

AUTISM Spectrum Disorders and Suicidality

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Abstract: The paper describes the suicidal ideation and behavior in a series of 26 adult psychiatric patients affected by Autism Spectrum Disorders (ASDs), the clinical features and the psychiatric comorbidity of patients presenting suicidal behavior, and the history of suicide or suicide attempt in their relatives. Two (7.7%) patients committed suicide. One (3.8%) patient attempted suicide twice, and one (3.8%) patient self-harmed by cutting his face and one finger of his hand with a razor. Eight (30.8%) patients presented suicidal ideation. Two (7.7%) patients had one relative who had attempted suicide, and two (7.7%) patients had one or more relatives who had committed suicide. Most patients with suicidal behavior or ideation presented psychotic symptoms. Although it is not clear whether the high suicidal risk is related with ASDs per se or with psychotic symptoms, a high index of suspicion is warranted in evaluating suicidal risk in patients affected by ASDs, whatever is their age, psychiatric comorbidity, and setting of visit.

Key Words: Autism spectrum disorders, Pervasive developmental disorders, Psychotic signs, Schizophrenia, Suicide.

INTRODUCTION

There are few reports on suicidal behavior among patients with Autism Spectrum Disorders (ASDs). Causes of under-reporting may be the low rate of suicidal behavior among children and pre-adolescents and the under-diagnosing of ASDs in the adult psychiatric setting.

Suicide is rare in childhood and early adolescence, and becomes more frequent with increasing age. Worldwide annual rates of suicide are respectively 0.5 per 100,000 for females and 0.9 for males among 5-14-year-olds, and 12.0 for females and 14.2 for males among 15-24-year-olds [1].

A systematic review of the literature [2] on the prevalence of suicidal phenomena in adolescents (128 studies, comprising 513,188 adolescents), found that the mean proportion of adolescents reporting having attempted suicide at some point in their lives was 9.7% (95% CI, 8.5-10.9), whilst 29.9% (95% CI, 26.1-33.8) of adolescents said they had thought about suicide at some point.

Only few studies examined suicidal behavior of children and adolescents affected by ASDs. In a study [3] on 126 children referred to a child psychiatric ward because of suicidal behavior, 123 (97%) were diagnosed as having at least one definite psychiatric diagnosis. Children with suicidal behavior made out 6% of all referred male and female children. Among them, 7 boys suffered from psychoses and Pervasive Developmental Disorders (PDDs), whilst the rest of the boys suffered from attention deficit and hyperactivity disorders or mixed disorders of conduct and emotions.

Hardan & Sahl [4] examined suicidality in a clinically referred sample of children and adolescents and found that 47

(20%) patients experienced either suicidal ideation, threats, or attempts. They observed suicidality more often in individuals with oppositional defiant disorder, depressive disorder, and post traumatic stress disorder, and less often in the autistic and the severely mentally retarded groups. They observed suicidal behavior frequently in children and adolescents with developmental disabilities other than Autistic Disorder (AD), however.

In a consecutive study [5] of adolescents who had attempted suicide and had been hospitalized for inpatient treatment, 12 of the 94 subjects (12.8%) were affected by PDDs.

To our knowledge, there is no study on suicidal behavior among adult people with ASDs, possibly because psychiatrists caring adult people are not familiar with the diagnosis. In fact, ASDs are usually considered a condition of childhood and the diagnosis and treatment of ASDs has only recently gained attention also in adult psychiatry.

The awareness of the ASDs diagnosis has been considered contingent on certain key professionals, who are interested in the area [6]. Patients with ASDs attending psychiatric services for adult people often receive a dual diagnosis, but most of them are diagnosed late or are wrongly considered to have schizophrenia [7]. Actually, these patients are clinically more similar to psychiatric patients affected by schizophrenia, mood, or obsessive compulsive spectrum disorders than to patients with ASDs attending neuropsychiatric services for children and adolescents or autism and developmental centers, who don't have a dual diagnosis.

The aims of the present study are: (a) to describe suicidal ideation and behavior in a relatively large series of adult psychiatric patients with ASDs; (b) to describe the clinical features of patients presenting suicidal behavior and evaluate their psychiatric comorbidity; (c) to assess history of suicide or Suicide Attempt (SA) in their relatives.

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METHODS

Sample Selection

Since 1994 we studied intensively all consecutive subjects who presented symptoms of ASDs in the Psychiatric Intensive Care Unit (PICU) of a general hospital and in private practice. According to DSM-IV diagnostic criteria and associated features of AD or Asperger's Syndrome (AS), we considered signs suggestive of PDDs the following: impairment in communication or social interactions, failure to develop adequate peer relationships, lack of spontaneous seeking to share enjoyment, interests, or achievements with other people, lack of social or emotional reciprocity, restricted repetitive or stereotyped patterns of behavior, interests, and activities, cognitive verbal and non verbal impaired abilities and super-abilities; clumsy, uncoordinated movements; repetitive behavior, atypical obsessions or compulsions, and stereotypies.

Furthermore, we included in our diagnostic criteria good sense of humor; ability to imitate, and history of several inconsistent psychiatric diagnoses on the basis of our personal experience with patients affected by ASDs, visited in the adult psychiatric setting. Whenever we recognized one of these clinical features, we made intensive clinical assessment, including medical charts review and interview with patient's relatives to confirm the diagnosis. The diagnoses according to DSM-IV-TR were made by agreement of two authors who are senior neurologists and psychiatrists (MR, AA). Subjects with PDDs present heterogeneous symptoms and the categorical boundaries among the most common PDDs – AS, AD, PDDs-Not Otherwise Specified (NOS) – lack of diagnostic validity. These disorders lie on an autism spectrum [8-10]. Walker *et al.* [11] found even the residual class of PDDs-NOS highly heterogeneous. Accordingly, we neglected this uncertain subtyping and chose to use in the analysis the generic diagnosis of ASDs which is more and more utilized in the current research [12].

Comparisons and Assessment

Patients with ASDs vs all Other Patients

In order to compare patients with ASDs and patients with other diagnoses, we considered only the 11 patients admitted to the PICU, because patients visited in the private practice were not always assessed using rating scales. In the comparison, we considered socio-demographic (age, gender, civil status, parenthood), and clinical variables [Brief Psychiatric Rating Scale, Scale for the Assessment of Positive Symptoms, Scale for the Assessment of Negative Symptoms, Mini Mental State Examination, Clinical Global Impression (CGI), Global Assessment of Functioning (GAF), Morrison's scale [13], Unified Parkinson's Disease Rating Scale, Barnes Akathisia Scale, daily dose of antipsychotic treatment expressed in chlorpromazine-equivalents [14] on admission and on discharge]. Regarding relative oral potency of 2nd generation antipsychotics, we considered chlorpromazine 100 mg equivalent to clozapine 50 mg, risperidone 1.6 mg, sertindole 3.2 mg, olanzapine 5 mg, quetiapine 200 mg, amisulpride 200 mg, aripiprazole 7.5 mg. We registered patients' previous SAs. Furthermore, we asked patients whether in the previous month they had: a) wished to die, b) thought about suicide in general, c) thought about methods

for possible suicide, d) attempted suicide or self-harmed anyway. Patients with ≥ 2 positive answers were considered with explicit suicidal risk. Although we collected the data prospectively to study suicidal behavior in ASDs patients with dual diagnosis, we conducted the present study retrospectively through use of record charts. All patients gave oral consent to participate to the study and collaborate fully.

Statistical Analysis

All data were entered into a SPSS database. An alpha of 0.05 was used for all statistical analyses. Only non parametric tests were used, because the distribution of the variables was not normal. Demographic and clinical features were compared across groups using Chi-Square test and Fisher's exact test for categorical variables and Mann-Whitney U test for continuous variables.

RESULTS

Suicidality in Patients with ASDs.

In the last 15 years, we diagnosed ASDs in 26 subjects [25 men, 1 woman; mean age (\pm SD): 30.2 years (± 9.8); mean years of education (\pm SD): 11.7 years (± 7.1); mean I.Q. (\pm SD): total: 83.5 (± 18.2); verbal: 92.0 (± 19.4); non-verbal: 75.9 (± 19.2)]. Sixteen subjects received a DSM-IV-TR diagnosis of AS, 5 of AD, and 5 of PDDs-NOS.

Table 1 reports gender, age, ASDs diagnosis, suicidal ideation or behavior, psychiatric symptoms in relatives, delusions, hallucinations, and disorganized thought. Table 2 reports years of education, child/adolescent history, social, cognitive and psychological functioning, and I.Q. Two (7.7%) patients committed suicide, one, affected by PDDs-NOS, schizophrenia and alcohol abuse by jumping from a bridge, and one, affected by AS and schizophrenia, by disembowlement. Total I.Q. was 96 in the former (verbal I.Q. 108, non verbal I.Q. 80) and 75 in the latter (verbal I.Q. 89, non verbal I.Q. 66). One (3.8%) patient, affected by mood disorder with psychotic signs, with total I.Q. 103 (verbal I.Q. 107, non verbal I.Q. 98), attempted suicide twice, cutting and injecting air in his veins. One (3.8%) patient, affected by mood disorder with psychotic signs, with total I.Q. 80 (verbal I.Q. 85, non verbal I.Q. 76), cut his face and one finger of his hand with a razor. Eight (30.8%) patients presented suicidal ideation. Two (7.7%) patients had one relative who had attempted suicide, and two (7.7%) patients had one or more relatives who had committed suicide.

In their lifetime, twenty-one of 26 (80.8%) subjects presented delusions and nineteen of 26 (73%) presented hallucinations. Among the 22 (84.6%) cases who presented hallucinations or delusions, 16 received a concurrent diagnosis of schizophrenia and 6 of mood spectrum disorder with psychotic signs. Other concurrent diagnoses were obsessive-compulsive disorder (OCD) (n. 2), and substance abuse disorder (n. 4). Positive psychotic symptoms were reported among relatives of 5 (19.2%) patients and a mood disorder diagnosis among relatives of 8 (30.8%) patients. Schizophrenia had been diagnosed in a relative of one patient (3.8%). We did not find any difference among patients with and without suicidality regarding the considered socio-demographic or clinical variables, except for anxiety which

Table 1.

Age, Gender, Diagnosis	Suicidality	Psychiatric Comorbidity	Psychiatric Familiarity	Delusions	Hallucinations	Conceptual Disorganization
33 ♂ AD		Schi, OCD, alcohol abuse		Persecution, horror, sex		
20 ♂ AS	Suicidal ideation	Schi		Persecution, reference	Auditory	Circumstantiality
42 ♂ AS		Schi	Grandmother: depression	Religiosity; thought reading and withdrawal	Auditory, Visual	Echolalia
18 ♂ PDD-NOS		Schi	Father: SAD; sister: cyclothymia	Persecution, religiosity	Auditory	Derailment, illogicality, incoherence
31 ♂ AS		Schi	Mother: personality disorder NOS	Persecution	Auditory, visual	illogicality
31 ♂ AS		Schi; substance abuse	Uncle: AS persecutory delusions Aunt: persecutory delusions	Persecution	Auditory	Illogicality, incoherence, tangentiality
23 ♂ AS	Suicide by disembowelment	Schi	Uncle: mental retardation; Grandmother: alcoholism	Reference	Auditory, olfactory	
36 ♂ AS	Suicidal ideation	Schi	Sister: anxiety Father: PD-NOS	Reference	Auditory, olfactory, somatic, visual	Illogicality, incoherence, tangentiality
34 ♂ AD		Schi		Persecution	Auditory	
42 ♂ AS		Schi	Mother: cold and strange, OCD Father: depression 2 sisters: eating disorder	Persecution, reference, guilt, religiosity	Olfactory, somatic	Circumstantiality, tangentiality
28 ♂ PDD-NOS	Suicide by fall	Schi, alcohol abuse	Unknown	Persecution, reference, religiosity, megalomania		Illogicality, incoherence, tangentiality
19 ♀ AS	Suicidal ideation	Mania with psychotic signs	Father and grandfather: anxiety, depression, hypochondriasis Uncle: paranoid delusions, SA	Sex, somatization		
25 ♂ AS		Depression		Persecution and reference	Auditory	
30 ♂ AD	Suicidal ideation	Depression	Sister of grandmother: complete isolation	Magic, esoteric content	Auditory, olfactory, visual	
31 ♂ AS	Suicidal ideation	Depression, agitation, hostility	Brother: PD-NOS; Two cousins, son of a mother's cousin: suicides			
19 ♂ AS	Suicidal ideation		Grandfather: SA			
35 ♂ AS		Schi	Father: depression Mother: StPD, autistic behavior		Olfactory	

Table 1.

Age, Gender, Diagnosis	Suicidality	Psychiatric Comorbidity	Psychiatric Familiarity	Delusions	Hallucinations	Conceptual Disorganization
30 ♂ AS	Suicide attempts	MDps		Persecution	Olfactory	
48 ♂ AS		Schi	Aunt: PD-NOS; Uncle: suicide by fall	Delusion of reference	Auditory	Illogicality
16 ♂ AD			Grandmother: depression Mother: hyperthymic			
32 ♂ AD		MDps; OCD	Aunt: chronic psychosis Uncle: OCD	Persecution	Auditory	
20 ♂ AS		Schi		Persecution, reference, somatization	Auditory, thought eco	Circumstantiality, logorrhea,
22 ♂ AS	Suicidal ideation	Schi	Two cousins: depression	Persecution, reference, magic	Auditory, visual	
56 ♂ PDD-NOS		Alcohol abuse				
39 ♂ PDD-NOS	Suicidal ideation	Schi	Grandmother: depression with somatic delusions Grandfather: alcoholism Father: irritable, choleric, violent Sister: SA	Persecution, reference, guilty	Auditory, visual	Circumstantiality
25 ♂ PDD-NOS	Self-harm (cutting his face and hand with a razor)	MDps	Grandfather: OCD Brother of grandfather: Schi Brother: SAD Mother: anxiety Uncle: PD-NOS; Aunt: complete isolation	Persecution, reference, magic-esoteric,	Auditory	

AD = Autistic disorder; AS = Asperger's syndrome; BPD = Borderline personality disorder; MDps = Mood disorder with psychotic signs; PD-NOS = Psychiatric disorder not otherwise specified; PDD-NOS = Pervasive developmental disorder not otherwise specified; SAD = Schizoaffective disorder; Schi = Schizophrenia; SdPD = Schizoid personality disorder; OCD = Obsessive-compulsive disorder; StPD = Schizotypal personality disorder;

is more frequent in patients with suicidality than in those without (66.7% vs. 21.4%, $p=0.03$).

ASDs Patients Compared to all Psychiatric Patients

Compared with patients admitted to the PICU who received other diagnoses, patients with ASDs were younger, mostly males, more frequently without children; They were more severely affected at the CGI score, and they had lower current GAF score and best GAF score in the last year (i.e., worse functioning), more severe negative symptoms, more retire/retard, and higher vulnerability to motor side effects of treatment with antipsychotics. Interestingly, they had never attempted suicide in the past but had more frequently suicidal ideation (5 out of 10 vs 622 of 1502), even in a not statistically significant way.

DISCUSSION

To our knowledge, this is the first study on suicidal behavior in adult patients affected by ASDs. Several limita-

tions of the study must be acknowledged. 1) Since patients with ASDs and no severe psychiatric comorbidity seldom seek assistance to adult psychiatry services, the sample of the study can be considered relatively large, but the absolute number of patients is actually small. 2) We did not use standardized diagnostic instruments because we choose to widen the spectrum of symptoms suggestive of ASDs and not to set rigid inclusion/exclusion criteria in order to increase the sensitivity of diagnostic assessment. Similar reasons prompted other authors to modify DSM-IV or ICD-10 criteria, to treat AS and High Functioning Autism interchangeably, or to use investigator-defined criteria, although, doing so, they make it difficult to compare studies [15]. Whenever we noted a symptom suggestive of ASDs, intensive clinical assessment allowed a reliable diagnosis of ASDs, according to DSM-IV-TR. The discrepancy between verbal and non verbal I.Q. assisted the diagnosis of ASDs. 3) Since the reported patients are characterized by a high functioning level and most of them do not have mental retardation by IQ, the results of the study cannot be generalized to most patients affected by

Table 2.

Age, Gender, Diagnosis	Educational (years)	Childhood/Adolescent History	Social, Cognitive, and Psychological Functioning	I.Q.
33 ♂ AD	14	Introverted. No interest in making peer friendship. Poor social intercourse. Better interaction with adults. Fatuous attitude.	Detached from interpersonal relationships. Focusing attention on the most significant stimulus. Poor vocabulary and syntax. Asking repetitive inappropriate questions. Hyper-ability in verbal and visual memory, and mathematics. Pervasive circumscribed interests. Distress over trivial changes in the environment. Obsessions. Stereotypes. Clumsiness.	Total IQ: 79 Verbal IQ: 96 Non Verbal IQ: 59
20 ♂ AS	8	Introverted. Difficult relationships with same age children. Intolerance of any remark	No friend, no jobs, no interests, no hobbies. Prodigious memory. Unusual ability to grasp the double meaning of words. Pervasive circumscribed interests. Circumstantial and poor of content speech. Distress over trivial changes in the environment. Asking repetitive questions. Stereotypes. Clumsiness.	Total IQ: 73 Verbal IQ: 84 Non Verbal IQ: 62
42 ♂ AS	11	Impaired social interaction with his fellows. Nice, jocular, facetious in his relation with adults. Periods of mutism.	Bizarre and awkward communication. Echolalia. No friend, no jobs, no interests, no hobbies. Pervasive circumscribed interests. Hilarious attitude. Repetitive questions, contradictory answers. Bizarre thoughts. Endlessly doubts. Stereotypes. Clumsiness.	Total IQ: 46 Verbal IQ: 55 Non Verbal IQ: 40
18 ♂ PDD-NOS	8	Minimal spontaneous speech. Periods of mutism, over-eating and under-eating. Inexpressive, unreactive.	Poor relationship with his schoolmates. Lonely. Minimal speech. Frequently mute. No eye contact. Coprophagy. Monosyllabic, frequently contradictory answers. Echolalia. Prodigious memory. Compulsive cleaning of his teeth. Stereotypes. Clumsiness.	Total IQ: 73 Verbal IQ: 77 Non Verbal IQ: 71
31 ♂ AS	13	Introverted, disinclined to relationships. No interest in other people. Lack of social or emotional reciprocity	Social isolation and inability to function in almost all areas. No contact with anyone but his grandfather and mother. Poor verbal communication and eye contact. Pervasive circumscribed interests. Slow, repetitive, pedantic speech. Obsessions. Clumsiness.	Total IQ: 88 Verbal IQ: 94 Non Verbal IQ: 81
31 ♂ AS	8	Introverted, disinclined to relationships.	Lack of empathy. Only one friend, no jobs, no interests, no hobbies, no sentimental relationships. Poor abstract thinking. Obsessive thought. Blunted affect, emotional withdrawal. Clumsiness.	Total IQ: 66 Verbal IQ: 72 Non Verbal IQ: 66
23 ♂ AS	14	Poor communication. Inattentive, restless, lively, turbulent, saucy. He used to play, dance, run all alone. Unmotivated laughs.	Impaired social interaction with his fellows. Better relationship with adults. Soliloquy. Poor handwriting and outcome in mathematics, spelling errors. Excellent memory, very able to play a part or to draw. Restlessness. Keeps useless objects. Interested only in watching football games or films on TV. Stereotypes. Clumsiness	Total IQ: 75 Verbal IQ: 89 Non Verbal IQ: 66
36 ♂ AS	9	Lonely. No playing with his fellows. Wandering eyes.	Social isolation. Poor school outcome. Prodigious memory of dates. Scanty and poor of content speech. Long pauses. Delayed answers. Compulsions. Mannerisms, stereotypes. Clumsiness	Total IQ: 76 Verbal IQ: 85 Non Verbal IQ: 67
34 ♂ AD	8	Attention deficit, poor concentration, learning difficulties. Poor school outcome.	Shy, embarrassed, unable to communicate, sensitive, lonely. Inappropriate eye contact. No friends, no personal or social relationship. Unable to follow rules. Prodigious eidetic memory. Accumulation of car miniatures and foreign money. Severe compulsions. Mannerisms, stereotypes. clumsiness	Total IQ: 65 Verbal IQ.: 59 Non Verbal IQ: 76
42 ♂ AS	11	Precocious speech. Poor attention and concentration. Poor school outcome. Obsessions and compulsions.	Bizarre mimic, wide open eyes, far away gaze, Social isolation. No friends, no personal or social relationship. Circumstantial, tangential, pedantic speech. Hyper-ability to play on words. Stuttering. Delayed answers. Pervasive circumscribed interests. Obsessions. Mannerisms, stereotypes. Clumsiness.	Total IQ: 90 Verbal IQ: 110 Non Verbal IQ: 66
28 ♂ PDD-NOS	8	Mild speech delay. difficult relationship with his schoolmates and his adoptive parents.	Social isolation and inability to function in almost all areas. Unable to follow rules. Rebellious. Violation of norms. Habit of collecting bottles full of his urines. Stereotypes. Clumsiness	Total IQ: 96 Verbal IQ: 108 Non Verbal IQ: 80
19 ♀ AS	11	Precocious speech. Hyperactive, restless. Difficult relationship with her schoolmates	Social isolation. No friends, no jobs, no interests, no hobbies. Difficult relationships with his schoolmates. Better relationship with adults. Scanty and poor of content speech. Excellent memory. Obsessions, compulsions.	Total IQ: 70 Verbal IQ: 88 Non Verbal IQ: 54

Table 2. contd...

Age, Gender, Diagnosis	Educational (years)	Childhood/Adolescent History	Social, Cognitive, and Psychological Functioning	I.Q.
25 ♂ AS	13	Poor school outcome. Dyscalculia.	Impaired social interaction and communication. Lack of social and emotional reciprocity. Poor peer relationships and eye contact. No friends, no jobs. He spends time only watching films in TV or hearing music. Compulsions. Clumsiness.	NA
30 ♂ AD	14	Inappropriate peer relationships.	Impaired social interaction. Lack of social and emotional reciprocity. Tics, dysarthria, stuttering, dyslexia. Poor concentration and attention. Hyper-able to find original solutions of engineering. Pervasive circumscribed interests. Lonely, seldom leaving home. Obsessions, compulsions. Clumsiness.	Total IQ: 108 Verbal IQ: 105 Non Verbal IQ: 110
31 ♂ AS	13	Impaired social interaction with his fellows. Poor school outcome.	Shy, self-denigrating, methodical, but transient. Impaired social interaction with his fellows, easier interaction with adult people. Bizarre behavior. Pervasive circumscribed interests. Endless repetition of thoughts. Ruminative, poor of content speech. Clumsiness.	Total IQ: 60 Verbal IQ: 75 Non Verbal IQ: 48
19 ♂ AS	13	Pedantic speech. Rich vocabulary. Tics. Clumsiness. Good school outcome.	Introverted, depressed, obsessive. Complete social isolation from peers, easier relationship with adults. Poor speech and eye contact. Pervasive circumscribed interests. Compulsions. Accumulation of journals. Rigidly programmed routine. Mannerisms. Clumsiness.	Total IQ: 100 Verbal IQ: 131 Non Verbal IQ: 79
35 ♂ AS	15	Shy, precise, methodical. Rigid thoughts. Difficult relationship with people. Periods of mutism. Stereotypes.	Partially socially integrated. No friends, no sentimental relationships. Focused on the literal meaning of words. Antipathetic, insolent, exasperating. Fixative gaze. Pervasive circumscribed interests. Cold relationships with his family. Compulsions. Stuttering. Mannerisms.	Total IQ: 121 Verbal IQ: 121 Non Verbal IQ: 117
30 ♂ AS	15	Lonely. Isolated and ostracized at school. Poor outcome at school. Stereotyped movements.	Isolated. Impaired social interaction with his fellows. Easier interaction with adults. Only one sentimental relationship. Pervasive circumscribed interests. Excellent ability to narrate histories. Stuttering. Explosive words. Compulsions to collect journals. Stereotypes.	Total IQ: 103 Verbal IQ: 107 Non Verbal IQ: 98
48 ♂ AS	14	Impaired social interaction with his fellows. Poor school outcome.	No friends, no sentimental relationship, no jobs, no interests, no hobbies. Poor eye contact. Gaze on irrelevant targets. Bizarre behavior. Hyper-ability in mechanics and drawing. Obstinate, tidy, resistant to change mind. Echolalia. Contradictory answers. Distress over trivial changes in the environment. Scanty and poor of content speech. Stereotypes. clumsiness	Total IQ: 100 Verbal IQ: 105 Non Verbal IQ: 96
16 ♂ AD	9	Impaired social interaction with his fellows. Poor writing and school outcome. Verbal stereotypes.	Impaired social interaction. No friends, no sentimental relationship. Poor eye contact, lack of reciprocity, bizarre behavior. Short, stereotyped sentences, delayed answers, explosive words, dysprosodia. Fascination with spinning objects. Stereotypes. clumsiness	NA
32 ♂ AD	13	Impaired social interaction with his fellows. Mild delay in speech. Capable of relationship with adults. Poor school outcome.	Anxiety during interaction with other people. No friends. He likes only computers and travel. Dyscalculia. Poor writing. No sense of money. Collection of useless objects. Obsessions. Stereotypes. clumsiness	Total IQ: 71 Verbal IQ: 72 Non Verbal IQ: 73
20 ♂ AS	15	Hyperability in reading, verbal and eidetic memory, checking orthographical errors immediately. Impaired social interaction with his fellows. he spent most of his time using computers. Hyperactive.	Only one close friend in the course of years (his cousin) Very few acquaintances; no sentimental relationship; Possessory of his preferred foods and toys. Pervasive circumscribed interests. Accumulation of comic-strip magazines. Bizarre thoughts. Stereotyped smile. Clumsiness.	Total IQ: 86 Verbal IQ: 92 Non verbal IQ: 81
22 ♂ AS	15	Hyperability in the calculation of dates. Excellent school outcome.	Social isolation. Pervasive circumscribed interests. Clumsiness.	Total IQ: 102 Verbal IQ: 112 Non Verbal IQ: 89
56 ♂ PDD-NOS	12	Impaired social interaction. Poor school outcome. Short communications, out of context	No friends; in the past: short sentimental relations. Hyper-methodical in his habits. Tendency to syllabise words; stopped words. Accumulation of comic-strip magazines. Pervasive circumscribed interests. Clumsiness.	Total IQ: 95 Verbal IQ: 95 Non Verbal IQ: 95

Table 2. contd...

Age, Gender, Diagnosis	Educational (years)	Childhood/Adolescent History	Social, Cognitive, and Psychological Functioning	I.Q.
39 ♂ PDD-NOS	17	Impaired social interaction. Periods of mutism. Hyper-ability in reading	Stereotyped facial expression. Punctilious, pedantic, distractible, repetitive, meticulous, uncreative. Pedantic speech. Stuttering. Pervasive circumscribed interests. Accumulation of magazines. Obsessions. Clumsiness	NA
25 ♂ PDD	8	Impaired social interaction with his fellows. Poor school outcome.	Introverted, lonely, punctilious, pedantic, sensitive. Inappropriate, bizarre communications. Memory talent. Previous unskilled jobs for short periods of time, currently no job. Obsessions, compulsions. Clumsiness	Total IQ: 80 Verbal IQ: 85 Non Verbal IQ: 76

AD = Autistic disorder; AS = Asperger’s disorder; BPD = Borderline personality disorder; MDps = Mood disorder with psychotic signs; PD-NOS = Psychiatric disorder not otherwise specified; PDD-NOS = Pervasive developmental disorder not otherwise specified; SAD = Schizoaffective disorder; Schi = Schizophrenia; SdPD = Schizoid personality disorder; OCD = Obsessive-compulsive disorder; StPD = Schizotypal personality disorder; NA= Not available.

Table 3.

	Patients with ASDs: 11	Patients with Other Diagnoses: 2495	χ ² or U	P-value
Males	10 (90.9%)	1133 (45.4%)	9.14	.004§ .003*
Single	11 (100%)	1752 (77.9%)	3.12	.136§ .08*
Children	0	743 (38.6%)	6.9	.009§ .009*
Commitment	3 (27.3%)	644 (26%)	0.01	1.00§ .92*
Previous suicide attempt	No: 10; Yes: 0	No: 1082; yes: 381	3.51	.05§ .06*
Current suicidal ideation or behavior	No: 5; Yes: 5	No: 880; yes: 622	0.30	.75§ .58*
Age (years)	28.9 ±9.1	42.7 ±14.9	6026	.001
Years of education	10.5±2.01	11.05±4.02	7240	.7
CGI severity	(n=10) 6.20±0.42	(n=2008) 5.73±0.62	6431	.009
CGI improvement	(n=10) 2.20±1.03	(n=1990) 2.20±1.04	8811.5	.5
Current GAF score	(n=10) 18.7 ±6.3	(n.=1733) 23.5 ±8.1	5422.5	.04
Best GAF score in the last year	(n=10) 38.2 ±12.3	(n.=1474) 52.2 ±14.7	3575	.005
BPRS total score:	(n=9) 64.2 ±10.5	(n= 1423) 59.3 ±13.2	4886.5	.220
BPRS th score	(n=9) 10.7 ±4.1	(n=1424) 10.7 ±5.2	6173.5	.849
BPRS rr score	(n=9) 11.6 ±4.6	(n=1424) 6.6 ±4.1	2490.5	.001
BPRS hos score	(n=9) 7.3 ±4.0	(n=1423) 8.0 ±3.7	5780.5	.613
BPRS ad score	(n=9) 9.1 ±5.5	(n=1424) 9.5 ±4.5	6119.5	.815
SAPS score	(n=9) 41.3 ±18.8	(n=1423) 34.4 ±23.6	4897.5	.223
SANS score	(n=9) 72.6 ±15.1	(n=1424) 40.9 ±24.6	1863.5	<0.001
MMSE score	(n=9) 27.7 ±2.1	(n=1356) 26.7 ±3.2	5083	.383
UPDRS total score	(n=9) 12.1 ±5.5	(n=1332) 5.5 ±5.8	2122	.001
UPDRS rigidity score	(n=9) 0.3 ±0.5	(n=1338) 0.4 ±0.6	5763	.792
UPDRS tremor score	(n=9) 2.6 ±1.1	(n=1340) 1.2 ±1.4	2412.5	.001
UPDRS akinesia score	(n=9) 1.3 ±1.2	(n=1335) 0.7 ±1.0	4069	.05
BAS score	(n=9) 0.9 ±1.2	(n= 1335) 0.4 ±0.9	4550	.08

Table 3. contd....

	Patients with ASD: 11	Patients with Other Diagnoses: 2495	χ^2 or U	P-value
CPZ-eq dose on admission(mg)	(n=10) 261.8 \pm 133.0	(n=1762) 257.0 \pm 282.4	7143.5	.298
CPZ-eq dose on discharge(mg)	(n=10) 326.0 \pm 152.1	(n=1832) 359.1 \pm 313.0	8585	.731

BPRS = Brief Psychiatric Rating Scale; BPRS th = BPRS thought disorder cluster; BPRS rr = BPRS retard-retirement cluster; BPRS hos = BPRS hostility cluster; BPRS ad = BPRS anxiety-depression cluster; CGI: Clinical Global Impression; CPZ-eq = Chlorpromazine equivalent; GAF: Global Assessment of Functioning; MMSE = Mini Mental State Examination; n. = number; NA = Not assessed; SANS = Scale of Assessment of Negative Symptoms; SAPS = Scale of Assessment of Positive Symptoms; UPDRS = Unified Parkinson's Disease Rating Scale; BAS = Barnes Akathisia Scale; statistically significant p-values are in bold; χ^2 = Chi -Square test; U= Mann-Whitney U test ; §Fisher's exact test; * Chi-square; data are shown in frequency (percentage) or mean \pm standard deviation.

autism or severe PDD. 4) The meaning of ASDs and schizophrenia comorbidity in adult people is debatable. The high rate of comorbidity between ASDs and schizophrenia in this sample might suggest that suicidal risk is related more with the comorbid diagnosis of schizophrenia than with ASDs per se. However, the high rate of comorbidity between ASDs and schizophrenia could be only an artifact due to the DSM-IV-TR invalid exclusion of psychotic symptoms from the symptomatic spectrum of ASDs. Actually, if delusions or hallucinations had been considered features of ASDs, we would have always omitted the diagnosis of schizophrenia, since the ASDs diagnosis accounted for all the other symptoms. The relationship between ASDs and schizophrenia is still uncertain. While DSM-IV-TR considers ASDs distinct from schizophrenia, recent studies on comorbidity and familiarity join ASDs and schizophrenia again [16,17].

Despite these drawbacks, the study shows that suicidal behavior is highly prevalent in patients with ASDs attending psychiatric services for adult people. It is impressive the high suicide/SA ratio in this sample. In general, unsuccessful SAs outnumber completed suicides by a multiple by 16 [18]. According to Irwin & Shafer [19], for every completed suicide, there may be 50 to 120 SAs, with a female preponderance. Although the sample is too small to draw any firm conclusion, several hypotheses could be made to account for this discrepancy: a) higher male prevalence, since the suicide/SA ratio is higher in males; b) younger age and comorbid diagnosis of schizophrenia, since the early phase of this illness is characterized by the highest risk of suicide; c) pervasive obsessive traits suggesting low level of impulsivity and possible higher degree of planning. From a behavioral standpoint, suicide attempters who plan suicide resemble those who complete suicide more than those who attempt suicide impulsively, both biologically and behaviorally [20].

We wish also to emphasize our surprise in being informed of the completed suicide of two patients, both of whom we had visited and treated in the previous months and for whom we had not realized their suicidal risk.

Possibly, suicidal behavior in patients with ASDs is related with specific clinical variables different from those typically observed in psychiatric patients affected by mood or schizophrenia spectrum disorders. This could mislead clinicians in their evaluation. It has been hypothesized that low self-esteem due to repeated serious social failures, feelings of isolation, and the "conflict" between patients and their parents are psycho-social predisposing factors [21].

Recognizing suicidal risk in ASDs patients may be difficult also because typical symptoms indicating impending suicidal risk can be masked by other symptoms. Impaired communication and social interactions, inappropriate or bizarre behavior, cognitive deficits, prominent negative symptoms can make ASDs patients not easily accessible to psychiatric evaluation. Prominent negative signs can hide under hopelessness, sadness, anguish, and suicidal intention. Neuroleptic-induced akinesia and poverty of speech can cover emotional turmoil and give a misleading impression of stability, quiescence, or even calmness.

The absence of a previous SA should not minimize concern about suicidal risk. Many individuals commit suicide on their first or second attempt [22]. In one population-based study of completed suicides, 56% of the individuals were successful on the first attempt [23].

The results of this exploratory study suggest that among adult patients affected by ASDs and attending psychiatric services suicide is frequent, the suicide/SA ratio is high, and the suicidal risk may be difficult to ascertain. Although it is not clear whether the high suicidal risk is related with ASDs per se or with psychotic symptoms, a high index of suspicion is warranted in evaluating suicidal risk in patients affected by ASDs, whatever their age, psychiatric comorbidity, and setting of visit. A great deal of work remains before the relationship between ASDs and schizophrenia can be understood. Future researchers will need to confirm our findings with larger samples and in different settings.

LIST OF ABBREVIATIONS

AD	=	Autistic Disorder
AS	=	Asperger's Syndrome
ASDs	=	Autism Spectrum Disorders
CGI	=	Clinical Global Impression
GAF	=	Global Assessment of Functioning
OCD	=	Obsessive-Compulsive Disorder
PDDs	=	Pervasive Developmental Disorders
PDDs-NOS	=	Pervasive Developmental Disorders Not Otherwise Specified
PICU	=	Psychiatric Intensive Care Unit
SA	=	Suicide Attempt

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Received: July 06, 2010

Revised: December 14, 2010

Accepted: January 04, 2011

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