

PARENT/CHILD REPORTS EBSD SLEEP PROBLEMS

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Parent and Child Reports of Sleep Problems Associated with Early-Onset Bipolar Spectrum Disorders

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Abstract

Despite sleep problems being part of the diagnostic criteria for mood disorders, research on sleep difficulties related to Early-Onset Bipolar Spectrum Disorders (EBSD) is sparse. Our study examined the parent and child agreement, frequency and severity of EBSD-related manic, depressive and comorbid sleep problems. A sample of 133 eight- to eleven-year-olds with EBSD was assessed with parental and self-report measures of EBSD related sleep problems. Dimensional and categorical measures indicated low agreement and high discrepancy between parent and child reports of EBSD sleep problems. Subsequent combination of parent-child data revealed the majority (96.2%) of children suffered from moderate-to-severe sleep problems related to manic, depressive or comorbid symptoms, either currently or during their worst mood period. More depressive than mania related sleep problems were reported, especially initial insomnia. Over half the sample had sleep problems associated with current comorbidity, particularly separation anxiety disorder. These findings, their implications and study limitations are discussed.

Key Words: sleep problems, bipolar disorder, parent-child reports

Various terms have been used to describe bipolar disorder in children and adolescents, including pediatric, juvenile, early-onset, childhood, and prepubescent bipolar disorder. However, the singular term *bipolar disorder* is misleading, as there appear to be a group of disorders (bipolar I [BP-I], bipolar II [BP-II], cyclothymia, and bipolar not otherwise specified [BP-NOS]). A more fitting reference frequently used in the adult literature is *bipolar spectrum disorders* (Akiskal, 1983). Furthermore, because of differences between adult-onset and childhood-or adolescent-onset bipolar spectrum disorders and of the imprecise connotations of previous terms (see Lofthouse and Fristad, 2004), we prefer the term Early-Onset Bipolar Spectrum Disorders (EBSD) when describing bipolar disorders that occur in persons younger than 18.

EBSD are a group of mood disorders in childhood and adolescence characterized by manic and depressive symptoms. The Diagnostic and Statistical Manual of Mental Disorders - 4th Edition (DSM-IV; American Psychiatric Association [APA], 1994) includes the four diagnoses of BP-I, BP-II, Cyclothymia, and BP-NOS distinguished by symptom frequency and severity. BP-I is characterized by at least one manic episode, with or without a major depressive episode. The diagnosis of BP-I can be further specified by noting the nature (manic, hypomanic, depressed or mixed) of the current and previous mood episodes. BP-II is typified by the occurrence of one or more major depressive episodes and one or more hypomanic episodes, without any history of a manic or mixed episode. Cyclothymic disorder is not as severe as either BP-I or BP-II, but the condition is more chronic, lasting for one year or more in children and adolescents. In contrast, BP-NOS is a disorder with bipolar features that does not meet the criteria for BP-I, BP-II or Cyclothymic Disorder.

Once thought to be nonexistent in children (Anthony & Scott, 1960), over the last decade EBSD have received substantial and increasing attention from the scientific community, media and general public (Lofthouse & Fristad, 2004). In fact, the NIMH recently assigned a high priority to future research in this area (NIMH, 2001). EBSD are often chronic, severe and characterized by a relapsing course, significant psychosocial impairment, mental health utilization, multiple hospitalizations, and suicidality (Geller et al., 2003; Lewinsohn et al., 2003).

While the exact cause(s) of EBSD is not known, substantial evidence in the adult literature and more recent research with children and adolescents suggests a biological basis involving genetics, various neurochemicals and certain affected brain regions (see review by Findling et al., 2003). This biological predisposition or “diathesis” can be activated by environmental triggers or “stressors” (Malkoff-Schwartz et al., 1998). One of these “stressors” is sleep disruption, which has been found to increase mania in adults with bipolar disorder (Barbini, Bertelli, Colombo & Smeraldi, 1996; Leibenluft, Albert, Rosenthal & Weher, 1996; Wehr, Sack & Rosenthal, 1987). Because of these findings, sleep loss has assumed a prominent position in etiological theories of adult bipolar disorder (e.g., Goodwin & Jamison’s circadian rhythms theory, 1990; Frank, Ehlers & colleagues’ psycho-chronobiological theory, 1988, 2000).

Research on EBSD Related Sleep Problems

Although a reduced need for sleep has been identified as a cardinal symptom of EBSD (Geller et al., 2002) and the DSM-IV lists reduced need for sleep as a symptom of mania and insomnia or hypersomnia as a symptom of depression, research on the presence, onset, course or effects of these sleep difficulties is scarce (Harvey, Mullin, & Hinshaw, 2006). To our knowledge, only two published studies (Rao et al., 2002 and Mehl., et al 2006) primarily examined sleep problems associated with EBSD. In addition to these, Kowatch, Youngstrom,

Danielyan and Findling's (2005) meta-analysis of the clinical characteristics of EBSD revealed six studies reporting a decreased need for sleep (Ballenger et al., 1982; Lewinsohn et al., 1995; Findling et al., 2001; Bhangoo et al., 2003; Faedda et al., 2004; & Geller et al., 2004).

Rao et al., (2002) used several sleep EEG measures on 21 adolescents with unipolar depression, five adolescents initially diagnosed with unipolar depression who later switched to EBSD and 33 normal controls. The investigators, found the EBSD group had a relatively normal REM sleep profile; however, they did have more stage 1 sleep than the unipolar group and less stage 4 sleep than both the unipolar and control groups.

More recently, Mehl et al., (2006) compared the results of polysomnography (PSG) evaluations and parent-report sleep questionnaires conducted on 13 six-to-seven year-olds with a "pediatric bipolar disorder profile" derived from the Child Behavior Checklist (i.e., not clinically diagnosed with EBSD) and matched controls. They found children with this profile demonstrated more PSG assessed sleep-continuity difficulties including poorer sleep efficiency, more awakenings, less REM sleep and longer periods of slow-wave sleep. Parents also reported significantly more problems than controls with initiating sleep, restless sleep, nightmares and morning headaches. Although the first PSG study of its kind and the only one using a child-only sample, Mehl et al.'s findings are compromised by the lack of verified diagnoses in the sample and the use of the Child Behavior Checklist, which has been shown to produce more false-positives than measures containing hypomanic and manic items (Youngstrom et al., 2004).

Ballenger et al. (1982) reviewed the inpatient records of nine youths under 21 years of age presenting with Research Diagnostic Criteria (RDC: Spitzer, Endicott & Robins, 1978) BP-I and found 67% experienced a reduced need for sleep. In 1995, Lewinsohn et al., in their community-based prospective study of 14-18 year-olds, identified 18 adolescents with DSM-III-

R diagnoses of BP-I, BP-II and Cyclothymia, 61.1% of who reported a decreased need for sleep. Similarly, Findling et al.'s (2001) examination of 90 five-to-seventeen year-old outpatients with DSM-IV BP-I and Bhangoo et al.'s (2003) study of the parents of 34 six- to 17 year-olds with DSM-IV BP-I and BP-II found rates of 72.2% and 76.0%, respectively. The highest rate for a reduced need for sleep (95.1%) was reported by Faedda et al. (2004) in their investigation of 82 three-to-seventeen year-old outpatients with DSM-IV BP-I, BP-II and Cyclothymia. In contrast, the lowest rate (43.0%) was reported by Geller et al. (2004) in year four of their community-based longitudinal study of 93 seven-to-sixteen year-olds with BP-I. Interestingly, at this study's commencement Geller et al (2002) found a decreased need for sleep significantly differentiated participants with BP-I (39.8%) from those with ADHD (6.2%) and community controls (1.1%).

In their meta-analysis, Kowatch and colleagues (2005) reported a weighted rate of 72% across studies for the symptom of reduced need for sleep suggesting that it was a commonly presenting symptom of EBSD in children and adolescents. Unfortunately, all of these studies used either an adolescent-only or mixed sample of children and adolescents and therefore do not shed light on EBSD related sleep problems in children alone.

Parent and Child Agreement

Informant agreement and disagreement is a significant issue for the field of developmental psychopathology in general. The inclusion or exclusion of informant data in both research and clinical applications may have significant implications for participant selection, data collection, analyses and interpretation, diagnoses, case conceptualization and treatment outcome. A large body of research suggests informant (mother, father, child or teacher) agreement for most psychiatric syndromes is low to moderate (c.f., Achenbach et al., 1987). Regarding parent-child agreement, Achenbach et al.'s (1987) meta-analysis of 119 studies produced a mean correlation

of .22 between parents and children. Ferdinand, van der Ende and Verhulst's (2004) study of parent-child agreement in a community sample of 2,600 4-16 year-olds also reported low agreement, with correlations ranging from .27 to .53. Youngstrom, Findling and Calabrese (2004) compared the reports of 324 parents and 11-17 year-olds with EBSD and found, compared to parents, youth tended to underreport manic symptoms. Further analyzing Geller et al.'s (2002) sample, Tillman and colleagues (2004) compared the separate parent and self-reports from the 93 children and adolescents with EBSD and found parent-child concordance for all symptoms of mania and depression was poor to fair.

In the field of pediatric sleep, few studies have examined parent versus child accounts of sleep disturbances and most clinicians rely on parent reports. Because sleep disturbances may occur without a parent's awareness, the study of informant agreement/disagreement for sleep problems of childhood is particularly important. Of the few cross-informant studies conducted, Owens Spirito, McGuinn and Nobile (2000) examined parent and child reports of various sleep habits in a community sample of 493 elementary school children. They found low agreement on most sleep behaviors, with correlations ranging from .06 to .33. Children tended to report more sleep problems than their parents reported about them, especially sleep-onset delay and night wakings. Paavonen et al., (2000) found similar results in a Dutch community sample. In a four-year-follow-up of their original study, Paavonen, Solantaus, Almqvist and Aronen (2003) reported a decrease in parent-child agreement on sleep difficulties from 23% at age eight to 12% at age 12.

To our knowledge, the only report of informant agreement for EBSD-related sleep problems was Tillman et al.'s (2004) previously described study. They found parent-youth concordance for a reduced need for sleep due to mania was particularly low (identified by 16.2%

of both informants, 54.1% of parents-alone and 29.7% of youth alone). Concordance was slightly higher for overall sleep problems related to depression (identified by 65.8% of both informants, 26.6% of parents-alone and 7.6% of youth alone) and depressive insomnia (61.5%, 30.8% and 7.7%, respectively) but lower for depressive hypersomnia (28.6%, 46.4% and 25%, respectively). Tillman et al.'s results suggest that data from both informants are required to comprehensively assess sleep problems in children and adolescents with EBSD. Unfortunately, their use of a mixed sample of children and adolescents does not allow generalizations to be made on EBSD related sleep problems in children alone, for which no publications currently exist.

Reasons to Study EBSD Related Sleep Problems

Apart from the scarcity of studies on this topic and the differential reports of sleep difficulties by parents and children, there are several additional reasons why an examination of EBSD related sleep problems is important (see also Harvey et al., 2006). First, since sleep difficulties are DSM-IV diagnostic symptoms for mania and depression, learning about their reported frequency as reported by parents and children will be illuminative. Second, although EBSD have been found to frequently co-occur with other diagnoses (see Lofthouse & Fristad, 2004), no studies have considered the frequency of sleep problems due to comorbid conditions. Third, while pediatric sleep problems in general can cause significant functional impairment across many domains (see review by Fallone, Owens & Deane, 2002), sleep problems associated with EBSD, albeit unexamined in the current literature, may lead to similar impairments at home, in school and with peers.

Fourth, because few studies on EBSD have examined associated risk factors, an exploration of EBSD sleep problems and their correlates may open a window on the biological

and psychosocial etiological mechanisms of EBSD. Fifth, sleep disruption in children and adolescents with EBSD, like in adults with bipolar disorder, may be instrumental in triggering or even maintaining further manic-depressive episodes or other comorbid symptoms. As no longitudinal studies on EBSD sleep difficulties have been conducted, we are unaware of the onset, course, impairment and outcome of these problems. Finally, as no empirically supported pharmacological or non-pharmacological interventions or preventions currently exist for EBSD sleep difficulties, evidenced-based treatments are sorely needed.

Goals of Study

This lack of scientific information on EBSD related sleep difficulties represents a significant and serious limitation to the field. For these reasons, we began systematically investigating the nature, frequency, severity, duration, impairment, development, cause and treatment of sleep problems associated with EBSD. This study represents our initial efforts to understand this phenomenon by exploring parent and child agreement regarding the frequency and severity of EOBPDS related sleep problems in a sample of children aged 8 to 11.

Method

Participants

Participants were 133 children assessed as part of their involvement in one of two psychosocial treatment studies for children with EBSD (Multi-Family Psychoeducation Group [MFPG] and Individual-Family Psychoeducation [IFP]: Fristad et al., 2003). Families were required to meet five inclusion criteria to participate in either of the studies: 1) the child had to be aged 8 to 11; 2) the child received a DSM-IV (APA, 1994) study diagnosis of EBSD [Bipolar-I, Bipolar-II, Cyclothymia, or Bipolar Not Otherwise Specified] as determined by a consensus conference process described below (in the MFPG study, major depression and dysthymic

disorder were also acceptable inclusion diagnoses; however, participants with those diagnoses were not included in this study); 3) the child did not have a diagnosis of schizophrenia or autism; 4) the child had a full scale IQ > 70; and 5) the child and one or two parent(s)/parental informant(s) completed the assessment batteries, which consisted of structured interviews, clinical rating scales, and self-report inventories (see Fristad et al. 2003, for a review of instruments used to determine study eligibility). Institutional Review Board approval and informed consent and assent from all participants were received prior to data collection.

Families were recruited through the following sources: psychologist ($n = 40$; 30.1%), media ($n = 26$; 19.5%), psychiatrist ($n = 16$; 12%), teacher, school counselor or school nurse ($n = 6$; 4.6%), social worker ($n = 10$; 7.5%), conference presentation ($n = 6$; 4.5%), general practitioner ($n = 7$; 5.3 %), family member or friend ($n = 2$; 1.5%), community advertisement ($n = 2$; 1.5%) and “other” ($n = 14$; 10.5%).

The sample included 133 8- to 11-year-olds diagnosed with EBSD and their primary caregivers or parents. No participants were undergoing inpatient treatment at the time of data collection; however, outpatient medication, therapy and school service utilization varied considerably and range from no services to optimal services. Primary parents were self-defined as the main caregivers within their children’s lives. The majority of children were male ($n = 98$; 73.7%) and Caucasian ($n = 122$; 91.7%). Nearly half of the children came from two-parent biological families ($n = 62$, 46.6%) containing an average of 2.4 ($SD=1.1$) children. Nearly half of the primary parents graduated from college ($n = 59$; 44.4%). Family incomes were evenly distributed with 28.6% ($n = 38$) below \$40,000, 36% ($n = 48$) between \$40,000 and \$80,000, and 34.8% ($n = 46$) over \$80,000.

Similar to previous reports of EBSD, DSM-IV (APA, 1994) comorbid diagnoses were very common. A comorbid diagnosis was identified if either the child or parent reported symptoms meeting diagnostic criteria. Using this method, children or parents reported the additional diagnoses of ADHD ($n=118$; 88.7%), ODD ($n=118$; 88.7%), Generalized Anxiety Disorder (GAD: $n=54$; 40.6%), Specific Phobia ($n=53$; 39.8%), Separation Anxiety Disorder (SAD: $n=50$; 37.6%), Conduct Disorder (CD: $n=39$; 29.3%), Enuresis ($n=37$; 27.8%), Social Phobia ($n=21$; 15.8%), Encopresis ($n=12$; 9%), Obsessive-Compulsive Disorder (OCD: $n=5$; 3.8%) and/or Posttraumatic Stress Disorder (PTSD: $n=4$; 3%). Overall, children had a mean of 3.8 (SD=1.8) additional diagnoses.

Measures

Children's Interview for Psychiatric Syndromes-Child and Parent Forms (ChIPS, P-ChIPS; Weller, Weller, Rooney, & Fristad, 1999a; Weller, Weller, Rooney, & Fristad, 1999b) are structured diagnostic interviews, based on DSM-IV criteria, for children ages 6-18. The interviews screen for twenty Axis I disorders and a variety of psychosocial stressors. Both the ChIPS and the P-ChIPS have acceptable reliability and validity (Weller, Weller, Fristad, Rooney, & Schecter, 2000). ChIPS and P-ChIPS measure current sleep problems related to specific phobia (i.e., a fear of the dark impairs the child's sleep routine), separation anxiety disorder (i.e., difficulty sleeping away from home or without being near a major attachment figure), generalized anxiety disorder (i.e., worry associated with sleep disturbance) and nocturnal enuresis (i.e., wetting the bed at night).

Children's Depression Rating Scale-Revised (CDRS-R; Poznanski, Freeman, & Mokros, 1985) is a 17-item interview-based rating scale designed to measure the severity of children's depressive symptoms. The total score can range from 17 to 113, correlates significantly with

clinical global ratings of depression (Pozanski et al., 1985), and has adequate interrater reliability ($r = 0.86$). Parents and children were interviewed using the CDRS-R to document depressive symptom severity in the child. The CDRS-R assesses the child and parent's report of "sleep problems" on a five-point scale: 1 (no or occasional difficulty, goes to sleep within 30 minutes) to 3 (frequently has mild difficulty with sleep) to 5 (moderate difficulty with sleep every night). In addition, the CDRS-R indicates whether sleep difficulties were associated with initial, middle or terminal insomnia (each is rated as present or absent).

Mania Rating Scale (MRS; Young, Biggs, Ziegler, & Meyer, 1978) is an interview-based rating scale that assesses the severity of manic symptoms. This scale includes 11 items rated on either a 0-4 ($n = 7$) or 0-8 ($n = 4$) continuum; the total score can range from 0-60. The MRS has excellent interrater reliability ($\alpha = 0.93$), and when used with children, the MRS has good internal consistency ($\alpha = 0.80$) and concurrent validity ($r = 0.84$; Young et al., 1978; Fristad, Weller, & Weller, 1992; Fristad, Weller, & Weller, 1995). Parents and children were interviewed using the MRS to document manic symptom severity in the child. Regarding sleep difficulties, the MRS assesses "reduced need for sleep" on a five-point scale: 0 (reports no decrease in sleep), 1 (sleeping less than normal amount by up to one hour), 2 (sleeping less than normal by more than one hour), 3 (reports decreased need for sleep) and 4 (denies need for sleep). As the MRS and CDRS-R used different rating scales (0-4 and 1-5, respectively), the MRS was recoded to an 1-5 scale equivalent to the CDRS-R scale to create a composite sleep impairment severity scale.

Procedure

During the initial pre-treatment assessment, the primary parent and child were interviewed separately to complete the aforementioned measures. Current (within the last two

weeks) and worst (worst mood episode during the child's life) ratings were obtained on the MRS and CDRS-R.

An initial case review of the above information was used to determine study eligibility. Following the initial case review, a written report prepared by the child and parent interviewers that included behavioral observations, developmental, medical, school, social and treatment histories, P-ChIPS and ChIPS diagnoses and symptoms; MRS ratings and CDRS-R ratings. This report was sent to two licensed clinical psychologists well acquainted with EBSD. After independently reviewing the report they completed a consensus conference to determine the participant's specific mood diagnoses and current and worst CGAS scores.

Results

Rationale for the following analyses is based on Treutler and Epkins' (2003) recommendations for cross-informant research, which include the examination of "correspondence" (i.e., similarity between informants shown by correlation) and "discrepancies" (i.e., differences between informants shown by mean differences).

Parent-Child Correspondence and Discrepancy

Dimensional measures. Correspondence of parent and child dimensional reports of sleep difficulties was determined by computing Pearson correlations for current and worst CDRS-R and MRS five-point scores. Based on Achenbach et al.'s (1987) findings, "low" correspondence was defined as correlations $\leq .22$, "moderate" correspondence for correlations between .23 and .40, and "large" correspondence for correlations $> .40$. All correlations were small and non-significant, indicating low correspondence between parents and children on sleep problems associated with current depressive symptoms ($r = -.01, p = .96$), worst depressive symptoms ($r = -.06, p = .48$), current manic symptoms ($r = .06, p = .53$) and worst manic symptoms ($r = .10, p =$

.24). Low correspondence was not specific to sleep problems as parent and child agreement on non-sleep CDRS-R and MRS items (current and worst) ranged from $r = -.005$ to $.334$ ($M = .16$, $SD = .11$).

Parent-child discrepancies were examined by comparing the magnitude of parent-child reporting differences and the directionality of informant differences. Discrepancy magnitude was computed by calculating the mean absolute value difference scores for the parent and child current and worst CDRS-R and MRS five-point scores. Based on the cut-offs used in training raters for the present study, discrepancies > 1 are considered clinically significant and those ≤ 1 are considered non-significant. Discrepancy direction was illustrated by calculating the percentage of parent scores that were higher, equal to or lower than child current and worst CDRS-R and MRS five-point scores. As shown in Table 1, all discrepancy magnitude estimates were > 1 , indicating clinically significant discrepancies between parent and child ratings on sleep problems associated with current and worst depressive and manic symptoms. Clinically significant discrepancies were not specific to sleep problems as 77% of non-sleep CDRS-R and MRS items (current and worst) reported by parents and children had discrepancy magnitude estimates > 1 .

Table 1 also demonstrates that the direction of discrepancy varies across variables such that more parents reported higher scores than children for sleep problems associated with current mania (24.8% vs. 21.8%) and worst mania (47.4% vs. 15.8%) but more children (34.6%) than parents (27.8%) reported higher scores for current depressive symptoms. For sleep problems related to the worst depressive episode 37.6% of parents reported higher scores than children and 37.6% of children reported higher scores than parents.

Categorical measures. The presence/absence of a sleep problem associated with depression was recorded if the sleep-specific CDRS-R item score (“sleep problems”) was ≥ 3 for either the parent or child. In addition, the presence or absence of the three types of depressive-related sleep problems (initial, middle or terminal insomnia) were coded if reported by either the parent or child. A sleep problem associated with mania was recorded if the sleep-specific MRS item converted score (“reduced need for sleep”) was ≥ 3 for either the parent or child. A sleep problem associated with comorbidity was recorded if the child or parent endorsed a ChIPS or P-ChIPS sleep specific item (i.e., a fear of the dark that impairs the child’s sleep routine, difficulty sleeping away from home or without being near a major attachment figure, worry associated with sleep disturbance, wetting the bed at night).

Agreement between parent and child reports on categorical sleep variables was assessed by computing kappa coefficients between parent and child reports of the presence/absence of sleep problems recorded via the CDRS-R, MRS and ChIPS/P-ChIPS. Based on the criteria proposed by Landis and Koch (1977), kappas between 0.21-0.40 are considered “fair;” 0.41-0.60, “moderate;” 0.61-0.80, “substantial;” and 0.81-1.00 “almost perfect.” The directionality of informant differences on these categorical measures was illustrated by the percentage of parent total scores that were higher, equal to or lower than child total scores.

As show in Table 1, 11/14 (78.6%) kappas calculated for the current and worst CDRS-R (overall, initial, middle and terminal insomnia), MRS and ChIPS/P-ChIPS sleep variables were below “fair.” Directionality of informant differences on these categorical variables varied considerably. Parents endorsed sleep problems as present 9.8% to 35.3% of the time that children endorsed them as absent. Conversely, children endorsed sleep problems as present 4.5% to 29.3% of the time that parents endorsed them as absent. Percent agreement between parents and

children on the presence of sleep problems ranged from 0.0% to 25.6%, whereas percent agreement on the absence of sleep problems ranged from 36.9% to 84.2%. Once again, low agreement was not specific to sleep problems as 81% of kappas calculated for parent and child report of the presence/absence of non-sleep problems on the CDRS-R and MRS (current and worst) were “below fair.”

Summary. Results for parent-child correspondence/agreement and discrepancy on dimensional and categorical measures all indicate low parent-child agreement on most EOBSPD sleep problems. Therefore, the following section on the occurrence and severity of sleep problems involves an “either/or” approach to combining parent-child data (i.e., if either the parent or child endorsed a sleep problems it was scored).

Frequency and Severity of EBSD Sleep Problems Using an “Either” Approach

The frequency of sleep problems as reported on the MRS, CDRS-R and ChIPS/P-ChIPS was calculated as previously described. For those participants who reported the presence of a sleep problem, the highest rating from the parent or child scores was used as a measure of severity.

Mania. A reduced need for sleep currently was reported by 28.6% ($n=38$) of the sample, with a mean severity of 3.6 (S.D. = 0.6). Over half the sample endorsed reduced need for sleep during the child’s worst episode, 57.9% ($n=77$), with a mean severity of 3.9 (S.D. = 0.7).

Depression. Over half the sample reported current sleep problems (58.6%, $n=78$), with a mean severity of 3.8 (S.D. = 0.9). More specifically, 47.4% ($n=63$) reported initial insomnia, 34.6% ($n=46$) reported middle insomnia and 24.8% ($n=33$) reported terminal insomnia. During the child’s worst depressive episode, 82% ($n=109$) reported sleep problems with a mean severity

of 4.2 (S.D. = 0.8). Specifically, 62.4% ($n=83$) reported initial insomnia, 48.1% ($n=64$), middle insomnia, and 35.3% ($n=47$) terminal insomnia.

Mania and depression. A majority of the sample reported sleep problems associated with mania and/or depression: 69.2% ($n=92$) reported current problems, with a mean severity of 3.8 (S.D. = 8). Nearly all the sample (94%; $n=125$) reported some sleep disruption during the child's worst episode, with a mean severity of 4.3 (S.D. = 0.7).

Comorbid sleep problems. Over half (63.9%, $n=85$) the sample reported current sleep problems associated with one or more comorbid disorders. More specifically, 40.6% ($n=54$) of children had sleep difficulties related to separation anxiety disorder, 32.2% ($n=43$) with fear of the dark, 23.3% ($n=31$) with nocturnal enuresis, and 15.8% ($n=21$) in association with generalized anxiety disorder (some children reported problems with more than one comorbid condition). As comorbid symptoms were only assessed as present versus absent, severity ratings could not be computed.

Overall sleep problems. Almost all participants (96.2%, $n=128$) reported some type of sleep problem, whether it was related to their current or worst episode of mania or depression or their current comorbidity. For these participants, the mean severity of overall sleep problems was 4.3 (S.D. = 0.8).

Discussion

Even though sleep symptoms are part of the DSM-IV (APA, 1994) diagnostic criteria for manic or depressive disorders, research on EBSD sleep difficulties is uncommon. Furthermore, despite a large-body of research suggesting parent-child agreement for most psychiatric syndromes is low (Achenbach et al., 1987), few studies have examined this topic in the area of sleep difficulties in general and no studies have compared parent-child reports of EBSD sleep

problems in a child-only sample. The current study is the first to describe and compare parent and child reports of manic, depressive and comorbid sleep problems in a large sample of children diagnosed with EBSD.

Results obtained using categorical and dimensional approaches to parent-child agreement/disagreement all led to the same general conclusion--agreement between parents and children regarding sleep problems in the child is poor. This finding was not specific to EBSD sleep problems as parent-child agreement for non-sleep symptoms of mania and depression within our sample was also low. Such discrepancies are consistent with past research on parent-child reports of psychiatric symptoms in general (Achenbach, et al., 1987), sleep problems in community samples (Owens et al., 2000; Paavonen et al., 2000, 2003) and sleep difficulties associated with mania and depression in a mixed sample of children and adolescents (Tillman et al., 2004). Our findings emphasize the need to obtain data from both sources. Children endorsed sleep problems as present up to 29.3% of the time that parents endorsed them as absent, emphasizing the importance of directly interviewing children about their sleep experiences.

A subsequent combination of parent-child data revealed that nearly all (96.2%) children with EBSD in our sample suffered from moderate-to-severe sleep problems related to manic or depressive symptoms, currently or during their worst mood period. As would be expected, most sleep difficulties were found during a worst mood episode, with 82% of children having depression related sleep problems of moderate severity and 57.9% associated with mania, also of moderate severity. However, for both current and worst time periods, participants reported more depressive than mania-related sleep difficulties. Regarding the timing of sleep symptoms associated with depression, most participants (either currently or during the worst period),

reported initial insomnia as the most pervasive problem followed by middle insomnia and then terminal insomnia.

Over half (63.9%) the children with EBSD in our sample had sleep problems associated with current comorbidity. Most of those problems were related to SAD (i.e., difficulty sleeping away from home or without being near a major attachment figure), followed by specific phobia (i.e., a fear of the dark impairs the child's sleep routine), nocturnal enuresis (i.e., wetting the bed at night) and GAD (i.e., worry associated with sleep disturbance).

Study Limitations and Future Directions

Although this study revealed several sleep difficulties associated with EBSD, due to the source of the data (two psychosocial treatment studies, MFPG and IFP), we were not able to examine sleep problems using a taxonomy-driven specific measure of sleep problems in children. Thus, we were also unable to categorize sleep problems (e.g., insomnia, sleep-related breathing disorders, circadian rhythm sleep disorders and periodic limb movement disorder), with reference to standard sleep taxonomies such as the International Classification of Sleep Disorders-2nd Edition (ICSD-2, American Academy of Sleep Medicine, 2005). However, a post-hoc examination of our results in terms of the ICSD-2 classification indicates children with EBSD have sleep problems in the following ICSD categories: Sleep Onset Delay, Sleep Duration, Sleep Anxiety, Night Wakings and Parasomnias. Future studies should use psychometrically rigorous sleep assessments developed with reference to standard sleep taxonomies and school-aged children.

Since only the presence or absence of comorbid symptoms, rather than comorbid symptom severity was determined via the ChIPS and P-ChIPS, we were not able to compute a measure of the severity of comorbid sleep problems associated with EBSD. Future studies may

consider using a severity scale to measure all sleep impairment. Furthermore, we examined a narrow age band of children, thus, we cannot comment on sleep problems in children diagnosed with EBSD who are younger than 8 or older than 12. Finally, we assessed sleep problems via “snap-shots” in time - during the current time period and during the child’s worst mood episodes. Longitudinal designs are required to understand the triggers, onset, course and effect of such difficulties on children and adolescents’ functioning at home, in school and with peers.

Implications

Despite these limitations, the current results indicate that input from both parents and children are important when assessing EBSD related sleep problems and that parents pay heed to their child’s reports of sleep difficulties. Further, our findings indicate EBSD in children is associated with significant sleep problems including difficulties falling and staying asleep, getting up, waking too early and a decreased need for sleep that are compounded by associated separation anxiety, bedwetting, fear of the dark and worry. Although the functional impairment of these sleep problems was not assessed in this study, one can imagine the significant disruption they might cause at home for the child, parents and siblings; in school on the child’s ability to attend, stay motivated, learn and behave appropriately; and with peers in terms of maintaining existing friendships, initiating new acquaintances and resolving interpersonal conflicts.

Given the additional potential for sleep disturbance triggering future manic episodes by causing increased psychosocial stress at home, in school and with peers and disrupting daily routines, current findings strongly suggest the necessity of effective intervention strategies. The development and testing of biological and psychological interventions are needed to address manic, depressive and associated comorbid sleep difficulties. Currently, only two studies for EBSD have reported use of a sleep hygiene module in their intervention (Pavuluri, Graczyk,

Henry, Carbray, Heidenreich, & Miklowitz, 2004; and Fristad, in-press). Pavuluri and colleagues examined their Child- and Family-Focused Cognitive-Behavioral Therapy (CFF-CBT) program plus medication in a specialty clinic with 34 children and adolescents with EBSD. Treatment as a whole led to significant reductions in sleep disturbance, mania, depression, psychosis, aggression and ADHD and significant increases in global functioning. Fristad examined her adjunct Individual Family Psychoeducation (IFP) intervention in 20 children with BPD who were on several medications with varying degrees of effectiveness. Improvements in mood and family climate and possible improvements in treatment utilization begin to occur immediately after treatment but were most pronounced at the 12-month follow-up period. Although neither study examined the specific effects of the sleep hygiene component, both suggest the potential for psychological interventions for EBSD sleep problems.

In the adult field, based on their psycho-chronobiological theory (1988, 2000), Frank and colleagues (1994) developed Interpersonal and Social Rhythm Therapy (IPSRT) for managing social and circadian rhythm and sleep-wake cycle abnormalities. Evidence from controlled treatment studies indicates IPSRT helps adults with bipolar disorder to achieve more stability in daily routines, lower levels of symptomatology, lower recurrence rates (Frank et al., 1997, Frank, 1999), attain clinical remission in half the time (Hlastala et al., 1997), experience longer periods of recovery and remain well two-years after treatment (Frank et al., 2005).

One final implication of our results is that the widespread presence of sleep problems in EBSD may reflect underlying biological mechanisms. As previously noted, Rao et al's (2002) EEG study revealed more stage 1 sleep and diminished stage 4 sleep in inpatient adolescents who later switched to EBSD than in those with unipolar depression. In adults with bipolar disorder, sleep difficulties have been connected to the medial prefrontal cortex (Wu et al., 1999),

urinary dopamine levels (Joyce et al., 1995), and CSF homovanillic levels of dopamine seem to increase just before a switch into mania (Wehr and Goodwin, 1981). Furthermore, animal studies appear to confirm the role of dopamine in sleep deprivation (e.g., Gardner et al., 1997). Future studies of children with EBSD using functional imaging and EEG studies and urinary and blood measures of dopamine may further elucidate the origins of associated sleep problems.

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Table 1

Parent and Child Current and Worst CDRS-R and MRS Ratings and Measures of Discrepancy Magnitude and Discrepancy Direction

	CDRS-R		MRS	
	Current	Worst	Current	Worst
Parent Mean (SD) Rating	1.93 (1.33)	2.80 (1.69)	1.51 (0.96)	2.51 (1.49)
Child Mean (SD) Rating	2.20 (1.42)	2/67 (1.52)	1.54 (0.97)	1.70 (1.10)
Discrepancy Magnitude				
Mean (SD) AVDS*	1.43 (1.35)	1.89 (1.39)	1.42 (1.31)	1.42 (1.31)
Discrepancy Direction				
% Parent Higher	27.8	37.6	24.8	47.4
% Parent = Child	36.1	23.1	52.6	36.1
% Child Higher	34.6	37.6	21.8	15.8

Note.

** AVDS: Absolute Value Difference Score*

Table 2

Percentages and Kappas for Parent and Child Endorsements of CDRS-R, MRS and ChIPS/ChIPS-P Sleep Variables

Sleep Variable	% Agreement		% Disagreement		Kappa*
	Present	Absent	Parent	Child	
			Present	Present	
<u>CURRENT</u>					
CDRS-R					
Overall	12.0	41.4	17.3	29.3	-0.00
Initial	6.9	52.3	11.5	29.2	0.01
Middle	4.6	64.6	11.5	19.2	0.47
Early	2.3	74.6	12.3	10.8	0.03
MRS	3.0	71.4	9.8	15.8	0.05
**Specific Phobia	5.3	67.7	15.8	11.3	0.12
**SAD	10.9	58.9	13.2	17.1	0.22
**GAD	0.0	84.2	11.3	4.5	-0.07
**Enuresis	4.6	76.2	14.6	4.6	0.23
<u>WORST</u>					
CDRS-R					
Overall	25.6	18.0	27.8	28.6	-0.14
Initial	20.8	36.9	19.2	23.1	0.13
Middle	9.2	51.5	19.2	20.0	0.44
Early	4.6	63.8	16.9	14.6	0.03
MRS	11.3	42.1	35.3	11.3	0.32

Note.

* Kappas between 0.21-0.40 = "fair;" 0.41-0.60 = "moderate;" 0.61-0.80 = "substantial;" and 0.81-1.00 = "almost perfect" (Landis & Koch, 1977)

** ChIPS/ChIPS-P