Published in final edited form as:

J Ment Health Res Intellect Disabil. 2008 ; 1(4): 238–253. doi:10.1080/19315860802313947.

Mood and Anxiety Symptoms in Psychiatric Inpatients with Autism Spectrum Disorder and Depression

Lauren Charlot,

Department of Psychiatry University of Massachusetts Medical School

Curtis K. Deutsch,

Eunice Kennedy Shriver Center University of Massachusetts Medical School

Aranya Albert,

Eunice Kennedy Shriver Center University of Massachusetts Medical School

Anne Hunt,

Eunice Kennedy Shriver Center University of Massachusetts Medical School

Daniel F. Connor, and

Department of Psychiatry University of Connecticut Medical School

William J. McIlvane Jr.

Eunice Kennedy Shriver Center University of Massachusetts Medical School

Abstract

Recent reports suggest that individuals with autism spectrum disorders (ASD) may experience depression at a high frequency, yet few published studies address this issue, especially among adults. In the current investigation, we reviewed features of depression and comorbid traits among depressed inpatients with intellectual disabilities (ID) as a function of ASD. A retrospective chart review was performed for 53 inpatients meeting criteria for depression (13 individuals with ASD and ID and 40 matched individuals with ID but without ASD), all of whom had received a diagnosis of depression at the time of discharge from a specialty psychiatric unit for adults with ID. The depression diagnoses were based on a comprehensive clinical assessment; specific mood and anxiety symptoms were reported by informants at the time of intake using the Mood and Anxiety Semi-Structured (MASS) Interview for Patients with Intellectual Disabilities (Charlot, Deutsch, Hunt, Fletcher, & McIlvane, 2007). Overall, few qualitative differences were detected between the 2 groups. Both depressed inpatient groups had high rates of comorbid anxiety disorders as well as externalizing behaviors. Inpatients with ASD had a total of 2 more symptoms (out of 29 possible symptom items) than their depressed peers without an ASD diagnosis (mean scores of 12.23 and 9.85, respectively). Anxiety disorders were reported in 62% of individuals with ASD and 38% of those without ASD. Antipsychotic medication was prevalent among the patients with ASD and depression. Over 80% of the inpatients with ASD and depression, compared with 49% of the non-ASD group, were treated with these medications.

Keywords

autism; autism spectrum disorders; depression; anxiety; antipsychotic medications; mood disorders

Little is known about the phenomenology of depression among individuals with autism spectrum disorders (ASD). Yet the existing literature suggests that individuals with ASD may have a markedly elevated risk of developing mood syndromes. In their review, Lainhart and Folstein (1994) reported that depression may have been substantially underdiagnosed in individuals with autism. Ghaziuddin, Ghaziuddin, and Greden (2002) reviewed the literature and concluded that “depression is probably the most common psychiatric disorder that occurs in autistic persons” (p. 299). Indeed, prevalence estimates for depression range from 30–40% of clinically referred adolescents and adults with ASD (Ghaziuddin et al., 2002). These base rates may be influenced by nosologic difficulties; significant challenges to accurate diagnosis of mental disorders have been noted by a number of investigators. In particular, people with ASD often have difficulties communicating, especially describing internal feeling states important to the diagnosis of mood disorders (Leyfer et al., 2006).

In a recent study emerging from the NIH CPEA collaboration (National Institute of Health and Child Protection Education of America, Inc.; Salt Lake City and Boston), Leyfer and colleagues (2006) assessed 109 children diagnosed with an autism spectrum using a modified the K-SADs or Kiddie Schedule for Affective Disorders and Schizophrenia (Chambers et al., 1985). Rates for a number of disorders defined in the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision (DSM-IV-TR; American Psychiatric Association, 2000) were reported. They found a prevalence rate of 10.1% for the full DSM-IV-TR syndrome of major depressive disorder and 13.8% for “subsyndromal” depression (children had definite symptoms of depression but did not meet full criteria). A number of other studies have revealed elevated risk rates for depression among first-degree relatives of probands with ASD indicating a possible genetic link between mood disorders and autism (Bolton, Pickles, Murphy, & Rutter, 1998; Ghaziuddin & Greden, 1998; Piven & Palmer, 1999). It has been suggested that symptoms of anhedonia, crying spells, weight loss, and poor sleep might be accompanied by aggressive behaviors in some individuals with depression and ASD. Also, characteristic ritualistic and repetitive behaviors may be seen to intensify with the onset of an acute mood episode (Ghaziuddin et al., 2002).

A substantial literature addresses mood disorders in individuals with intellectual disabilities (ID), not specifying whether or not some of the subjects might have ASD. Findings suggest that people with ID can be diagnosed with depression and may present with many of the same symptoms described in individuals who do not have ID (Charlot, Doucette, & Mezzacappa, 1993; Johnson, Handen, Lubetsky, & Sacco, 1995; Lunsy & Paluka, 2004; Meins, 1994; Reiss & Rojahn, 1993; Tsiouris, 2001; Tsiouris, Mann, Patti, & Sturmey, 2003). A number of experts have expressed concern that depression has been underdiagnosed among persons with ID, primarily due to the presence of unusual or atypical features (Lowry, 1998; Sovner & Hurley, 1983). Atypical features described in people with ID and depression have included more irritable versus sad mood; withdrawn behavior; high occurrence of psychomotor agitation as compared with slowing, reduced cognitive symptoms; and aggressive or other agitated behaviors (Clarke & Gomez, 1999; Johnson et al., 1995; Reiss & Rojahn, 1993; Tsiouris, Mann, et al., 2003). It has been noted that adults with ID present with features of depression similar to those described in typically developing children (Angold, 1988; Carlson & Kashani, 1988; Charlot, 2005). Aggressive or disruptive behaviors that occur in the setting of depression may represent a manifestation of dysphoric mood in people with ID, who have a limited behavioral repertoire (Charlot et al., 1993).

In the current exploratory investigation, a retrospective chart review was conducted. The primary aim of our study was to examine and compare rates of mood and anxiety symptoms

across two groups of psychiatric inpatients with depression and ID, one with and one without ASD.

This aim followed directly from the suggestion by a number of authors that depression may present differently in people with ASD when compared with other depressed individuals (Ghaziuddin, 2005; Lainhart & Folstein, 1994). However, it is unclear if these suggested differences would be found when comparing depressed individuals with ASD and ID to depressed peers with ID who do not have an ASD diagnosis.

A second objective was to address the largely neglected topic of ASD in adults with ID. Most extant studies have focused on the occurrence of psychiatric problems among children and adolescents.

In the present contrast of depressed adults, we endeavor to characterize any similarities or differences in the nature of depressive and associated symptoms among patients with ASD/ID versus ID alone.

METHOD

Participants

We conducted a retrospective chart review of a series of inpatients diagnosed at discharge with Depressive Disorder Not Otherwise Specified (NOS) or Major Depressive Disorder after an inpatient stay on a specialty psychiatric unit serving adults with ID. The locked 10-bed inpatient psychiatric unit admits only individuals who carry a DSM-IV (American Psychiatric Association, 2000) diagnosis of mental retardation. The average length of stay was approximately 17 days. Psychiatric diagnoses had previously been made by the attending psychiatrist on the specialty unit, who has extensive experience in evaluating people with ID. The diagnoses were based on a comprehensive clinical assessment. The assigned diagnoses for level of ID including mild, moderate, or severe/profound mental retardation were based on reports of previous psychological assessment, reviewed at the time of admission. ASD diagnoses were made using established DSM-IV-TR criteria and included Asperger's syndrome, pervasive developmental disorder NOS, and autistic disorder and were also assigned by the attending psychiatrist at the time of discharge.

The initial sample included 58 individuals, 13 with ASD (ASD/ID) and 45 without ASD (non-ASD/ID). The ASD group included a higher ratio of males:females when compared with the non-ASD group (62% males in the ASD group and 53% males in the "Other" group). To render the two study groups comparable, 5 female cases were randomly excluded from the non-ASD contrast group, which originally contained 45 cases, leaving a total of 40 cases in this group. Following removal, a comparative analysis was performed to confirm that the 5 females removed did not differ from the other participants in terms of symptomatology (Wilcoxon Rank Sum test, $p = .97$). The 2 groups were then reviewed and no statistically significant differences were found between the ASD and non-ASD group in terms of age (Wilcoxon Rank Sum test, $p = .47$), gender (χ^2 test, $p = .92$), or level of ID (Exact test, $p = .27$). Characteristics of the final group of 53 patients are reported in Table 1.

The MASS Interview

A semi-structured interview of familiar informants had been conducted at the time of admission on all 53 patients. The Mood and Anxiety Semi-Structured (MASS) Interview was initially developed to help improve intake assessment of patients admitted to the specialty unit (Charlot, Deutsch, Hunt, Fletcher, & McIlvane, 2007). The interview includes 29 items/questions regarding the presence of DSM-IV symptom criteria for several mood and anxiety disorders and certain additional symptoms that are associated with these

disorders (e.g., tics, aggressive or self-injurious behavior, etc.). For each symptom item, several behavioral descriptions of possible manifestations of the symptoms are provided. The clinician provides informants with multiple observable descriptions for each symptom (e.g., anhedonia might be seen as refusing previously preferred activities or a decrease in hygiene in a person who had previously been judged to take pride in his/her appearance, etc.). For each symptom-item, the examiner's goal is to identify problems that represent (a) a change from the individual's typical behavior when well that (b) interfere with daily functioning or quality of life (i.e., not minor problems or transient issues). Based on the responses of the multiple informants, the examiner judges if the symptom is most likely present and, if so, that the intensity and duration is significant enough to warrant a "yes" for the given symptom. The MASS Interview was administered by the unit psychologist, clinical social worker, or nurse-prescriber, each of whom had over 20 years experience in the evaluation of clinically referred individuals with ID.

In a preliminary investigation, a significant degree of agreement was found between diagnoses based on the MASS Interview and diagnoses based on comprehensive clinical evaluation as well as HDRS (Hamilton Depression Rating Scale) depression cutoff scores (κ coefficients ranged from .42–.78, $p < .001$). The HDRS has been widely used in the assessment of depression in people without ID (Hamilton, 1967) but has also been used in reports examining depression in persons with ID (Charlot, Fox, Silka, Hurley, Lowry & Pary, 1997; Howland, 1992; Reynolds & Baker, 1988).

Procedure

Rates for each of the DSM-IV symptoms reported for major depressive episode, manic episode, panic attack, obsessive-compulsive disorder (OCD), and generalized anxiety were tallied for the two clinical groups examined. Rates for additional symptoms including tics, aggression to others, and self-injurious behavior were also tabulated. The rates represent all of the "yes" answers assigned and recorded by the clinician conducting the MASS Interview (Charlot, Deutsch, et al., 2007). at the time of the admission. Rates for inpatients with ASD who were diagnosed with depression at discharge were contrasted to rates for inpatients diagnosed with depression who did not have an ASD diagnosis. The data were grouped into six smaller subsets based on the symptom criteria from the DSM-IV-TR for depression, anxiety, OCD, and mania with two additional clusters including physical or vegetative symptoms and other symptoms (self-injurious behavior, aggression, and tics).

Statistical Analysis

Most group comparisons required nonparametric methods because the assumptions of parametric methods were not met -- in most cases this was most likely due to the small sample studied.

The comparability of the samples in terms of mean age was tested using the Wilcoxon Rank Sum test (Table 1). A chi-square test was used to determine the comparability of the sample in terms of gender (Table 1). Due to the small cell sizes, a nonparametric Exact Permutation test was used to compare the level of ID in the two groups (Table 1).

Exact tests were also used to compare the frequency of mood, anxiety, and other symptoms in the ASD and non-ASD groups (Table 2). Because the current study is exploratory and geared to the creation of hypothesis generation, we admitted in our analyses a large number of variables. Consequently, this strategy increased the possibility of a multiple comparisons effect that can inflate alpha. Rather than correcting for multiplicity, we focused on effects sizes; these were calculated for all of the contrasts and provide a key parameter for subsequent statistical power analyses. The effect sizes were calculated using the phi

coefficient, which is used to express the degree of association of two variables that are dichotomous. It is a special case of the Pearson product-moment correlation coefficient when the variables' values are 0 or 1. Its value can range from 0 (no association between factors) to 1 (a perfect relation between the two variables) (Sheskin, 2004). The computation of effect sizes for the phi coefficient, with classification of their magnitude, have been published by Cohen (1988). The mean number of symptoms reported for the two inpatient groups was calculated and contrasted using the Wilcoxon Rank Sum test, a nonparametric alternative to the t test, and the effect size (Cohen, 1988) was calculated (Table 2).

Exact Permutation tests were used to compare the frequency of psychoactive medications at discharge between groups (Table 3) and to examine differences in comorbid diagnoses at discharge (Table 4).

RESULTS

Table 2 reports comparisons in rates for mood, anxiety, and other psychiatric symptoms by symptom cluster for the 53 patients.

Symptom clusters included groupings of symptoms associated with various DSM-IV-TR syndromes as well as some commonly comorbid problems, including generalized anxiety disorder, OCD, depression, the vegetative signs of depression, mania, and other behaviors. A total of 29 symptoms were rated for each participant, some of which occur in more than one DSM-IV-TR syndrome. For example, fatigue is a symptom of depression as well as generalized anxiety disorder.

Symptom clusters included groupings of symptoms associated with various DSM-IV-TR syndromes as well as some commonly comorbid problems, including generalized anxiety disorder, OCD, depression, the vegetative signs of depression, mania, and other behaviors. A total of 29 symptoms were rated for each participant, some of which occur in more than one DSM-IV-TR syndrome. For example, fatigue is a symptom of depression as well as generalized anxiety disorder.

Inpatients with ASD had an average of 12.23 symptoms ($SD = 3.59$, $min = 5$, $max = 19$) whereas inpatients without ASD had a mean of 9.85 symptoms ($SD = 3.37$, $min = 5$, $max = 17$; Wilcoxon Rank Sum 2 sample test, $p = .05$). Notably, the effect size for this difference was within the medium-to-large range (0.68) using Cohen's (1988) criteria.

Inpatients with ASD and depression had a somewhat higher rate of sleep problems compared with the non-ASD group (Exact Permutation test, $p = .05$). The effect size for this difference was within the medium range (0.58) using Cohen's (1988) criteria. Medications prescribed to the 2 groups are reported in Table 3. Psychopharmacologic approaches differed somewhat between the 2 groups reviewed, with more of the inpatients with ASD having been prescribed antipsychotic medications (Exact Permutation test, $p = .05$). The effect size (ES) for this difference was in the medium to large range (0.63). Individuals with ASD were more likely to have their depression treated with an Selective Serotonin Reuptake Inhibitor (SSRI) (Exact Permutation test, $p = .05$). For this contrast an ES of .61 was found, also in the medium-to-large range.

Medical problems diagnosed at discharge for the inpatients were also tallied and presented in Table 4. The inpatients had similar rates for most comorbid health problems. All of the depressed inpatients had high rates of constipation, gastroesophageal reflux disease (GERD), and either a current or past history of seizures.

Many of the inpatients in our sample were also diagnosed with anxiety disorder NOS or generalized anxiety disorder in addition to their diagnosis of depression. This included 62% of the ASD group (8/13) and 38% of the non-ASD group (15/40).

DISCUSSION

The aim of our study was to examine the characteristics of mood and anxiety symptoms in our sample of adults with ID and depression, comparing individuals with and without ASD. In our sample, there was little difference in clinical phenomenology between the depressed inpatients with ID, irrespective of whether an ASD diagnosis was made. However, depressed inpatients with ASD had more mood, anxiety, and other related symptoms than peers without ASD. These results raise the possibility that inpatients with ASD may be more impaired by their mood disorder given the higher per individual rate of symptoms reported for this group. Several recent investigations have suggested that children with ASD and ID have greater overall psychopathology when compared to other children with ID (Bradley & Bolton, 2006; Bradley, Summers, Wood & Bryson, 2004; Lainhart (1999) noted that many children and adolescents fail to express changes in their mood or do so in unusual ways, and detection of depression relies upon observations by others of alterations in behavior. As a result, she states, “. . . most autistic children and adults with depression do not present clinically until the depression is quite severe . . .” (p. 287).

The finding that the inpatients with ASD may have more sleep problems when depressed could be related to the commonality of sleep problems within this clinical group at baseline (Liu, Hubbard, Fabes, & Adam, 2006). However, the examiner stressed that sleep problems should be endorsed only if the informant judged that the individual was having sleep problems that were greater than those typically observed. Perhaps the onset of a major depressive disorder selectively exacerbates preexisting sleep problems in individuals who are already prone to such problems (Riemann, 2007).

Of particular note in the present study were the high rates of anxiety comorbidity in both study groups. Previous reports regarding individuals with depression who do not have a developmental disability have identified a substantial subgroup of depressed people who have comorbid anxiety disorders (Sullivan & Kendler, 1998). Few investigations have noted comorbidity of anxiety and depression in people with ASD, whereas many do report high rates for both anxiety disorders and anxiety symptoms (Chalfant, Rapee, & Carroll, 2007). Leyfer and colleagues (2006) noted a high rate of multiple disorders with the median per child rate of three DSM-IV-TR diagnoses but did not comment a specific rate for comorbid anxiety problems with depression (apart from OCD, which occurred with depression in 5–6% of their sample). It has been suggested that having comorbid depression and anxiety may be more debilitating than having either condition alone (Moffitt et al., 2007).

A relatively large number of females were found among the ASD group in the present investigation. Usual male:female ratios of about 2.5–4.0:1.0 have been reported in most epidemiologic investigations regarding ASD. However, recent findings suggest, when individuals have more severe ID, the ratio of male and female is not the typical 4:1 but rather approaches comparability (Honda, Shimizu, Imai, & Nitto, 2005). In the current sample, all of the inpatients with ASD had ID, whereas most population investigations report at least 25% of individuals with ASD have an IQ in the normal range (Smeeth et al., 2004). An alternative explanation is that our adult sample contained more females because depression affects adult females more than males. This is a common finding from epidemiologic studies of individuals without developmental disabilities in general population studies of depression (Weller, Kloos, Kang, & Weller, 2006). To our knowledge,

this has not been studied in any large scale population based investigations of psychiatric disorder in adults with ID or ASD.

A large number of the inpatients with and without ASD presented with “mood swings,” including 38% of the individuals with an ASD diagnosis and 40% of individuals in the other ID group. Affective instability and difficulties in the regulation and modulation of affective states may be common among individuals with ASD or ID in general, given the association with a wide variety of neurological conditions (Schiffer & Pope, 2005). The occurrence of rapid shifts in affect may not be specific to bipolar disorder and may be as common in other psychiatric disorders for individuals who have central nervous impairment (Charlot, 1997). This finding is of special interest given the recent debate as to whether or not a trend has developed leading to bipolar disorder being overdiagnosed in people with ID (Pary, Levitas, & Hurley, 1999; Wozniak et al., 1997). Differentiating some of the core symptoms of ASD that may become exaggerated or elevated under stressful circumstances may be very difficult, especially for clinicians who do not have extensive experience working with individuals with ASD (Lainhart & Folstein, 1994).

As in past studies of patients with ID and mood disorders, many of the inpatients described in the current investigation were seen as having an irritable mood as well as high rates of externalizing behaviors. The high rates of aggression and self-injurious behavior (SIB) reported for the depressed individuals in the present study were similar to rates reported for other inpatients on this unit who had received a variety of other psychiatric diagnoses (Charlot et al., 2002). Self-injurious and aggressive behaviors have been reported in association with almost every Axis I psychiatric condition and may not have a unique relationship to mood disorders (Charlot, 2005; Gardner, 2000; Tsiouris, Cohen, Patti, & Korosh, 2003). The occurrence of externalizing behaviors, however, may decrease the suspicion of depression or anxiety (internalizing conditions) as a primary cause of changes in mood, mental status, and behavior (Charlot et al., 1993). This is because high-profile problems such as aggression or self-injury tend to draw clinical attention away from less dramatic internalizing ones, especially when informants provide a substantial portion of the information about symptoms (Cantwell, 1996; Carlson, & Kashani, 1988; Rutter, 1998). The presence of disruptive and aggressive behaviors has been found to have an impact on prescribing patterns (Stolker, Heerdink, Leufkins, Clerkx, & Nolen, 2001; Tsakanikos, Costello, Holt, Sturmey, & Bouras, 2007).

We also noted that depressed inpatients with ASD were more likely to be taking an antipsychotic medication. However, the rate with which all of the depressed individuals in the present investigation, with or without ASD, were treated with antipsychotic drugs was higher than we had anticipated, including 83% of the ASD group and 49% of the non ASD group. In a recent study, Tsakanikos and colleagues (2007) looked at individuals with ID and behavior problems. Those with an ASD diagnosis were more likely to be treated with psychotropic medications, despite having clinical issues similar to peers with ID who did not have a pervasive developmental disorder. As noted, the inpatient sample in the present study had high rates of aggression or self-injurious behavior.

Some experts in the field of ID have expressed concern that antipsychotic medications may be used at high rates that are not clinically indicated (Kroese, Dewhurst, & Holmes, 2001; Langworthy-Lam, Aman, & Van Bourgondien, 2002; Lieberman et al., 2005). Given evidence that agitated behaviors may occur as “state-dependent” features, possibly a more aggressive approach to resolving the depression might mitigate the need to treat with additional medications targeting externalizing behaviors (Lowry & Sovner, 1992; Tsiouris, Cohen et al., 2003).

In the current investigation, the depressed inpatients with ASD were also treated with SSRIs more often than other depressed inpatients. The reason for this is unclear but may conceivably have arisen from the fact that at baseline, individuals with ASD tended to have high rates of repetitive behaviors (King & Bostic, 2006).

The present exploratory investigation is limited due to the small sample size and retrospective review of existing clinical data. Despite the aforementioned limitations, our findings highlight areas for future prospective investigation, including further examination of the relation between anxiety and depression in adults with ID and ASD. Other areas that may warrant future study include the frequency of antipsychotic medication treatment in people with ID (with and without ASD) and whether or not adults with ASD and ID experience more clinically severe mood syndromes when compared to peers without ASD.

Acknowledgments

This work was funded in part by NICHD grants to William J. McIlvane, Jr. (PI; R01 HD42807, P30 HD04147), and by the Commonwealth of Massachusetts.

REFERENCES

- American Psychiatric Association. Diagnostic and statistical manual of mental disorders. 4th ed., Text Revision. Author; Washington, DC: 2000.
- Angold AS. Childhood and adolescent depression II: Research in clinical populations. *British Journal of Psychiatry*. 1988; 153:476–492. [PubMed: 3074855]
- Bolton PF, Pickles A, Murphy M, Rutter M. Autism, affective and other psychiatric disorders: Patterns of familial aggregation. *Psychological Medicine*. 1998; 28:385–395. [PubMed: 9572095]
- Bradley E, Bolton P. Episodic psychiatric disorders in teenagers with learning disabilities with and without autism. *British Journal of Psychiatry*. 2006; 189:1–6. [PubMed: 16816298]
- Bradley EA, Summers JA, Wood HL, Bryson SE. Comparing rates of psychiatric and behavior disorders in adolescents and young adults with severe intellectual disability with and without autism. *Journal of Autism and Developmental Disabilities*. 2004; 34:151–161.
- Cantwell DP. Classification of child and adolescent psychopathology. *Journal of Child Psychology and Psychiatry*. 1996; 17:3–12. [PubMed: 8655656]
- Carlson G, Kashani JH. Phenomenology of major depression from childhood through adulthood: Analysis of three studies. *American Journal of Psychiatry*. 1988; 145:1222–1225. [PubMed: 3421342]
- Chalfant AM, Rapee R, Carroll L. Treating anxiety disorders in children with high functioning autism spectrum disorders: A controlled trial. *Journal of Autism & Developmental Disorders*. 2007; 37:1842–1857. [PubMed: 17171539]
- Chambers WJ, Puig-Antich J, Hirsch M, Paez P, Ambrosini PJ, Tabrizi MA, et al. The assessment of affective disorders in children and adolescents by semistructured interview: Test-retest reliability of the schedule for affective disorders and schizophrenia for school-age children, present episode version. *Archives of General Psychiatry*. 1985; 42:696–702. [PubMed: 4015311]
- Charlot LR. Irritability, aggression, and depression in adults with mental retardation: A developmental perspective. *Psychiatric Annals*. 1997; 27:190–197.
- Charlot, LR. Use of behavioral equivalents for symptoms of mood disorders.. In: Sturmey, P., editor. *Mood disorders in people with mental retardation*. NADD Press; Kingston, NY: 2005. p. 17–46.
- Charlot, LR.; Abend, S.; Silka, VR.; Kuropatkin, BB.; Garcia, O.; Bolduc, M., et al. A short stay inpatient psychiatric unit for adults with developmental disabilities.. In: Jacobson, J., editor. *Model programs for individuals with developmental disabilities and psychiatric disorders*. NADD Press; Kingston, NY: 2002. p. 35–53.
- Charlot L, Deutsch C, Hunt A, Fletcher K, McIlvane W. Validation of the Mood and Anxiety Semi-Structured (MASS) Interview for Patients with Intellectual Disabilities. *Journal of Intellectual Disabilities Research*. 2007; 51:821–834.

- Charlot LR, Doucette AD, Mezzacappa E. Affective symptoms in institutionalized adults with mental retardation. *American Journal of Mental Retardation*. 1993; 98:408–416. [PubMed: 8292317]
- Charlot, LR.; Fox, S.; Silka, VR.; Hurley, A.; Lowry, M.; Pary, R. Mood disorders in individuals with intellectual disabilities.. In: Fletcher, R.; Loschen, E.; Stavrakaki, C.; First, M., editors. *Diagnostic manual—intellectual disability (DM-ID): A textbook of diagnosis of mental disorders in persons with intellectual disability*. NADD Press; Kingston, NY: 2007. p. 271-316.
- Clarke DJ, Gomez GA. Utility of the DCR-10 criteria in the diagnosis of depression associated with intellectual disability. *Journal of Intellectual Disability Research*. 1999; 43:413–420. [PubMed: 10546966]
- Cohen J. A power primer. *Psychological Bulletin*. 1988; 112:155–159. [PubMed: 19565683]
- Gardner, W. Understanding challenging behaviors.. In: Griffiths, DM.; Gardner, WI.; Nuget, JA., editors. *Behavioral supports: Individual centered interventions: A multimodal functional approach*. NADD Press; Kingston, NY: 2000. p. 7-17.
- Ghaziuddin, M. Mental health aspects of autism and Asperger's syndrome. Jessica Kingsley Publishers; London: 2005. p. 127-148.
- Ghaziuddin M, Ghaziuddin N, Greden JF. Depression in persons with autism: Implications for research and clinical care. *Journal of Autism & Developmental Disorders*. 2002; 32:299–306. [PubMed: 12199134]
- Ghaziuddin M, Greden J. Depression in children with autism/pervasive developmental disorders: A case-control family history study. *Journal of Autism & Developmental Disorders*. 1988; 28:111–115. [PubMed: 9586773]
- Hamilton M. Development of a rating scale for primary depressive illness. *British Journal of Social and Clinical Psychology*. 1967; 6:278–296. [PubMed: 6080235]
- Honda H, Shimizu Y, Imai M, Nitto Y. Cumulative incidence of childhood autism: A total population study of better accuracy and precision. *Developmental Medicine & Child Neurology*. 2005; 47:10–18. [PubMed: 15686284]
- Howland RH. Fluoxetine treatment of depression in mentally retarded adults. *Journal of Nervous & Mental Diseases*. 1992; 180:202–205.
- Johnson CR, Handen BL, Lubetsky MJ, Sacco KA. Affective disorders in hospitalized children and adolescents with mental retardation: A retrospective study. *Research in Developmental Disabilities*. 1995; 16:221–231. [PubMed: 7652203]
- King BH, Bostic JQ. An update on pharmacologic treatments for autism spectrum disorders. *Child & Adolescent Psychiatric Clinics of North America*. 2006; 15:161–175. [PubMed: 16321729]
- Kroese BS, Dewhurst D, Holmes G. Diagnosis and drugs: Help or hindrance when people with learning disabilities have psychological problems? *British Journal of Learning Disabilities*. 2001; 29:26–33.
- Lainhart JE. Psychiatric problems in individuals with autism, their parents and siblings. *International Review of Psychiatry*. 1999; 11:278–298.
- Lainhart JE, Folstein SE. Affective disorders in autism. *Journal of Autism and Developmental Disorders*. 1994; 24:587–601. [PubMed: 7814308]
- Langworthy-Lam KS, Aman MG, Van Bourgondien ME. Prevalence and patterns of use of psychoactive medicines in individuals with autism in the Autism Society of North Carolina. *Journal of Child & Adolescent Psychopharmacology*. 2002; 12:311–321. [PubMed: 12625991]
- Leyfer OT, Folstein SE, Bacalman S, Davis NO, Dinh E, Morgan J, et al. Comorbid psychiatric disorders in children with autism: Interview development and rates of disorders. *Journal of Autism and Developmental Disorders*. 2006; 36:849–861. [PubMed: 16845581]
- Lieberman JA, Stroup TS, McEvoy JP, Swartz MS, Rosenbeck RA, Perkins DO, et al. Effectiveness of antipsychotic drugs in patients with chronic schizophrenia. *New England Journal of Medicine*. 2005; 353:1209–1223. [PubMed: 16172203]
- Liu X, Hubbard JA, Fabes RA, Adam JB. Sleep disturbances and correlates of children with autism spectrum disorders. *Child Psychiatry and Human Development*. 2006; 37:179–191. [PubMed: 17001527]
- Lowry M. Assessment and treatment of mood disorders in persons with developmental disabilities. *Journal of Developmental and Physical Disabilities*. 1998; 10(4):387–406.

- Lowry M, Sovner R. Severe behavior problems associated with rapid cycling bipolar disorder in two adults with profound mental retardation. *Journal of Intellectual Disabilities Research*. 1992; 36:269–281.
- Lunsky Y, Paluka AM. Depression and intellectual disability. *Current Opinions in Psychiatry*. 2004; 17:359–363.
- Meins W. Symptoms of major depression in mentally retarded adults. *Journal of Intellectual Disabilities Research*. 1994; 39:41–45.
- Moffitt TE, Harrington H, Caspi A, Kim-Cohen J, Goldberg D, Gregory AM, et al. Depression and generalized anxiety disorder: Cumulative and sequential comorbidity in a birth cohort followed prospectively to age 32 years. *Archives of General Psychiatry*. 2007; 64:651–660. [PubMed: 17548747]
- Pary RJ, Levitas AS, Hurley AD. Diagnosis of bipolar disorder in persons with developmental disabilities. *Mental Health Aspects of Developmental Disabilities*. 1999; 2:37–49.
- Piven J, Palmer P. Psychiatric disorder and the broad autism phenotype: Evidence from a family study of multiple-incidence autism families. *American Journal of Psychiatry*. 1999; 156:557–563. [PubMed: 10200734]
- Reiss S, Rojahn J. Joint occurrence of depression and aggression in children and adults with mental retardation. *Journal of Intellectual Disabilities Research*. 1993; 37:287–294.
- Reynolds WM, Baker JA. Assessment of depression in persons with mental retardation. *American Journal of Mental Retardation*. 1988; 93:93–103. [PubMed: 3415843]
- Riemann D. Insomnia and comorbid psychiatric disorders. *Sleep Medicine*. 2007; 4:15–20.
- Rutter, M. Depressive disorders.. In: Rutter, M.; Tuma, AH.; Lann, IS., editors. *Assessment and diagnosis in child psychopathology*. Guilford; New York: 1998. p. 347-376.
- Schiffer R, Pope LE. Review of pseudobulbar affect including a novel and potential therapy. *Journal of Neuropsychiatry & Clinical Neurosciences*. 2005; 17:447–454. [PubMed: 16387982]
- Sheskin, D. *Handbook of parametric and nonparametric statistical procedures*. CRC Press; New York: 2004.
- Smeeth L, Cook C, Fombonne PE, Heavey L, Rodrigues LC, Smith PG, et al. Rate of first recorded diagnosis of autism and other pervasive developmental disorders in United Kingdom general practice, 1988 to 2001. *BMC Medicine*. 2004; 2:39. [PubMed: 15535890]
- Sovner R, Hurley AD. Do the mentally retarded suffer from affective illness? *Archives of General Psychiatry*. 1983; 40:61–67. [PubMed: 6849621]
- Stolker JJ, Heerdink ER, Leufkens HG, Clerkx MG, Nolen WA. Determinants of multiple psychotropic drug use in patients with mild intellectual disabilities or borderline intellectual functioning and psychiatric or behavioral disorders. *General Hospital Psychiatry*. 2001; 23:345–349. [PubMed: 11738466]
- Sullivan PF, Kendler KS. Typology of common psychiatric syndromes: An empirical study. *British Journal of Psychiatry*. 1998; 173:12–19.
- Tsakanikos E, Costello H, Holt G, Sturmey P, Bouras N. Behaviour management problems as predictors of psychotropic medication and use of psychiatric services in adults with autism. *Journal of Autism & Developmental Disorders*. 2007; 37:1080–1085. [PubMed: 17053989]
- Tsiouris JA. The diagnosis of depression in people with severe/profound intellectual disability. *Journal of Intellectual Disability Research*. 2001; 45:115–120. [PubMed: 11298250]
- Tsiouris JA, Cohen IL, Patti PJ, Korosh WM. Treatment of previously undiagnosed psychiatric disorders in persons with developmental disabilities decreased or eliminated self-injurious behavior. *Journal of Clinical Psychiatry*. 2003; 64:1081–1090. [PubMed: 14628984]
- Tsiouris JA, Mann R, Patti PJ, Sturmey P. Challenging behaviours should not be considered as depressive equivalents in individuals with intellectual disability. *Journal of Intellectual Disability Research*. 2003; 47:14–21. [PubMed: 12558691]
- Weller EB, Kloos A, Kang J, Weller RA. Depression in children and adolescents: Does gender make a difference? *Current Psychiatry Reports*. 2006; 8:108–114. [PubMed: 16539885]

Wozniak J, Biederman J, Faraone SV, Frazier J, Kim J, Millstein R, et al. Mania in children with pervasive developmental disorder revisited. *Journal of the American Academy of Child and Adolescent Psychiatry*. 1997; 36:552–1559.

Age, Sex and Level of Functioning for N= 53 Psychiatric Inpatients with Intellectual Disabilities and Depression, With and Without ASD

TABLE 1

	ASD (n = 13)			Non-ASD (n = 40)			ASD vs. Non-ASD Comparison	
	n	Mean (SD)	%	n	Mean (SD)	%	p	
Age	13	39 (13.8)		40	41 (10.5)			.47 ^a
Sex								
Male	8		62	24		60		.92 ^b
Female	5		38	16		40		
Level of ID								
Mild	8		62	2		70		.27 ^c
Moderate	3		23	11		28		
Severe/Profound	8		15	1		2		

^aWilcoxon Rank Sum test.

^bChi-square test.

^cExact test.

Comparison of Rates for Mood, Anxiety, and Other Symptoms in Psychiatric Inpatients with Intellectual Disabilities, With and Without ASD, who had been Diagnosed with Depressive Disorder NOS or Major Depressive Disorder at Discharge

TABLE 2

Symptom clusters	ASD (n=13)		Non-ASD (n=40)		Exact test ASD vs. Non-ASD		p	PHI	Effect size
	n	%	n	%					
<i>DSM-IV-TR</i> Anxiety symptoms	8	62	21	53			.75	.08	0.16
Anxiety									
Difficult to console	7	54	14	35			.33	.17	0.35
Restless/Tense	10	77	19	48			.11	.11	0.22
Fatigue	10	77	26	65			.51	.11	0.22
Decreased concentration	10	77	24	60			.33	.15	0.30
Irritable	10	77	29	73			1.00	.04	0.08
Decreased sleep	8	62	12	30			.05	.28	0.58
Panic	2	15	5	13			1.00	.01	0.02
OCD symptoms									
Obsessions	6	46	14	35			.52	.10	0.20
Compulsions	6	46	9	23			.16	.23	0.47
<i>DSM-IV-TR</i> Depression symptoms									
Depression	9	69	28	70			1.00	.10	0.20
Anhedonia	10	77	32	80			1.00	.03	0.06
Irritability	10	77	29	73			1.00	.04	0.08
Fatigue	10	77	26	65			.51	.11	0.22
Decreased concentration	10	77	24	60			.33	.15	0.30
Excessive guilt	3	23	11	28			1.00	.04	0.08
SI/morbid ideas	2	15	15	38			.18	.20	0.41
Decreased appetite/weight	6	46	10	25			.18	.20	0.41
Increased appetite/weight	1	8	8	20			.42	.14	0.28
Decreased motor activity	4	31	21	53			.21	.19	0.39
Increased motor activity	8	62	16	40			.21	.19	0.39
Increased sleep	2	15	8	20			1.00	.05	0.10
Decreased sleep	8	62	12	30			.05	.28	0.58
<i>DSM-IV-TR</i> Mania symptoms									

Symptom clusters	ASD (<i>n</i> =13)		Non-ASD (<i>n</i> =40)		Exact test ASD vs. Non-ASD		<i>p</i>	PHI	Effect size
	<i>n</i>	%	<i>n</i>	%					
Elated mood	2	15	3	8			.59	.12	0.24
Rapid speech	2	15	4	10			.63	.07	0.14
Manic overactivity	0	0	2	5			1.00	.11	0.22
Hypersexual	3	23	2	5			.09	.27	0.56
Grandiose	0	0	3	8			.57	.14	0.28
Mood swings	5	38	16	40			1.00	.01	0.02
Flight-of-ideas	0	0	0	0			1.00	.01	0.02
Other									
Assaults	11	85	26	65			.30	.18	0.37
Self-injurious behavior	9	68	16	40			.11	.25	0.52
Tics	3	23	4	10			.34	.17	0.35

ASD = autism spectrum disorders; NOS = not otherwise specified; OCD = obsessive-compulsive disorder; SI = suicidal ideation (*DSM-IV-TR*; American Psychiatric Association, 2000).

TABLE 3

Psychoactive and Other Medications at Discharge for Psychiatric Inpatients with Intellectual Disabilities and Depression, With and Without ASD

Medications	ASD (n=12) ^a		Non-ASD (n=39) ^a		Exact test ASD vs. Non-ASD		p	PHI	Effect size
	n	%	n	%					
SSRI	12	100	28	72			.05	.29	0.61
Other antidepressants	1	8	12	31			.15	.22	0.45
Trazodone (for sleep)	4	33	11	28			1.00	.05	0.10
Any antipsychotic	10	83	19	49			.05	.30	0.63
Atypical antipsychotic	7	58	18	46			.52	.10	0.20
Older antipsychotics	4	33	4	10			.08	.27	0.56
Benzodiazepines	5	42	15	38			1.00	.03	0.06
Antiepileptics	5	42	20	51			.74	.08	0.16
Lithium carbonate	1	8	2	5			1.00	.06	0.12
Antihypertensives	5	42	8	20			.25	.21	0.43
GERD medications	3	25	11	28			1.00	.03	0.06
Anti-Parkinsonian	6	50	21	54			1.00	.03	0.06

ASD = autism spectrum disorders; SSRI = selective serotonin reuptake inhibitor; GERD = gastroesophageal reflux disease.

^aMissing data.

Comorbid Medical Diagnoses at the Time of Discharge for Psychiatric Inpatients with Intellectual Disabilities and Depression, With and Without ASD

TABLE 4

Medications	ASD (n=12) ^a		Non-ASD (n=38) ^a		Exact test ASD vs. Non-ASD		p	PHI	Effect size
	n	%	n	%					
Constipation	7	58	18	47			.76	.06	0.12
URI	2	16	3	11			1.00	.07	0.14
Hyperlip/Chol	4	33	13	34			1.00	.03	0.06
Diabetes	1	8	2	8			1.00	.00	0.00
Obesity	1	8	4	16			.66	.10	0.20
Hypothyroidism	1	8	13	34			.08	.26	0.54
Hypertension	4	33	13	34			1.00	.03	0.06
H/O or current seizures	4	33	14	37			.75	.06	0.12
H/O or current UTI	2	16	3	11			1.00	.07	0.14
GERD	4	33	12	32			1.00	.01	0.02
Misc. neurological	2	16	16	42			.10	.24	0.74
Hearing and vision	2	16	8	21			1.00	.06	0.12

ASD = autism spectrum disorders; URI = urinary tract infection; Hyperlip/Chol = hyperlipidemia and hypercholesterolemia; H/O = history of; GERD = gastroesophageal reflux disease.

^aMissing data.