberty rather than age per se (Angold et al 1998). Pediatric MDD is associated with significant impairment in functioning (Puig-Antich et al 1993, 1985a, 1985b). A majority of those with pediatric depression have a recurrent illness (Kovacs et al 1984a, 1984b). Episodes of depression last months or, in a significant minority, more than a year (Ryan et al 1987). Pediatric depression is treatable with both psychotherapeutic approaches and pharmacotherapeutic approaches (reviewed in Birmaher et al 1996a, 1996b).

Perhaps surprisingly, despite expected effects of cognitive and emotional maturation on the clinical syndrome, it appears that the clinical picture of child and adolescent depression is remarkably similar to that of adult depression (Kovacs 1996; Ryan et al 1987). Although the same criteria are used to diagnose pediatric depression as are used to diagnose adult depression, the finding of clinical similarity is not purely tautologic. The criteria symptoms could certainly vary (some might be much more or less frequent in the child), although the individual would continue to fit diagnostic criteria. Similarly, depressive symptoms not included in the diagnostic criteria also display an adultlike pattern. A few symptoms are somewhat less frequent in children than in adolescents or adults, including endogeneity-melancholic subtypes, suicide attempts, and lethality of suicide attempts; however, children show equal frequency of suicidal ideation and equal intent (Ryan et al 1987). Younger children have somewhat higher frequency of comorbid separation anxiety, phobias, somatic complaints, and comorbid behavioral problems (Ryan et al 1987).

This article reviews issues relevant to the clinical diagnosis of depression in children and adolescents. Systematic work on diagnosing pediatric depression has focused on the methodology of making diagnoses as part of research studies of epidemiology, studies of clinical treatment, or studies of longitudinal course.

This work has direct application to making systematic diagnoses in this population for clinical purposes; however, there are separate issues in making diagnoses in purely clinical settings which are, unfortunately, largely unaddressed to date. These include speed and ease of administration, optimizing the boundary between declaring an episode or not, and making extremely easy-to-follow rules for administering scoring of the instrument (e.g., simple decision trees with skip-outs). Little has been done in child and adolescent depression to address these additional important and researchable topics. Therefore, the remainder of this article considers the research work that has been done in making a research diagnosis of MDD, with the understanding that this work is all directly applicable to the task of making a diagnosis in the clinical setting as well.

Diagnosis of internalizing disorder in preschool children present particular problems, and the optimal method-

From the Department of Psychiatry, University of Pittsburgh, Pittsburgh, Pennsylvania.

Address reprint requests to: Neal D. Ryan, M.D., Western Psychiatric Institute and Clinic, 3811 O'Hara Street, Pittsburgh, PA 15213.

Received January 11, 2001; revised March 8, 2001; accepted March 9, 2001.

ology remains unclear. The diagnosis of pediatric depression depends on the parent or child being able to report the internal affect state of the child (depressed mood). This has proved to be a substantial obstacle in diagnosing preschool children because of the limited ability of very young children to identify dysphoric moods and to appropriately label such moods. Some success has been found with asking younger children to point to cartoon figures showing different facial emotions and to identify which of several different cartoon figures "they are most like." One can, of course, use interview methods, largely with the parent, paralleling parental interview input in the diagnosis of school-age children, but that omits data from the child (which has proven crucial in school-age children). One can expect further advances in this area, but as yet the necessary validation of the success of these approaches is slight. Diagnosis of depression in preschool children is not further considered below.

Depression Is Comorbid with Other Specific Disorders

It makes little sense to assess the child for depression without assessing for other psychiatric disorders, including, at the very least, anxiety disorders, ADHD, and CD. Psychiatric diagnoses are not orthogonal, entirely separate constructs but rather a useful way of representing a more complex underlying process. Child psychiatric disorders show high rates of comorbidity, as do adult psychiatric disorders. This comorbidity occurs at a much higher rate than can be accounted for by the base rate of the disorders or even by the nonspecific effect of psychosocial adversity in elevating the rate of most psychiatric disorders. In a recent, large meta-analysis, child and adolescent depression was highly and statistically significantly comorbid with ADHD, CD, and anxiety disorders (Angold et al 1999). This comorbidity does not appear to be a methodologic artifact and may well have treatment implications (Puig-Antich 1982). Although there is insufficient data at present to say whether these comorbid patterns of diagnoses represent developmental sequence, represent shared genetic or environmental risk factors, or represent a separate subtype from the component diagnoses, it is likely that one or more of these factors contribute to each of these significant comorbidities. It could well be argued that this comorbidity arises from limitations in our dichotomous diagnostic schema, but dimensional approaches have other limitations and do not map readily onto the decision of whether to treat the individual; thus dichotomous diagnostic schema will continue to have a central role.

Content Validity versus Criterion Validity

One could optimize criterion validity (i.e., discrimination between those with the disorder and those without) by dropping all questions that do not significantly contribute to this discrimination. Such an approach is not, in general, useful in research studies in which one needs content validity, that is, assessment of the full range of symptoms associated with the disorder. Such broader assessment is also critical if measures of severity are to be extracted from the diagnostic instrument and broader measures are critical to prediction of course. For example, rapid onset, psychosis, psychomotor retardation, psychotic features, a family history of bipolarity, and tricyclic-induced hypomania are the best predictors of which depressed children and adolescents will go on to develop bipolar disorder (Strober and Carlson 1982). The question of which particular depressed children respond to a particular treatment or show a particular finding is at least as important as the question of whether depressed children as a group respond or show the finding.

The Parent and the Child as Informants

When asked about the same domains, children and their parents give significantly different information (Angold et al 1987; Nguyen et al 1994). In general, parents give more reliable or complete descriptions of behaviors, and children give a better description of their internal affect states; however, this rule is only approximate. In research interviews, sometimes one finds the child giving a complete description of behaviors and affect states, but the parent is oblivious or, alternatively, one finds the parent giving detailed descriptions of the child's behavior and affect, with the child denying all symptoms. The latter case presents an interesting problem because there is evidence that depressed mothers may overreport depressive symptoms in their child. Given these divergent results, there is no perfect or best way to combine data from both parent and child. Some studies and instruments have approached this algorithmically with a fixed rule for the combination whereas others (e.g., the Schedule for Affective Disorders and Schizophrenia for School-Age Children; K-SADS) have suggested using the interviewing clinician's best estimate on a symptom-by-symptom basis. Because the information is divergent and both interviews contain information about the child's disorder, most research studies will choose an instrument that obtains data from both parent and child and will commit to an a priori approach to combining them. In addition to parent and child information, borrowing from work in both the adult field and child work (e.g., Leckman et al 1982), the K-SADS has, from the beginning, emphasized that all

sources of information available should be used in making the diagnosis (e.g., information from rating scales and other assessment instruments the child or parent completed, information from others in the household, from teachers, or from medical records, etc.)

Questions That Are Inherently Difficult for Children

Some kinds of questions are inherently difficult for children, including questions about internal affect state, questions that contain time concepts, and questions in which the child or adolescent has to exercise judgment (Perez et al 1998). The structure of the interview can partially offset these problems. For example, in the K-SADS interview, the parent is questioned first, and the time course is elucidated during the parent interview. Then the interviewer can use that information to better structure time questions for the child (e.g., “since Christmas” rather than “for the last 4 months”). A series of simple questions asked sequentially with pauses between for the child to answer is more satisfactory than a compound question. For example, the child can be asked if she is sad, then separately asked if she is “blue,” and then asked if she is “depressed.”

Is There a “Best” Instrument?

There are a number of well-known validated instruments used to diagnose pediatric depression and other child psychiatric disorders including the Child and Adolescent Psychiatric Assessment (CAPA; Angold and Costello 2000), K-SADS-PL (Present and Lifetime Version; Kaufman et al 1997) and other versions of the K-SADS (Ambrosini 2000), Diagnostic Interview Schedule for Children (DISC; Fisher et al 1993; Schwab-Stone et al 1996; Shaffer et al 1996; Shaffer et al 2000; Shaffer et al 1993), Children’s Interview for Psychiatric Symptoms (ChIPS; Fristad et al 1998a, 1998b; Teare et al 1998a, 1998b), Diagnostic Interview for Children and Adolescents (DICA; Reich 2000a, 2000b), and others. Some, for example, the DISC, provide the exact questions to ask. Such “fully structured” or “respondent-based” instruments are frequently used in epidemiologic studies because lay interviewers may be quickly trained to reliably administer them. Other “semistructured” or “interviewer based” instruments, e.g., the CAPA and K-SADS, provide suggested questions but leave considerable choice of exactly what questions to ask, how much to follow up on individual answers, and other interview details to the expertise of the interviewer. Such interviews are considerably more expensive to administer because they require clinically

trained personnel and considerably more training time on the instrument.

The more structured instruments are amenable to administration by electronic means, including computer, and this approach has been developed for the DISC and DICA (Reich et al 1995) (although it is not yet clear whether these computerized instruments are as reliable for the diagnosis of depression, which is relatively more challenging than is the diagnosis of externalizing disorders). Some instruments provide complete computer algorithms for diagnostic scoring as SAS programs or in other computer program formats.

Because the K-SADS interview was not copyrighted and because the original author, Puig-Antich, encouraged others to adopt it as needed to particular studies, there are a number of different versions of the K-SADS by different authors adapted to different specific populations or research issues (for a detailed review see Ambrosini 2000). For example, the Wash-U-KSADS (Geller et al 1998), which has a considerably expanded section on bipolar symptoms, is probably the most widely used instrument to assess bipolar disorder in research studies.

Although there are some meaningful psychometric differences between these widely used instruments (e.g., some versions of the DISC do not achieve as high interrater reliability on the diagnosis of major depression as do other instruments), ultimately the question of which of a range of perfectly reasonable assessment instruments to use for a particular research study usually involves the issues of 1) cost and speed of administration, 2) the fit of a particular instrument to particular demands of a particular study (e.g., availability of computer scoring program), and 3) using an instrument that has been used in prior studies to allow comparability between studies. In practice, incumbent, widely used instruments have a large advantage over new instruments because of the issue of comparability to prior studies and familiarity of the field with a particular instrument.

Discussion

For research studies with high per-subject costs (e.g., treatment studies or studies of psychobiology), interviews with the highest inter-rater agreement and greatest elucidation of individual symptoms are generally used even though such instruments require experienced interviewers and extensive training. For such studies, the cost of assessment of the individual child is trivial compared with other costs. Individual studies may target more questions to a particular area because the time one can interview the child and parent is limited by subject fatigue. For example, the Wash-U-KSADS concentrates extra questions on bipolar symptoms. As we develop further hypotheses for

nosologic refinement of the broad expanse of depressive disorders, the questions we ask on our instruments may be further refined. Nevertheless, this particular niche is relatively well filled.

For research studies of larger populations where economic efficiency must be a strong consideration, we are likely to see additional important work that further increases the reliability of assessment of depression and anxiety (those disorders depending on the child's report of internal affect state are more difficult to make reliably than disorders in which the diagnosis is largely made by parental or teacher reports of the child's behavior). In addition, for the same economic reasons, further development of computer administered interviews, interviews on the Web, interviews administered by automated telephone systems, and automated scoring algorithms all will provide important efficiencies that will allow the field to undertake larger and more ambitious studies.

As we adopt what we have learned from research interviews to provide systematic diagnostic methods for use in primary care settings, in schools, and in community health surveys, brevity and vastly simpler decision algorithms that are both efficient and easily understood become of great importance.

In summary, the reliability and validity of instruments to assess pediatric depression are on par with the parallel instruments to assess adult depression. Nonetheless, more work is needed for instrumentation with children younger than age 6 and for instrumentation designed for efficiency for use in clinical settings.

Aspects of this work were presented at the conference, "The Unmet Needs in Diagnosis and Treatment of Mood Disorders in Children and Adolescents," October 17–18, 2000, in Washington, DC. The conference was sponsored by the National Depressive and Manic-Depressive Association through unrestricted educational grants provided by Abbott Laboratories, AstraZeneca, Bristol-Meyers Squibb Company, Forest Laboratories Inc., Glaxo Wellcome Inc., The Henry Foundation, Janssen Pharmaceutica, Eli Lilly and Company, Merck & Co. Inc., National Institute of Mental Health, Pfizer Inc., Pharmacia, SmithKline Beecham, Solvay Pharmaceuticals Inc., and Wyeth-Ayerst Laboratories.

References

- Ambrosini PJ (2000): Historical development and present status of the schedule for affective disorders and schizophrenia for school-age children (K-SADS). *J Am Acad Child Adolesc Psychiatry* 39:49–58.
- Angold A, Costello EJ (2000): The Child and Adolescent Psychiatric Assessment (CAPA). *J Am Acad Child Adolesc Psychiatry* 39:39–48.
- Angold A, Costello EJ, Erkanli A (1999): Comorbidity. *J Child Psychol Psychiatry* 40:57–87.
- Angold A, Costello EJ, Worthman CM (1998): Puberty and depression: The roles of age, pubertal status and pubertal timing. *Psychol Med* 28:51–61.
- Angold A, Weissman MM, John K, et al (1987): Parent and child reports of depressive symptoms in children at low and high risk of depression. *J Child Psychol Psychiatry* 28:901–915.
- Birmaher B, Ryan ND, Williamson DE, Brent DA, Kaufman J (1996a): Childhood and adolescent depression: A review of the past 10 years. Part II. *J Am Acad Child Adolesc Psychiatry* 35:1575–1583.
- Birmaher B, Ryan ND, Williamson DE, et al (1996b): Childhood and adolescent depression: A review of the past 10 years. Part I. *J Am Acad Child Adolesc Psychiatry* 35:1427–1439.
- Fisher PW, Shaffer D, Piacentini JC, et al (1993): Sensitivity of the Diagnostic Interview Schedule for Children, 2nd edition (DISC-2.1) for specific diagnoses of children and adolescents. *J Am Acad Child Adolesc Psychiatry* 32:666–673.
- Fleming JE, Offord DR (1990): Epidemiology of childhood depressive disorders: A critical review. *J Am Acad Child Adolesc Psychiatry* 29:571–580.
- Fristad MA, Cummins J, Verducci JS, Teare M, Weller EB, Weller RA (1998a): Study IV: Concurrent validity of the DSM-IV revised Children's Interview for Psychiatric Syndromes (ChIPS). *J Child Adolesc Psychopharmacol* 8:227–236.
- Fristad MA, Glickman AR, Verducci JS, Teare M, Weller EB, Weller RA (1998b): Study V: Children's Interview for Psychiatric Syndromes (ChIPS): Psychometrics in two community samples. *J Child Adolesc Psychopharmacol* 8:237–245.
- Geller B, Warner K, Williams M, Zimmerman B (1998): Prepubertal and young adolescent bipolarity versus ADHD: Assessment and validity using the WASH-U-KSADS, CBCL and TRF. *J Affect Disord* 51:93–100.
- Kaufman J, Birmaher B, Brent D, et al (1997): Schedule for Affective Disorders and Schizophrenia for School-Age Children-Present and Lifetime Version (K-SADS-PL): Initial reliability and validity data. *J Am Acad Child Adolesc Psychiatry* 36:980–988.
- Kovacs M (1996): Presentation and course of major depressive disorder during childhood and later years of the life span. *J Am Acad Child Adolesc Psychiatry* 35:705–15.
- Kovacs M, Feinberg TL, Crouse-Novak MA, Paulauskas SL, Finkelstein R (1984a): Depressive disorders in childhood. I. A longitudinal prospective study of characteristics and recovery. *Arch Gen Psychiatry* 41:229–237.
- Kovacs M, Feinberg TL, Crouse-Novak M, Paulauskas SL, Pollock M, Finkelstein R (1984b): Depressive disorders in childhood. II. A longitudinal study of the risk for a subsequent major depression. *Arch Gen Psychiatry* 41:643–649.
- Leckman JF, Sholomskas D, Thompson WD, Belanger A, Weissman MM (1982): Best estimate of lifetime psychiatric diagnosis: A methodological study. *Arch Gen Psychiatry* 39:879–883.
- Nguyen N, Whittlesey S, Scimeca K, et al (1994): Parent-child agreement in prepubertal depression: Findings with a modified assessment method. *J Am Acad Child Adolesc Psychiatry* 33:1275–83.
- Perez R, Ascaso L, Domenech Massons J, de la Osa Chaparro N (1998): Characteristics of the subjects and interview influenc-

- ing the test-retest reliability of the Diagnostic Interview for Children and Adolescents-Revised. *J Child Psychol Psychiatry* 39:963–972.
- Puig-Antich J (1982): Major depression and conduct disorder in prepuberty. *J Am Acad Child Adolesc Psychiatry* 21:118–128.
- Puig-Antich J, Kaufman J, Ryan ND, et al (1993): The psychosocial functioning and family environment of depressed adolescents. *J Am Acad Child Adolesc Psychiatry* 32:244–253.
- Puig-Antich J, Lukens E, Davies M, Goetz D, Brennan-Quatrock J, Todak G (1985a): Psychosocial functioning in prepubertal major depressive disorders. I. Interpersonal relationships during the depressive episode. *Arch Gen Psychiatry* 42:500–507.
- Puig-Antich J, Lukens E, Davies M, Goetz D, Brennan-Quatrock J, Todak G (1985b): Psychosocial functioning in prepubertal major depressive disorders. II. Interpersonal relationships after sustained recovery from affective episode. *Arch Gen Psychiatry* 42:511–517.
- Reich W (2000a): Diagnostic Interview for Children and Adolescents (DICA). *J Am Acad Child Adolesc Psychiatry* 39:59–66.
- Reich W (2000b): More on the DICA. *J Am Acad Child Adolesc Psychiatry* 39:14–15.
- Reich W, Cottler L, McCallum K, Corwin D, VanEerdewegh M (1995): Computerized interviews as a method of assessing psychopathology in children. *Compr Psychiatry* 36:40–45.
- Ryan ND, Puig-Antich J, Ambrosini P, et al (1987): The clinical picture of major depression in children and adolescents. *Arch Gen Psychiatry* 44:854–861.
- Schwab-Stone ME, Shaffer D, Dulcan MK, et al (1996): Criterion validity of the NIMH Diagnostic Interview Schedule for Children Version 2.3 (DISC-2.3). *J Am Acad Child Adolesc Psychiatry* 35:878–888.
- Shaffer D, Fisher P, Dulcan MK, et al (1996): The NIMH Diagnostic Interview Schedule for Children Version 2.3 (DISC-2.3): Description, acceptability, prevalence rates, and performance in the MECA Study. Methods for the Epidemiology of Child and Adolescent Mental Disorders Study. *J Am Acad Child Adolesc Psychiatry* 35:865–877.
- Shaffer D, Fisher P, Lucas CP, Dulcan MK, Schwab-Stone ME (2000): NIMH Diagnostic Interview Schedule for Children Version IV (NIMH DISC-IV): Description, differences from previous versions, and reliability of some common diagnoses. *J Am Acad Child Adolesc Psychiatry* 39:28–38.
- Shaffer D, Schwab-Stone M, Fisher P, et al (1993): The Diagnostic Interview Schedule for Children-Revised Version (DISC-R): I. Preparation, field testing, interrater reliability, and acceptability. *J Am Acad Child Adolesc Psychiatry* 32:643–650.
- Strober M, Carlson G (1982): Predictors of bipolar illness in adolescents with major depression: A follow-up investigation. *Adolesc Psychiatry* 10:299–319.
- Teare M, Fristad MA, Weller EB, Weller RA, Salmon P (1998a): Study I: Development and criterion validity of the Children's Interview for Psychiatric Syndromes (ChIPS). *J Child Adolescent Psychopharmacol* 8:205–211.
- Teare M, Fristad MA, Weller EB, Weller RA, Salmon P (1998b): Study II: Concurrent validity of the DSM-III-R Children's Interview for Psychiatric Syndromes (ChIPS). *J Child Adolescent Psychopharmacol* 8:213–219.