EFFICACY AND CLINICAL UTILITY OF THE DIAGNOSTIC SCALE FOR AUTISM SPECTRUM DISORDERS (DSASD)

Register No.: 02SH0011

A Dissertation submitted in part fulfillment of
Final year M.Sc. (Speech and Hearing),
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ALL INDIA INSTITUTE OF SPEECH AND HEARING
NAIMISHAM CAMPUS, MANASAGANGOTRI
MYSORE-570 006

MAY - 2004

Dedicated to :

All the wonderful children who have been
a part of this study and whose
"autism"
only makes them more special!

Ma & Papa
for being the wonderful parents that you are!

Certificate

This is to certify that this dissertation entitled **"Efficacy and Clinical Utility of the Diagnostic Scale for Autism Spectrum Disorders"** is bonafide work in part fulfillment for the degree of **Master of Science (Speech and Hearing)** of the student **(Register No. 02SH0011).**

Director
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Mysore
May, 2004

Certificate

This is to certify that this dissertation entitled **"Efficacy and Clinical Utility of the Diagnostic Scale for Autism Spectrum Disorders"** has been prepared under my supervision and guidance. It is also certified that this dissertation has not been submitted earlier in any other university for the award of any diploma or degree.

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May, 2004

DECLARATION

This is to certify that this dissertation entitled **"Efficacy and Clinical Utility of the Diagnostic Scale for Autism Spectrum Disorders"** is the result of my own study under the guidance of **Dr. Shyamala Chengappa,** Reader, Department of Speech Pathology, All India Institute of Speech and Hearing, Mysore, and has not been submitted earlier in any other university for the award of any diploma or degree.

Register No. 02SH0011

Mysore
May, 2004

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Adz (Buddhu!) : you know what you are to me. Thanks for all the freshness you bring into my life, without which I'd probably choke!

Anjana : you have been an inseperable part of my life in AIISH. I knew we would be friends the moment I met you!

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Thank you God, for giving me the strength to see this through.....

LIST OF FIGURES

INTRODUCTION

Autism and other Pervasive Developmental Disorders (PDDs) are a phenomenologically related set of neuropsychiatric disorders. These conditions are characterized by patterns of both delay and deviance in multiple areas of development, typically their onset is in the first months of life.

Leo Kanner (1943, cited in Volkmar, 1998) was the first to describe the syndrome of infantile autism which he initially believed to be quite different from the forms of childhood 'psychosis' then recognized.

A substantial body of research has established the validity of autism as a diagnostic concept, e.g.: on the basis its characteristics clinical features and course (Volkmar, 1998).

Childhood autism is the prototypic disorder in the spectrum of autistic disorders (DSM-IV, APA, 1994; ICD - 10, WHO, 1993). All disorders within the autistic spectrum are characterized by:

1. Qualitative impairments in social interaction.
2. Qualitative impairments in social communication.
3. A restricted repertoire of interests, behaviors and activities.

The assessment of the characteristics features in ASD/PDDs, and of particular deficits in psychological development and functioning, using appropriate scales and tests is indispensable to the diagnosis.

Until recently many children were not diagnosed before 4 or 5 years of age, or in many cases even later. (Howlin & Asgharian, 1999). However, progress has recently been made in the earlier identification of children with autism and many children are now first identified in the preschool period (Howlin & Asgharian, 1999).

Several factors have contributed to the decrease in age of referral and diagnosis of autism. Firstly, there has been an increase in recognition of the early features of autism amongst primary healthcare practitioners and this has lead to earlier referral to pediatric and child development specialists (Baird, Charman, Baron - Cohen, Cox, Swettenham, Wheelwright & Drew, 2000).

Secondly, attempts have been made to prospectively identify cases of autism using screening instruments (Charman & Baird, 2002). These have been applied both to general populations (Checklist for Autism in Toddlers, CHAT; Baird, Charman et al., 2000; Baron-Cohen, Wheelwright, Cox, Baird, Charman Swettenham, et al., 2000), and to referred populations (Modified-CHAT; Robins, Fein, Barton & Green, 2001). These studies have demonstrated that it is possible to identify some cases of autism by the age of 18 months. There is some evidence that

screening for ASD in referred children, where a concern about development has already been identified, may result in better sensitivity (Charman & Baird, 2002).

Thirdly, there is increasing evidence that appropriately targeted intervention improves outcome in children with ASD, and although not uncontroversial, the benefits of early intervention are clearly evident (Lovaas, 1987, cited in Charman & Baird, 2002). In addition some of the studies have also demonstrated positive outcomes in terms of IQ gains and reductions in symptom severity (Sheinkopf & Siegel, 1998).

Further, it is possible that early intervention might ameliorate the negative secondary consequences of the primary social orienting and communication deficits that characterize ASD. The growing recognition of the benefits of early intervention give added impetus to the move towards early, accurate identification of the children with ASD. Another impetus for the promotion of earlier identification is the fact that the risk of having a subsequent child with autism is substantially high. The chances of a more general problem in social communication or cognitive development are several terms higher still (Lauritsen & Ewald, 2001, cited in Charman & Baird, 2002).

While being welcome, this progress towards earlier referral and diagnosis presents new challenges to clinical practice. These include the accuracy and stability of early diagnosis, the utility of standardized assessment instruments with young pre-schoolers and the ability to indicate prognosis.

Hence, the present study endeavors to explore the clinical utility of the Diagnostic Scale for Autism Spectrum Disorders, which has been developed for use in the Indian context.

REVIEW OF LITERATURE

ASD is currently understood to involve a triad of symptoms:

a) impairments of social interaction

b) impairments of verbal and non verbal communication, and

c) restricted, repetitive and stereotyped patterns of behavior, interests and activities. (American Psychiatric Association (APA), 1994).

Because the pathophysiology of autism spectrum disorders is not yet established, clinicians and researchers rely on observing patterns of behavior within an individual and across time to make a diagnosis. Diagnosis of autism is also difficult because the best early indicators involve the absence of consistent social and communication behaviors rather than the presence of an abnormality. Another problem that may occur is that autism may very often be mis-diagnosed or mistaken for other developmental disorders. In part this is because most (but not all children with ASD have other learning problems, significant language delay or disorder or both, and additional comorbidities such as dyspraxia and behavioral problems. Thus, it becomes very important to differentially diagnose autism from the more common problems of speech and language delay, general developmental delay and behavioral difficulties (Charman & Baird, 2002).

Early diagnosis has become increasingly critical as treatments for the potentially devastating developmental disorder advance and research begins to show

that the earlier the disorder is diagnosed, the better the prognosis. Developmental researchers increasingly find that there are critical periods of child development after which certain systems—such as language, vision and motor skills—become less malleable.

Families may experience significant stress and confusion related to difficulties in identifying acknowledging and understanding their child's problem. (Prizant & Wetherby, 1993).

The diagnostic features of ASD should be evident in very young children because they involve abilities that develop typically in the first few years of life. As mentioned earlier, although most children with ASD are not diagnosed until 3 years of age, current research indicates that a diagnosis can be made reliably at 24 months of age by experienced clinicians, and that this diagnosis is likely to persist until 36 months of age. Research has demonstrated that a clinical diagnosis at 24 months of age was associated with the same diagnosis at 36 months of age or older in at least 80% of the children studied. (Lord, 1995; Stone, Lee, Ashford, Brissie, Hepburn, Coonrod, etal., 1999).

Diagnostic frameworks

A major achievement in the last 5 years has been producing diagnostic criteria for autism that are almost identical for the American system (APA 1994) and the international classification of diseases - 10 (WHO, 1993). To meet the criteria for autism an individual must exhibit abnormalities described in one or two items, as

specified in each of the three categories (social reciprocity, communication and restricted behaviors and interests) and reach a total across all items that is more than the sum of each area. That is to be diagnosed as having autism one must meet at least two of the criteria in social reciprocity, one criterion each in communication and restricted and repetitive behaviors and interests, and fulfill a total of six or more criteria across the three areas.

The requirement that individuals have a greater total number of items than £ the sum of criteria within each area reflects a number of aspects of autism. First the criteria are not independent. For example, within the area of social development a child who does not share his pleasures with others (A3) would also often lack social reciprocity (A4) or fail to develop peer relations (A2). Across areas, an autistic child who could not initiate or sustain conversation (B2) might also be considered to lack social emotional reciprocity (A_4), both deficits might be associated with difficulties in peer relationship (A2) (Lord & Risi, 1998).

Second, while a similar pattern of deficits characterizes all individuals with autism, the ways in which the pattern is manifested differs across individuals and over time (Tsai, 1992, cited in Lord & Risi, 1998). This variation is not unusual in psychiatric or developmental disorders. However, because we do not yet have discriminative, biological markers for autism, variations in behaviors across individuals and within individuals across time must be taken into account in diagnostic measures.

Because diagnostic criteria for various PDDs overlap, a hierarchy of selection is necessary. According to DSM-IV and ICD-10, Rett's syndrome and Childhood Disintegrative Disorder are diagnosed first, if applicable. Autism is diagnosed next followed by Asperger's disorder and PDD-NOS. The hierarchy was specified in order to avoid having individuals receive different diagnoses at different points in their lives. Such moving from diagnosis to diagnosis would make it very difficult to follow development and to predict outcome.

Though it is not without controversy, the current frame work for diagnosis of autism has a number of strengths. The compatibility across international systems (DSM-IV, ICD-10) is very important. The current criteria have been well documented in the DSM-IV field trials (Volkmar, Carter, Sparrow, Cicchetti, 1993). In addition, the present framework builds on earlier versions of DSM-IIIR, making it relatively easy to operationalize criteria into specific behaviors.

Diagnostic instruments

For nearly three decades now, the autism field has been fortunate to have several standardized screening and diagnostic instruments. These may be used as an alternative, and/or as a complement to categorical diagnoses/profiles (eg. DSM-IV, ICD-10). The ability to quantify the severity of autism would be helpful both for research and clinical purposes (Lord 1991). However, such estimates become very complex because of the developmental nature of autism.

As individuals with autism are rarely amenable to direct interview, dimensional assessment instruments usually rely either on behavioral observation (in structured or unstructured situations) or on parent/caregiver report.

Most notable among these instruments has been the Childhood Autism Rating Scale (CARS) (Schopler, Reichler & Renner, 1988). The CARS offers reliable ratings highly associated with autism. It can be used by clinicians and teachers through direct observation or in a parent interview. Cut-offs provided for the initial sample, which was predominantly children with autism and mild to severe mental retardation have also been extended, with minor variations, to older and younger populations (Lord, 1995).

The CARS was designed before DSM-IIIR or DSM-IV/ICD-10 criteria, and it does not reflect the current frame works of DSM-IV and ICD-10 that weigh the social deficits as most significant in autism. Intellectual skills, language delay and certain nonspecific behavior problems are also included within the scoring. Because of its relative brevity and high sensitivity, the CARS may be particularly helpful as a screening instrument (DiLalla & Rogers, 1994).

Other scales have also made important historic contributions. The E-l and E-2 scales by Rimland (1968, 1971) were some of the first to direct observers to look specifically at behaviors associated with autism. Form E-2 was designed for completion by parents, and asks questions about the child's early development, and about language and behavior through age five and a half. The form-E2 is not a

diagnostic tool pre se. Its purpose is to build a large detailed database on autism-related symptoms and behaviors. The total score is used to provide an indication of the likelihood that the person exhibits autism (Rimland, 1971). There has been concern that the questionnaire results in diagnoses that are not equivalent to standard criteria or other measures, but it was an important first step in the creation of standardized instruments in autism (Parks, 1983).

The Behavior Rating Instrument of Autistic and Atypical Children (BRIAAC) (Ruttenberg, 1977, cited in Volkmar, 1998) was based on observations of children with autism enrolled in a day treatment programme. Scales in this instrument are behaviorally defined and examine various domains of functioning. E.g.: relationship to adult, communication, drive for mastery, vocalization and expressive speech, sound and speech reception, social responsiveness, body movement and psychobiological development. Scores on each scale range from normal to severely autistic. BRIAAC scores appear to be related to some important aspects of clinical diagnosis (Cohen, Caparulo, Gold, Waldo, Shaywitz, Ruttenberg & Rimland, 1978) but are not directly comparable to current diagnostic framework.

The Behaviour Observation Scale for autism (BOS) (Freeman, Schroth, Ritvo, Guthrie & Wake, 1980) has been used for behavioral assessment and monitoring response to intervention. A series of behaviors are evaluated during a structured period of observation.

The Autism Behavior Checklist (ABC) (Krug, Arick & Almond, 1980) provides rating that discriminate autism from other disorders, when mental retardation and language level are not controlled. Because many of the items describe behaviors that reflect general impairment, it has been suggested that the ABC may be best used as a general measure of behavior difficulties and perhaps in treatment outcome studies. (Volkmar, Cohen, Hoshino & Rende, 1988).

The Autism Screening Instrument for Educational Planning (2^{nd} ed.) (ASIEP- 2) (Krug, Arick, & Almond, 1993) is a major revision of one of the most popular individual assessment instruments available for evaluating and planning for subjects with autistic behavior characteristics. Standardized and researched in diagnostic centers ASIEP-2 uses five components to provide data on five unique aspects of behavior with individuals from eighteen months through adult- hood. The components of the ASIEP examine behavior in five areas: Sensory, Relating, Body Concept, Language, and Social Self - Help. The ASIEP-2 samples vocal behavior, assesses interactions and communication, and determines learning rate. In combination, ASIEP-2 subtests provide a profile of abilities in spontaneous verbal behavior, social interaction, educational level, and learning characteristics. Percentiles and standard scores are provided for the five subtests.

Designed for use by teachers, parents, and professionals, the Gilliam Autism Rating Scale (GARS) (Gilliam, 1995) helps to identify and diagnose autism in individual's age three through twenty-two years and to estimate the severity of the problem. Items on the GARS are based on the definitions of autism adopted by the

adopted by the DSM-IV. The items are grouped into four subtests: stereotyped behaviors, communication, social interaction, and developmental disturbances. The GARS has three core subtests that describe specific and measurable behaviors. An optional subtest (Developmental Disturbances) allows parents to con- tribute data about their child's development during the first three years of life. Validity and reliability of the instrument are high. The entire scale can be completed in five to ten minutes by persons who have knowledge of the child's behavior or the greatest opportunity to observe him or her. Standard scores and percentiles are provided.

The Pervasive Developmental Disorder Screening Test (PDDST) (Siegel, 1996) is designed to be administered in settings where concerns about possible autistic spectrum disorders arise. Different "stages" of the PDDST correspond to representative populations in (a) primary care clinics; (b) developmental clinics; and (c) autism clinics. The PDDST is designed as a screening test and is a parent report measure. As such, it does not constitute a full clinical description of early signs of autism but does reflect those early signs that have been found to be reportable by parents and correlated with later clinical diagnosis.

The Autism Diagnostic Interview Revised (ADI-R) (Lord, Rutter, & LeCouteur, 1994) offers the possibility of quantifying severity within specific domains. Separate scores are provided for social reciprocity, communication, and restricted and repetitive behaviors, as are other scores concerning behavior difficulties not specific to autism. This approach reduces the possibility of individuals receiving diagnosis of autism because of severe deficits in only one or

two areas. The ADI-R is considered by some professionals in the field as a measure of high diagnostic accuracy. It takes several hours to administer and score. The ADI-R is recognized as one of the better standardized instruments currently available for establishing a diagnosis of autism. It is a semi-structured interview administered to subjects' caregivers which determines whether or not an individual meets the Diagnostic and Statistical Manual of Mental Disorders (3rd ed., revised) criteria for autism.

The Checklist for Autism in Toddlers (CHAT) (Baron-Cohen, Allen & Gillberg, 1992) is a very brief screening instrument that encourages physicians and nurses to observe specific aspects of behavior in an attempt to identify autism. It was designed to prospectively identify autism at 18 months of age. The CHAT assesses pretend play, protodeclarative pointing, and gaze monitoring, by parental report and health practitioner observation through direct testing. According to the authors, "we stress that the CHAT should not be used as a diagnostic instrument, but it can alert the primary health care professional to the need for an expert" (Baron-Cohen et al., 1992)

Diagnostic Scale for Autism Spectrum Disorders (DSASD)

The DSASD (see Appendix-I), developed by Chakravarti, (2002), attempts to quantify the nature of the ASD, while also making an allowance for the profiling of symptoms. It was constructed following a detailed review of prevalent diagnostic tools from all over the world. Items from all the checklists reviewed were taken and categorized into 4 domains: Social, Cognitive, behavioral and communication.

-> **Social domain**

It is divided into 2 subparts.

Interpersonal interaction: consisting of 18 items.

(e.g.: Does the child avoid eye contact?)

Play: Consisting of 6 items.

(e.g.: Does the child lack an initiative to play?)

-> **Cognitive domain**

It consists of 12 items.

(e.g.: Does the child show an unusual degree of skill in a particular area?)

•> **Behavioral domain**

It is divided into 4 subparts

General behavior

Consisting of 9 items.

(e.g.: Does the child engage in repetitive but aimless activities?)

Adaptive Behavior

Consisting of 7 items.

(e.g.: Does the child insist on TV/music all the time?)

Sensory behaviors

Consisting of 11 items.

(e.g.: Does the child exhibit a lack of sensitivity to low levels of pain?)

Motor behaviors

Consisting of 5 items.

(e.g.: Does the child whirl himself like a top?)

--> **Communication domain**

It is divided into 3 subsections.

Prelinguistic skills

This consists of 14 items.

(e.g.: Does the child lack a communication intent?)

Non verbal communication

This consists of 7 items.

(e.g.: Does the child use another person like an instrument?)

Verbal communication

This consists of 21 items.

(e.g.: Does the child repeat phrases/expressions in a parrot-like manner without situational relevance? (Echolalia))

This forms the 1st section of the DSASD, with the other 2 sections being, one for the profile and one for scoring instructions.

The scoring scale is different for different items, which is specified in the form (Appendix).

To the best of the author's knowledge, there is currently no diagnostic tool for ASD, which has been developed and checked for its efficacy in the Indian context. Although developed in India, the efficacy of the Diagnostic Scale for Autism Spectrum Diorders has not been established so far. The present study endeavors to explore the efficacy and clinical utility of the DSASD in the Indian context.

METHOD

This study was aimed at exploring the efficacy and clinical utility of the Diagnostic Scale for Autism Spectrum Disorders, in the Indian context.

Subject criteria

--> Subjects were 25 children (21 males, 4 females) ranging in age from 2 years to 7 years.

--> All the subjects had been diagnosed as having Delayed Speech and Language with Autistic Features (based on the DSM-IV criteria).

--> Mental retardation was ruled out in all the subjects based on the results of standardized IQ measures.

--> No other associated problems were present.

--> The duration of therapy did not exceed two years in any of the subjects.

Procedure

The DSASD was administered on each of the subjects individually, with the help of the parent/caregiver report, as well as direct observation of the child.

The subjects were scored on the various domains, as per the scoring criteria provided in the scale.

The scores obtained were then subjected to appropriate statistical analysis. The results are being presented and discussed in the next chapter.

RESULTS AND DISCUSSION

This study was aimed at exploring the clinical utility of the DSASD, in the Indian context. The subjects chosen for the study were 25 children, ranging in age from 2 - 7 years; all of whom had been diagnosed as having autism/autistic features. The checklist was administered on each child individually, and were scored on the four domains:

1) Social
2) Cognitive
3) Behavioral
4) Communication

The results obtained on the four domains are being presented and discussed in the same order.

Social Domain

It is evident from figure. 1 that 76% of the total subjects (i.e. 19 out of 25) fell in the moderate category, and 8% each (i.e. 2 out of 25 each) in the mild, mild-moderate and moderate-severe category. None of the subjects fell in the severe category. The lowest and highest scores in this domain were 14 and 48 respectively.

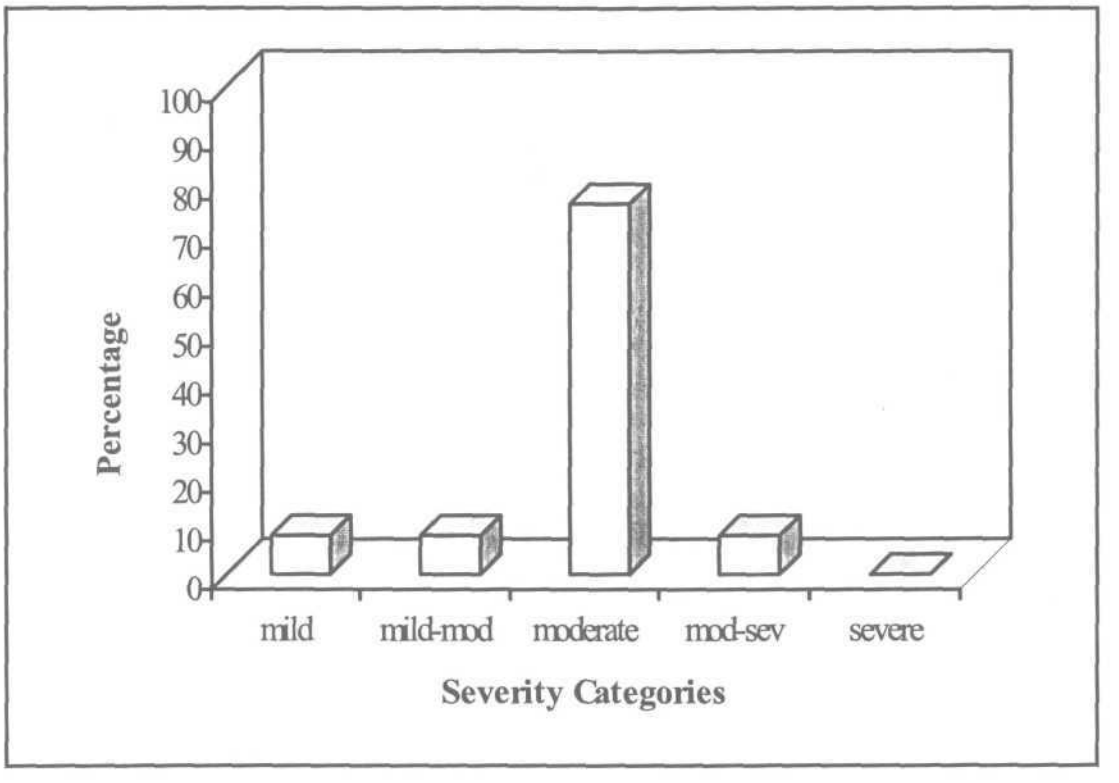

Figure-1: Percentage of subjects in the various severity categories in the Social Domain

Cognitive Domain

In the Cognitive Domain, 44% of subjects (i.e. 11 out of 25) fell in the moderate category, followed by 32% (i.e. 8 out of 25) in the moderate-severe category. From the figure-2 it is also evident that 24% of the subjects (i.e. 6 out of 25) fell in the mild-moderate category. There were no extreme scores in this domain as evident from the figure. The lowest and the highest scores in this domain were 10 and 38 respectively, with no subjects in the mild or severe categories.

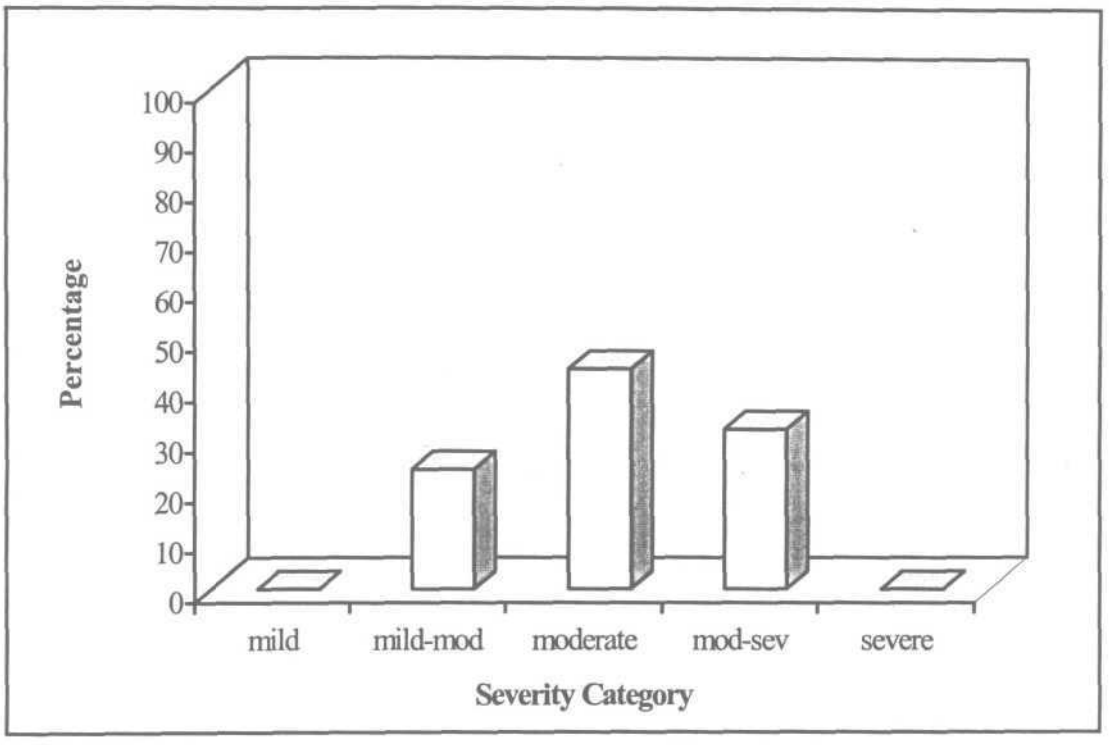

Figure-2: Percentage of subjects in the various severity categories in the Cognitive Domain.

Behavioral Domain

In the Behavioral Domain a majority of 80% of the subjects (i.e. 20 out of 25) fell in the mild-moderate category. From the figure-3 it is also evident that 12% of the subjects (i.e. 3 out of 25) fell in the mild category, followed by 8% (i.e. 2 out of 25) in the moderate category. The lowest and highest scores in this domain were 23 and 52 respectively, and none of the subjects fell in the moderate-severe or the severe category.

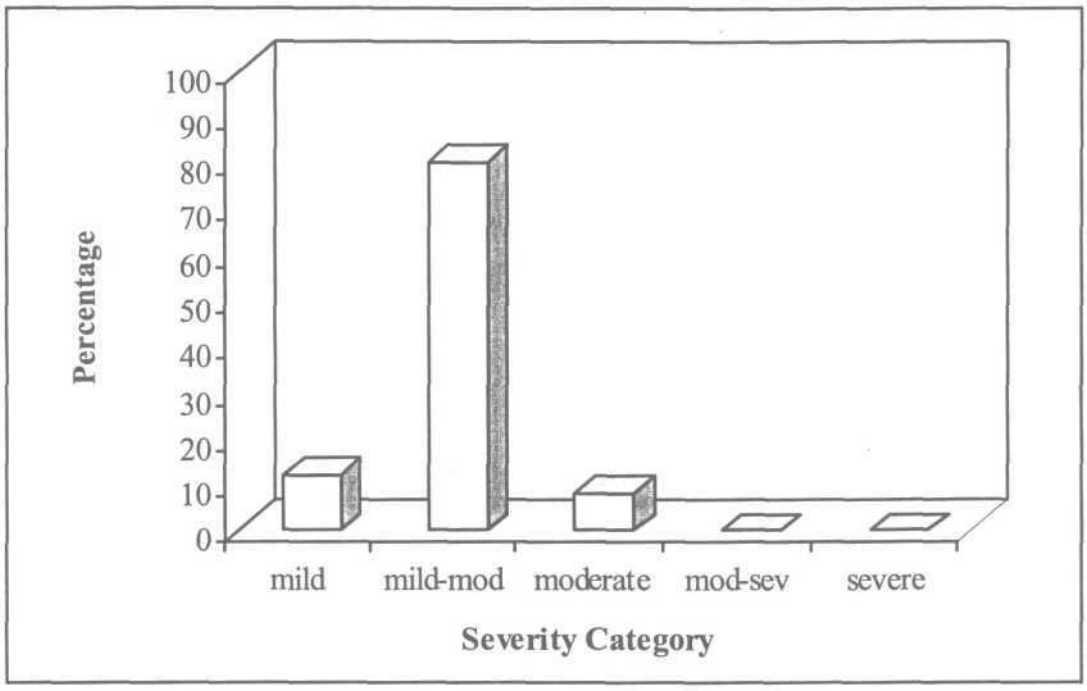

Figure-3: Percentage of subjects in the various severity categories in the Behavioral Domain

Communication Domain

This Domain has been divided into 3 subsections with independent scoring scales in each. The 3 subsections are:

- Prelingiuistic
- Non-verbal
- Verbal

Prelinguistic

In the Prelinguistic Subsection, the subjects were scattered across the various categories, with a maximum of 44% (i.e. 11 out of 25) in the mild-moderate category, followed by 36% (i.e. 9 out of 25) in the moderate category. 12% of the subjects (i.e. 3 out of 25) fell in the mild category and 8%(i.e. 2 out of 25) in the

moderate-severe category. As evident from figure-4, none of the subjects fell in the severe category, with the lowest and highest scores being 8 and 37 respectively.

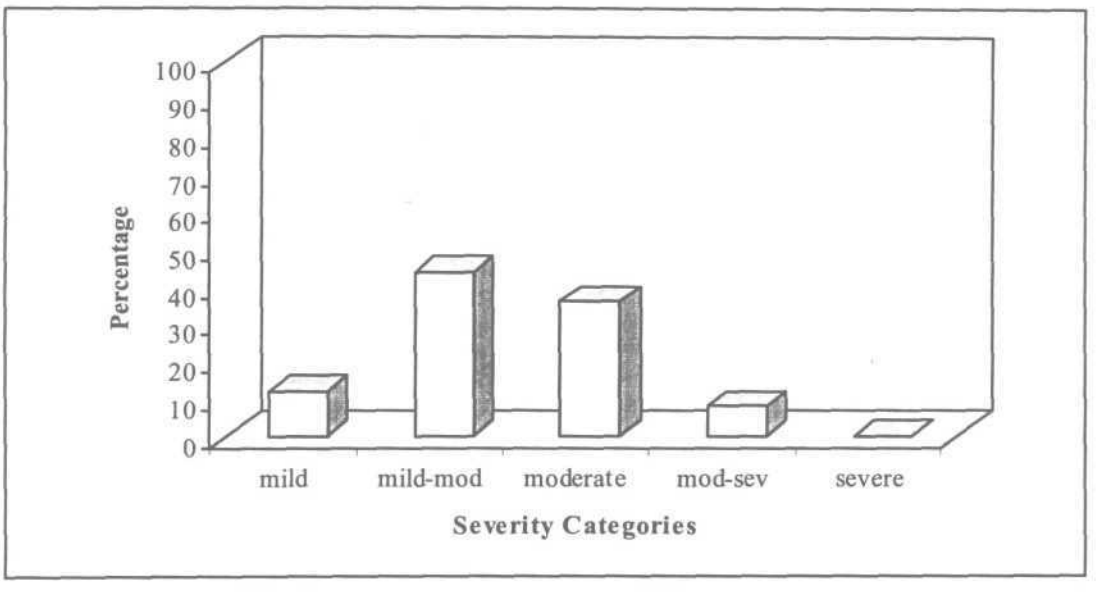

Figure-4: Percentage of subjects in the various severity categories in the Prelinguistic Subsection

Non-Verbal

In this subsection, a majority of 56% of the subjects (i.e. 14 out of 25) fell in the mild-moderate category. As evident from the figure-5, 28% of the subjects (i.e. 7 out of 25) fell in the moderate category, followed by 16% (i.e. 4 out of 25) in the mild category. The lowest and the highest scores were 4 and 20 respectively, with no subjects falling in the moderate-severe and severe category.

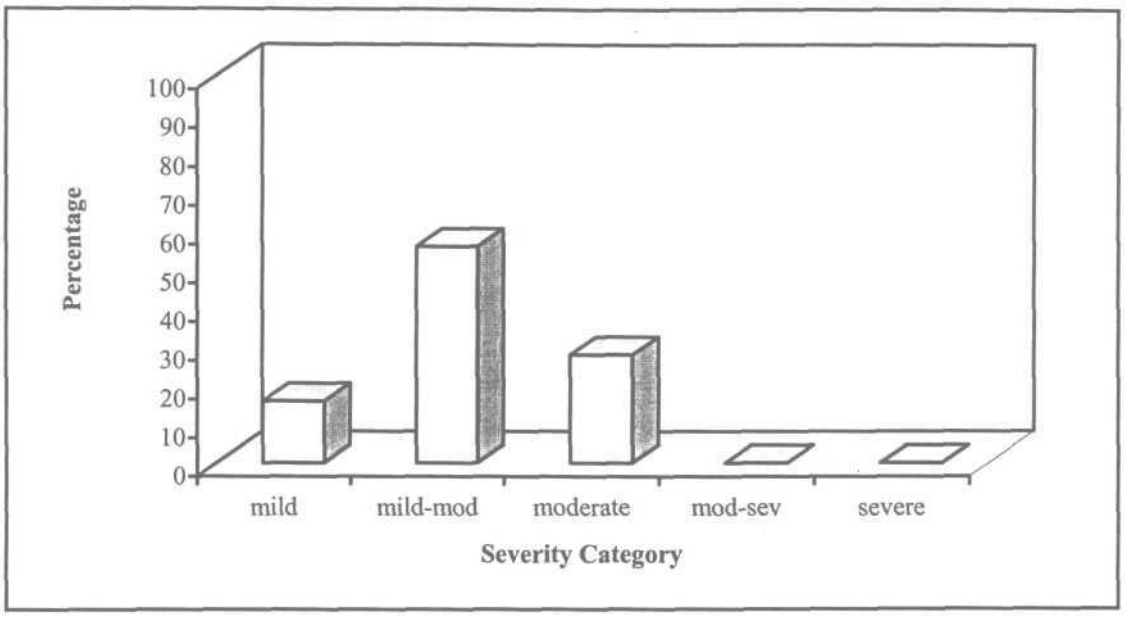

Figure-5: Percentage of subjects in the various severity categories in the Non-Verbal Subsection

Verbal

In the Verbal Subsection of the Communication Domain, a majority of 56% of the subjects (i.e. 14 out of 25) fell in the moderate category, followed by 32% (i.e. 7 out of 25) in the moderate-severe category. From figure-6, it is also evident that the remaining 12% (i.e. 3 out of 25) fell in the mild-moderate category, with no subjects falling in either the mild or the severe categories. The lowest and the highest scores were 29 and 59 respectively.

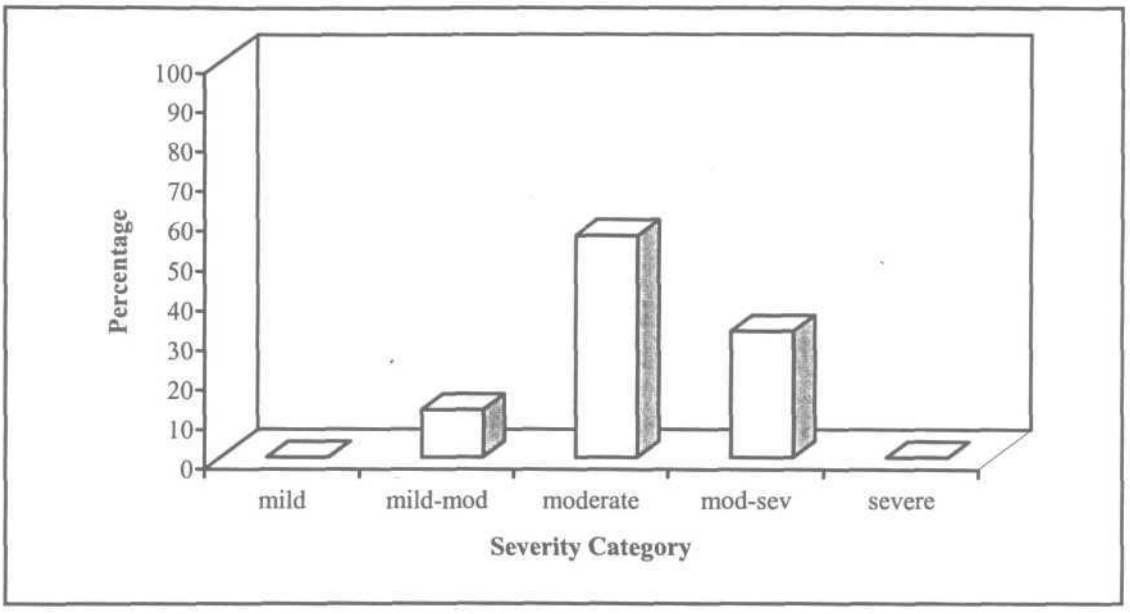

Figure-6: Percentage of subjects in the various severity categories in the Verbal Domain

From the above results it is apparent that none of the subjects chosen for the study fell in the severe category on any of the domains. This can be attributed to the scoring system used in the checklist, whereby the scores are divided equally into the five scales i.e. mild, mild-moderate, moderate, moderate-severe and severe.

It is also evident that all the 25 subjects chosen were affected to some extent on all the domains studied, although there was a variation in the extent of severity on these domains, for all the subjects. As specified in the DSM-IVR (appendix-II) and ICD10 (appendix-II) criteria, all of these subjects satisfy the conditions to be diagnosed as having an Autism Spectrum Disorder.

Apart from this, the DSASD was also found to have certain other advantages over other assessment tools reviewed and in current use:

1) The DSASD allows for quantifying the sevrity of the disorder, without compromising on the qualitativeness, which is a very essential attribute of any assessment tool for ASD.

2) It also makes allowance for profiling of these children, which is crucial before the planning of treatment strategies.

3) The checklist can also be used as a measure of the child's progress following intervention.

Based on the study and the results obtained the following observations were jund to be pertinent:

1) Some of the items in the checklist were found to be redundant or ambiguous and could be eliminated or modified respectively. These items include:

   - Item (d) in the Verbal subsection of the Communication Domain. This item includes a further six items all of which check for the presence or absence of various types of echolalia. Since the item (c) has already checked for the presence of echolalia, the item (d) might be redundant. (Appendix-I) in this context.
   - Items [n] (can the child answer simple questions?) in the Verbal subsection of the Communication Domain was found to be very subjective and parents found it difficult to answer in a "yes" or "no" for the same. So, instead of a polar scale [B#] this item can be placed in the directional scale of B.
   - Similar observations were made for items [o] (can the child name some common objects?), [p] (can the child name family members?), [q] (can the child carry out a simple series of 2 related commands?). All these items can be placed in the directional scale of B.

2) The checklist does not include items that could help to differentially diagnose the various disorders on the spectrum. Thus, it gives no information as to where the child is placed on the spectrum of PDD/ASD.

A separate section can be included which would check for the presence or absence of the characteristic features that help to differentiate the variants of PDD. Using the DSM-IV and ICD-10 criteria, these items could be incorporated. Some examples are being suggested here:

To identify Rett's Disorder:

> Did the child have a normal course of development for a certain period, before the regression was noticed?

> Has there been a reduction in the child's head size?

> Has there been a loss of previously acquired purpose hand skills?

> Does the child have any stereotyped hand movements ? (eg : Hand wringing a hand washing)

To identify Childhood Disintegrative Disorder

> Has the child's development followed a very normal course till the second year?

> Has the child shown any significant loss of previously acquired skills? (eg : bowel bladder control, motor skills)

The other disorders in the spectrum, namely Asperger's syndrome and PDD-Not Otherwise Specified are more difficult to differentiate, and hence identification

of the same should be carried out following a detailed assessment and sometimes after observation of the child's changing clinical picture over a length of time.

The examples suggested above are by no means exhaustive and have only been included to give a clearer picture of what such a section would entail.

Based on the study, it can be safely stated that the DSASD, bears scope for both qualitative categorizations as well as for the profiling of symptoms, to account for a more thorough diagnosis. Among the assessment tools and scales currently in use as well as those reviewed, it was observed that they are either purely checklists, or symptom-scales or profiles. The DSASD attempts to combine all of the above to make for a more effective tool, for the assessment of the ASD.

SUMMARY AND CONCLUSIONS

Interest in what are now called the Autism Spectrum Disorders can be traced back to the early 19th century when the first descriptions of this disorder came about. Since their "discovery", these disorders have been researched extensively.

Since the establishment of the validity of autism as a diagnostic concept, a lot of research has been focused on the development of the diagnostic frameworks and tools for ASD. Although not without controversy, these frameworks and tools have come a long way in the assessment of these disorders.

For some time now, a need has been felt for the early diagnosis of these disorders, for the obvious advantages that it provides. Progress has recently been made in the earlier identification of children with ASD. Whilst being welcome, this progress to earlier referral and diagnosis presents new challenges to clinical practice, including the accuracy and stability of early diagnosis, the utility of standardized assessment instruments and the ability to indicate prognosis.

The present study aimed at exploring the efficacy and clinical utility of one such tool- the Diagnostic scale for Autism Spectrum Disorders- in the Indian context. The subjects for the study were 25 children, already diagnosed to be having Autistic Features. The checklist was administered individually on each child with the help of the parent report and direct observation of the child. The scores obtained were subjected to appropriate statistical analysis and the results were formulated in a

graphic form. Although it had a few limitations, the DSASD was found to be an effective tool for the assessment of ASD. It was found to have some advantages over other assessment tools currently in use:

1) The DSASD allows for quantifying the severity of the disorder, without compromising on the qualitativeness, which is a very essential attribute of any assessment tool for ASD.
2) It also makes allowance for profiling of these children, which is crucial before the planning of treatment strategies.
3) The checklist can also be used as a measure of the child's progress following intervention.

Limitations of the study

- The number of subjects taken up for the study was limited.
- Also, the subjects undertaken for the study had undergone therapy for different durations, which might imply that they have moved along the spectrum since their first diagnosis.
- This tool was not compared with any other existing assessment tool for ASD.

Implications for further research

- An extension of this study can be carried out as a field test across a larger population.
- This scale can be further refined on the lines of the modifications suggested in this study.
- A comparison study of the DSASD with other existing tools can be carried out.

REFERENCES

1. American Psychiatric Association (1994). Diagnostic and Statistical Manual of mental disorders. 4th Ed. Washington, DC : APA.
2. American Psychiatric Association (2000). Diagnostic and Statistical Manual of mental disorders (Fourth edition - Text Revision) (DSM-IV-TR): APA.
3. Baird, G., Charman, T., Baron-Cohen, S., Cox, A., Swettenham, J., Wheelwright, S. & Drew, A. (2000). A screening instrument for autism at 18 months of age : A six-year follow-up study. *Journal of American Academy of Child and Adolescent Psychiatry,* 39, 694-702.
4. Baron-Cohen, S., Allen, J. & Gillberg, C. (1992). Checklist for Autism in Toddlers. *British Journal of Psychiatry,* 12(6); 839-843.
5. Baron-Cohen, S., Wheelwright, S., Cox, A., Baird, G., Charman, T., Swettenham, J., Drew, A., & Doehring, P. (2000). The early identification of autism: The imitation and play as infancy precursors to language and theory of mind. *Cognitive Development,* 15,481-498.
6. Chakravati, A. (2002). Autism Spectrum Disorders: Construction of a diagnostic scale for SLPs. A Master's Dissertation submitted in part fulfillment for the second year M.Sc. (Speech and Hearing) University of Mysore, Mysore.
7. Charman, T. & Baird, G. (2002). Practitioner Review : Diagnosis of autism spectrum disorder in 2- and 3- year-old children. *Journal of Child Psychology and Psychiatry,* 43(3); 289-305.

8. Cohen, D.J., Caparulo, B., Gold, J., Waldo, M., Shaywitz, B., Ruttenberg, B & Rimland, B. (1978). Agreement in diagnosis: Clinical assessment and behaviour rating scales for pervasively disturbed children. *Journal of the American Academy of Child Psychiatry,* 17, 689-695.

9. Dilalla, D.L. & Roger L.J. (1994). Domains of the Childhood Autism Rating Scale: Relevance for diagnosis and treatment. *Journal of Autism and Developmental Disorders,* 24, 115-128.

10. Fillipek, P., Accardo, P., Baranek, G., Coole E., Dawson, G., Gordon, B., et al. (1999). The screening and diagnosis of autism spectrum disorders. *Journal of Autism and Developmental Disorders,* 29, 439-484.

11. Freeman, B.J., Schroth, P., Ritvo, E., Guthrie, D. & Wake, L. (1980). The Behaviour Observation Scale for autism (BOS): Initial results of factor analysis. *Journals of Autism and Developmental Disorders,* 10, 343-346.

12. Gilliam, E.J. (1995). Gilliam's Autism Rating Scale. Retrieved on March, 28, 2004, from *http://www.isnt.net/~ivpsv/tests.htm.*

13. Howlin, P., & Asgharian, A. (1999). The diagnosis of autism and Asperger's Syndrome: Findings from a systematic survey. *Developmental Medicine and Child Neurology,* 41, 834-839.

14. Krug, D.A., Arick, J. & Almond, P. (1980). Behaviour checklist for identifying severely handicapped individuals with high levels of autistic behaviour. *Journal of Child Psychology and Psychiatry,* 21, 221 -229.

15. Krug, D.A., Arick, J. & Almond, P (1993). The Autism Screening Instrument for Educational Planning (2nd ed.) (ASIEP-2) Retrieved on March 28, 2004, from *http://www. isnt.net/~iwsv/tests.htm.*

16. Lord, C. & Risi, S. (1998). Frame works and methods in diagnosing Autism Spectrum Disorders. *Mental Retardation and Developmental Disabilities Research Reviews.* 4; 90-96.

17. Lord, C. (1991). Methods and measures of behaviour in the diagnosis of autism and related disorders, *Psychiatric Clinic of North America,* 14, 69-80.

18. Lord, C. (1995). Follow-up of two-year olds referred for possible autism. *Journal of Child Psychology and Psychiatry*, 36, 1365-1382.

19. Lord, C, Pickles, A., McLennan, J., Rutter, M., Bregman, J., Folstein, S., Fombonne, E., Leboyer, M. & Minshew, N. (1997). Diagnosing Autism: Analysis of data from the Autism Diagnostic Interview. *Journal of Autism and Developmental Disorders,* 27(5); 501-517.

20. Parks, S.L. (1983). The assessment of autistic children: A selective review of available instruments. *Journal of Autism and Developmental Disorders,* 13, 255-267.

21. Prizant, B., & Wetherby, A. (1993). Communication and language assessment for young children. *Infants and Young Children, 5,* 20-34.

22. Rimland, B. (1968). On the objective diagnosis of infantile autism. *Acta Paedosychiatry,* 35, 146-161.

23. Rimland, B. (1971). The differentiation of childhood psychoses: An analysis of checklists for 2, 218 psychotic children. *Journal of Autism and Child Schizophrenia,* 1, 1161 -1174.

24. Robins, D.L., Fein, D., Barton, M.L., & Green, J.A. (2001). The modified checklist for autism in toddlers. An initial study in neotigating the early detection of autism and pervasive developmental disorders. *Journal of Autism and Developmental Disorders,* 31, 131-144.

25. Schopler, E., Reichler, R.J. & Renner, B.R. (1988). The Childhood Autism Rating Scale (CARS). Los Angeles : Western Psychological Services.

26. Sheinkopf, S.J. & Siegel, B. (1998). Home-based treatment of young children with autism. *Journal of Autism and Developmental Disorders,* 28, 15-23.

27. Short A., & Schopler, E. (1988). Factors relating to age of onset in autism. *Journal of Autism and Developmental Disorders*, 18, 207-216.

28. Stone, W., Lee, E., Ashford, L., Brissie, J., Hepburn, S., Coonrod E., et al. (1999). Can Autism be diagnosed accurately in children under three years? *Journal of Child Psychology and Psychiatry,* 40, 219-226.

29. Volkmar, F.R. (1998). Autism and Pervasive Developmental Disorders. (pp. 16-32) Cambridge University Press.

30. Volkmar, F.R., Canter, A., Sparrow, S.S. & Cicchetti, D.V. (1993). Quantifying social development in autism. *Journal of the American Academy of Child and Adolescent Psychiatry,* 32, 627-632.

31. Volkmar, F.R., Cohen, D.J., Hoshino, Y. & Rende, R.D.E.A. (1988). Phenomenology and classification of the childhood psychoses. *Psychological Medicine,* 18, 191-201.

32. Woods, J.J., & Wetherby, A.M. (2003). Early Identification of and Intervention for infants and toddlers who are at risk for Autism Spectrum Disorders. *Language, Speech and Hearing Services in Schools*, 34; 180-193.

33. World Health Organization (1992). The ICD-10 Classification of Mental and Behavioural Disorders: Clinical Description and Guidelines. Geneva : WHO.

APPENDIX-I

THE DIAGNOSTIC SCALE FOR AUTISM SPECTRUM DISORDERS

*Instructions **to** the Evaluator*

- This form should be filled by the professional on the bases of both parent/caregiver report, and observation of the child.
- The responses have to be recorded according to the ordinal scale as specified after each item.
- Three scales have been specified, with scales A and B for each. These scales must be applied appropriately depending on the item specification (Superscripts'^ or ^{B}; $^{\#}$,*, or none).
- The score should finally be totaled separately for each sub-section of the form.
- In the spaces provided at the end of the form, a profile of each sub-domain should be entered (based on the subject's score in that particular sub-domain). This is meant to be a free-statement of the evaluator's observations.
- **Note** : The pronoun "He" has been used throughout in the form to refer to the case ***for the** sake **of** convenience only.*

SECTION -1

I. Social Domain

1. Interpersonal Interaction

a) [A]Does the child avoid eye contact ? ☐

b) [A]Does the child lack precision/appropriateness in expression of emotion?* ☐

c) [A]Is the child indifferent to the presence of others ?* ☐

d) [A]Is the child often "in a shell", or so distant, that you cannot reach him ? ☐

e) [A]Does the child prefer to be alone ? ☐

f) [A]Does he have considerable difficulty interacting with peers ?* ☐

g) [A]Does he exhibit socially inappropriate behaviours ? ☐

h) [B]As an infant, did the child reach out to the picked up ? ☐

i) [B]As an infant, did the child acknowledge the presence of parents ?[#] ☐

j) [B]Does he display social awareness in familiar situations ?* ☐

k) [B]Does he take interest in other children ?* ☐

1) [B]Is he affectionate ?* ☐

2. Play

a) [A]Does the child lack initiative to play ?* ☐

b) [A]Does he just mouth/feel/fiddle with toys instead of playing with them ? ☐

c) [A]Does he lack an understanding of how to play with other children ?* ☐

d) [B]Does the child show creativity during play ?* ☐

e) [B]Does the child ever pretend while playing ?[#] ☐

f) [B]Does the child seem to know the various functions of objects while playing ?* ☐

II. Cognitive Domain

a) [A]Does the child usually not look at what he is doing ? ☐

b) [A]Does the child show an unusual degree of skill in a particular area ?[#] ☐

c) [A]Does the child sometimes exhibit an uncannily good memory for tunes/jingles/catch-phfases, etc. ? ☐

d) [A]Does the child repeat rhythms correctly ?* ☐

e) [A]Does the child only pay fleeting attention to you and remain highly distractible? ☐

f) [A]Does the child painstakingly focus attention on very trivial details ?* ☐

g) [B]Does the child recognize common objects ? ☐

h) [B]Is he able to match object-to-picture/picture-to-object ?[#] ☐

i) [B]Can the child discriminate Same Vs Different objects/colours/shapes, etc.?[#] ☐

j) Is he aware of degrees - more and less ? ☐

k) [A]Does the child comprehend referents, like prepositions or pronouns ?* ☐

1) [B]Can he discriminate Left Vs Right ?[#] ☐

III. Behavioural Domain

1. General Behaviours

a) [A]Does the child engage in repetitive but aimless activities ? ☐

b) [A]Can his behaviour be described as bizarre ? ☐

c) [A]Does the child engage in repetitive activities, which seem to require a degree of creativity, but with stereotyped outcome (such as drawing / building, etc.) ? ☐

d) [A]Does he have particular interests that border on obsessive ? ☐

e) [A]Does the child like gazing at certain objects with a repetitive movement, for e.g., fan, etc. ? ☐

f) [A]Is child fearful of certain sounds / people / strangers, etc. ? ☐

g) [A]Is child unusually aggressive to himself or to others ? ☐

h) [A]Does the child alternately demonstrate characteristics of hyperactivity and total inactivity ?[#] ☐

i) [B]Does the child show any awareness of danger ? ☐

2. Adaptive behaviours

a) [A]Does the child react adversely when interrupted in what he/se is doing ?* ☐

b) [A]Is he/she unduly upset by changes in routine/environmental setting, etc.?* ☐

c) [A]Does he/she insist on music/T. V all the time ? ☐

d) [A]Does the child line things up in precise, evenly spaced rows and insist they not be disturbed ? ☐

e) [A]Does the child have a pattern of interest, which takes up so much of time that other activities are restricted, irrespective of urgency ?[#] ☐

f) [B]Is he able to generalize and adapt to new and variable situations ?* ☐

g) [B]Does the child readily accept new personal articles (toys, clothes, etc.)? ☐

3. Sensory Behaviours

a) [A]Does the child exhibit a lack of sensitivity to low levels of pain?* ☐

b) [A]Does the child "look though" people as if they are not there ? ☐

c) [A]Is the child "deaf to some sounds, but hears other ? ☐

d) [A]Does the child have unusual cravings for things to eat / chew on ? ☐

e) [A]Does the child stare into space / at his fingers / at moving ants, etc ? ☐

f) [A]Does the child show auditory self-stimulation ? ☐

g) [A]Does he / she display an unusual degree of fear / distress due to certain sounds / touch / objects ? ☐

h) [B]As an infant, did the child react to bright lights / colours / loud sounds, etc ? ☐

i) [B]Is the child able to fix his gaze and attend ?* ☐

j) [B]Does the child recognize familiar voices ? ☐

k) [B]Does he recognize own name ? ☐

4. Motor behaviours

a) [A]Does the child have a tendency to flap / rock when excited / distressed ? ☐

b) [A]Does the child whirl himself like a top ? ☐

c) [A]Does the child hold his hands in strange positions ? ☐

d) [A]Does the child have an odd gait ?* ☐

e) [B]Does the child seem well coordinated while running, walking, climbing, etc ?* ☐

IV. Communication Domain

1. Prelinguistic Skills

a) [A]Is the child mute (other than crying or some vocal sounds) ?[#] ☐

b) [A]Does the child lack communication intent ? ☐

c) [B]Does the child look at people when they talk to him / her ? ☐

d) [B]Does the child respond to name call ? ☐

e) [B]As and infant, was there differential babbling ?[#] ☐

f) [B]Did the infant "reach out" for items of interest ? ☐

g) [B]did the infant consistently cry to indicate needs ? ☐

h) [B]Did the infant engage in "turn-taking dialogue" with smiles and coos, etc ? ☐

☐

i) [B]Does the child respond to facila expressions ?

j) [B]Does the child respond to environmental sounds ? ☐

k) [B]Does the child imitate anyone ?[#] ☐

1) [B]Does the child understand basic gestures like pointing/nodding ? ☐

m) [B]Does the child ask for desired objects with vocalizations/gestures ? ☐

n) [B]Does the child attend to others speech ?* ☐

2. Nonverbal Communication

a) [A]Does the child have a stiff/ strange / peculiar gaze ? ☐

b) [A]Is the child's body language strange, unusual or clumsy?* ☐

c) [A]Does the child use another person like an instrument ? ☐

d) [B]Does the child use his index finger to point and ask for something ? ☐

e) [B]Does the child attempt to communicate gesturally ? ☐

f) [B]Does he point to different objects when named ?[#] ☐

g) [B]Did the child as an infant initiate communication for anything other than needs ? ☐

3. Verbal communication

a) [A]Does the child show a total lack of meaningful speech, and instead have a persistent use of bizarre phrases ? ☐

b) [A]Is the child's vocabulary greatly out of proportion with is communication ability ?[#] ☐

c) [A]Does the child repeat phrases/expressions (that he / she has heard before) in a parrot-like manner without situational relevance ? (Echolalia) ☐

d) [A]Is echolalia used for :[#]

- Sounds ? ☐
- Tunes ? ☐
- Intonation patterns ? ☐
- Words ? ☐
- Phrases ? ☐
- Gestures ? ☐

e) [A]Is the child able to pronounce certain difficult words ? ☐

f) [A]Does the child only take literal interpretation of statemetnts ?[#] ☐

g) [A]Is the child's speech over-precise / pedantic ?* ☐

h) [A]Does the child have problems repairing a conversation ? ☐

i) [A]Is the use of language highly stereotyped and concrete ?* ☐

j) [A]Is the language content idiosyncratic, bizarre or obsessive ?* ☐

k) [A]Does the child seem to lack initiative to communicate verbally with peers / adults ? ☐

1) [B]Can the child understand what is said to him ? (Judging from his responses) ☐

m) [B]When asked to look in a particular direction, does the child attempt to find and id focus on the target ? ☐

n) [B]Can the child answer simple question ?[#] ☐

o) [B]Can the child name some common objects ?[#] ☐

p) [B]Can the child name family members ?[#] ☐

q) [B]Can the child carry out a simple series of 2 related commands ?[#] ☐

r) [B]Does he/she appear to be interested in the other side of the conversation ? ☐

s) [B]Is echolalia ever used appropriately ? ☐

t) [B]Does he / she modify utterances before repeating them (mitigated echolalia)? ☐

u) [B]Does the child use the personal pronoun ? ☐

v) [B]Is the child familiar with conversational rules like turn taking and listening?* ☐

SECTION - II

PROFILE

I. Social Domain

1. Interpersonal Interactions

2. Play

II. Cognitive Domain

III. Behaviour Domain

1. *General Behaviours*

2. *Adaptive Behaviours*

3. *Sensory Behaviours*

4. Motor Behaviours

IV. Communication Domain

/. *Prelinguistic Skills*

2. Nonverbal Communication

3. Verbal Communication

SECTION - III

SCORING

- Items are to be scored on a 5-point scale; from 0 to 4.
- The scale to be used for each item is indicated against the items. Superscripts*, # and Nil indicate the scale to be applied, and superscripts A and B indicate the direction of the scale.
- For most items, the scoring is thus :

A	B
0=> Almost Never	0=> Almost Always
1=> Very Rarely	1=> Often / Most of the time
2=> Sometimes	*2*=> Sometimes
3=> Often / Most of the time	3=> Very Rarely
4=> Almost Always	4=> Almost Never

- For the items*, scoring is thus :

A	B
0=>No	0=> Yes
1=> To a slight extent	1=> To a great extent
2=> To some extent	2=> To some extent
3=> To a great extent	3=> To a slight extent
4=> yes	4=>No

- For yet other items#, a polar scale has to be applied, i.e. Yes or No.

A	B
0=>No	0=>Yes
4=> Yes	4=> no

- The scores should be totaled for each sub domain.
- A profile for each sub domain should be filled in the space provided in the form.
- The domain may be graded as Mild, Mild-Moderate, Moderate, Moderate-Severe, and Severe Impairment, depending on the scores in each domain.
- The score break-ups are :

Social:	0-14 : Mild
	15-29 : Mild-Moderate
	30-44 : Moderate
	45-59 : Moderate-Severe
	60-72 : Severe
Cognitive :	0-9 : Mild
	10-19 : Mild-Moderate
	20-29 : Moderate
	30-39 : Moderate-Severe
	40-48 : Severe
Behavioural:	0-25 : Mild
	26-50 : Mild-Moderate
	51-75 : Moderate
	76-104 : Moderate - Severe
	105-128 : Severe

Communication :

Prelinguistic	0-11 :Mild
	12-22 : Mild - Moderate
	23-33 : Moderate

	34-44 : Moderate - Severe
	45-56 : Severe
Nonverbal	0-6 : Mild
	7-12 : Mild-Moderate
	13-18 : Moderate
	19-25 : Moderate-Severe
	26-32 : Severe
Verbal	0-17: Mild
	18-34 : Mild-Moderate
	35-52 : Moderate
	53-69 : Moderate-Severe
	70-88 : Severe

APPENDIX - II

DSM-IV (TR) (APA, 2000) Classification of Pervasive Developmental Disorders
Diagnostic Criteria for 299.00 Autistic Disorder

A. A total of six (or more) items from (1), (2) and (3), with at least two from (1), and one each from (2) and (3):

1. Qualitative impairment in social interaction, as manifested by at least two of the following :

   a. Marked impairment in the use of multiple nonverbal behaviors such as eye-to-eye gaze, facial expression, body postures, and gestures to regulate social interaction

   b. Failure to develop peer relationships appropriate to developmental level.

   c. A lack of spontaneous seeking to share enjoyment, interests, or achievements with other people (e.g., by a lack of showing, bringing, or pointing out objects of interest)

   d. Lack of social or emotional reciprocity.

2. Qualitative impairments in communication as manifested by at least one of the following :

Delay in, or total lack of, the development of spoken language (not accompanied by an attempt to compensate through alternative modes of communication such as gesture or mime) in individuals with adequate speech, marked impairment in the ability to initiate or sustain a conversation with others.

a. Sterotyped and repetitive use of language or idiosyncratic language.

b. Lack of varied, spontaneous make-believe play or social imitative play appropriate to developmental level.

3. Restricted repetitive and stereotyped patterns of behavior, interests, and activities, as manifested by at least one of the following :

Encompassing preoccupation with one or more stereotyped and restricted patterns of interest that is abnormal either in intensity or focus.

a. Apparently inflexible adherence to specific, nonfunctional routines or rituals stereotyped and repetitive motor manners (e.g., hand or finger flapping or twisting, or complex whole-body)

b. Persistent preoccupation with parts of objects.

B. Delays or abnormal functioning in at least one of the following areas, with onset prior to age 3 years : (1) social interaction, (2) language as used in social communication, or (3) symbolic or imaginative play.

C. The disturbance is not better accounted for by Rett's Disorder or Childhood Disintegrate Disorder.

Diagnostic Criteria for 299.80 Rett's Disorder

A. All of the following :

1. Apparently normal prenatal and perinatal development.
2. Apparently normal psychomotor development through the first 5 months after birth.
3. Normal head circumference at birth

B. Onset of all of the following after the period of normal development:

1. Deceleration of head growth between ages 5 and 48 months.
2. Loss of previously acquired purposeful hand skills between 5 and 30 months with the subsequent development of stereotyped hand movements (e.g., hand-wringing or hand washing).
3. Loss of social engagement early in the course (although often social interaction develops later).
4. Appearance of poorly coordinated gait or trunk movements.
5. Severely impaired expressive and receptive language development with severe psychomotor retardation.

Diagnostic Criteria for 299.10 Childhood Disintegrative Disorder

A. Apparently normal development for at least the first 2 years after birth as manifested by the presence of age-appropriate verbal and nonverbal communication, social relationships, play, and adaptive behavior.

B. Clinically significant loss of previously acquired skills (before age 10 years) in at least two of the following areas :

1. Expressive or receptive language.
2. Social skills or adaptive behavior
3. Bowel or bladder control
4. Play
5. Motor skills

C. Abnormalities of functioning in at least two of the following areas :

1. Qualitative impairment in social interaction (e.g., impairment in non verbal behaviors, failure to develop peer relationships, lack of social or emotional reciprocity)
2. Qualitative impairments in communication (e.g., delay or lack of spoken language, inability to initiate or sustain a conversation, stereotyped and repetitive use of language, lack of varied make believe play).
3. Restricted, repetitive, and stereotyped patterns of behavior, interest, and activities, including motor stereotypes and mannerisms.

D. The disturbance is not better accounted for by another specific Pervasive Developmental Disorder or by Schizophrenia

Diagnostic Criteria for 299.80 Asperger's Disorder

A. Qualitative impairment in social interaction, as manifested by at least two of the following:

1. Marked impairment in the use of multiple nonverbal behaviors such as eye-to eye gaze, facial expression, body postures, and gestures to regulate social interaction.
2. Failure to develop peer relationships appropriate to developmental level.
3. A lack of spontaneous seeking to share enjoyment, interests, or achievements with other people (e.g., by a lack of showing, bringing, or pointing out objects of interest to other people)
4. Lack of social or emotional reciprocity.

B. Restricted repetitive and stereotyped patterns of behavior, interests and activities, as manifested by at least one of the following :

1. Encompassing preoccupation with one or more stereotyped and restricted patterns of interest that is abnormal either in intensity of focus.
2. Apparently inflexible adherence to specific, nonfunctional routines or rituals.
3. Stereotyped and repetitive motor mannerisms (e.g., hand or finger flapping or twisting, or complex whole-body movements)
4. Persistent preoccupation with parts of objects.

C. The disturbance causes clinically significant impairment in social, occupational, or other important areas of functioning.

D. There is no clinically significant general delay in language (e.g., single words used by age 2 years, communicative phrases used by age 3 years).

E. There is no clinically significant delay in cognitive development or in the development of age-appropriate self-help skills, adaptive behavior (other than in social interaction), and curiosity about the environment in childhood.

F. Criteria are not met for another specific Pervasive Development Disorder or Schizophrenia.

299.80 Pervasive Developmental Disorder Not Otherwise Specified (Including Atypcial Autism)

This category should be used when there is a severe and pervasive impairment in the development of reciprocal social interaction associated with impairment in either verbal or nonverbal communication skills or with the presence of stereotyped behavior, interests, and activities, but the criteria are not met for a

specific Pervasive Developmental Disorder, Schizophrenia, Schizotypal Personality Disorder, or Avoidant Personality Disorder. For example, this category includes "atypical autism" - presentations that do not meet the criteria for Autistic Disorder because of late age at onset, atypical symptomatology, or sub threshold symptomatology, or all of these.

APPENDIX - III

The ICD-10 (WHO, 1996) Classification of Pervasive Developmental Disorders

The definitions and dialog below is taken from ICD-10 Chapter V, which is the chapter for mental and behavioural disorders. It is titled "The ICD-10 Classification of Mental and Behavioural Disorders - Clinical descriptions and diagnostic guidelines" and the following is taken from pages 252-259.

Now on to the definitions of PDD as listed in ICD-10 :

F84 Pervasive developmental disorders

This group of disorders is characterized by qualitative abnormalities in reciprocal social interactions and in patterns of communications, and by restricted, stereotyped, repetitive repertoire of interests and activities. These qualitative abnormalities are a pervasive feature of the individual's functioning in all situations, although they may vary in degree. In most cases, development is abnormal from infancy and, with only a few exceptions, the conditions become manifest during the first 5 years of life. It is usual, but not invariable, for there to be some degree of general cognitive impairment but the disorders are defined in terms of *behaviour* that is deviant in relation to mental age (whether the individual is retarded or not). There is some disagreement on the subdivision of this overall group of pervasive developmental disorders.

In some cases the disorders are associated with, and presumably due to, some medical condition, of which infantile spasms, congenital rubella, tuberous sclerosis, cerebral lipidosis, and the fragile X chromosome anomaly are among the most common. However, the disorder should be diagnosed on the basis of the behavioural features, irrespective of the presence or absence of any associated medical conditions; any such associated condition must, nevertheless, be separately coded. If mental retardation is present, it is important that it too should be separately coded, under F70-F79, because it is not a universal feature of the pervasive developmental disorders.

F84.0 Childhood autism

A pervasive developmental disorder defined by the presence of abnormal and/or impaired development that is manifest before the age of 3 years, and by the characteristic type of abnormal functioning in all three areas of social interaction, communications, and restricted, repetitive behaviour. The disorder occurs in boys three to four times more often than in girls.

Diagnostic guidelines

Usually there is no prior period of unequivocally normal development but, if there is, abnormalities become apparent before the age of 3 years.

There are always qualitative impairments in reciprocal social interaction. These take the form of an inadequate appreciation of socio-emotional cues, as shown by a lack of responses to other people's emotions and/or a lack of modulation of

behaviour according to social context; poor use of social signals and a weak integration of social, emotional, and communicative behaviours; and especially, a lack of socio-emotional reciprocity. Similarly, qualitative impairments in communications are universal. These take the form of a lack of social usage of whatever language skills are present; impairment in make-believe and social imitative play; poor synchrony and lack of reciprocity in conversational interchange; poor flexibility in language expression and a relative lack of creativity and fantasy in thought processes; lack of emotional response to other people's verbal and nonverbal overtures; impaired use of variations in cadence or emphasis to reflect communicative modulation; and a similar lack of accompanying gesture to provide emphasis or aid meaning in spoken communication.

The condition is also characterized by restricted, repetitive, and stereotyped patterns of behaviour, interests, and activities. These take the form of a tendency to impose rigidity and routine on a wide range of aspects of day-today functioning; this usually applies to novel activities as well as to familiar habits and play patterns. In early childhood particularly, there may be specific attachment to unusual, typically non-soft objects. The children may insist on the performance of particular routines in rituals of a nonfunctional character; there may be stereotyped preoccupations with interests such as dates, routes or timetables; often there are motor stereotypies; a specific interest in nonfunctional elements of objects (such as their smell or feel) is common; and there may be a resistance to changes in routine or in details of the personal environment (such as the movement of ornaments or furniture in the family home).

In addition to these specific diagnostic features, it is frequent for children with autism to show a range of other nonspecific problems such as fear/phobias, sleeping and eating disturbances, temper tantrums, and aggression. Self-injury (e.g. by wrist-biting) is fairly common, especially when there is associated severe mental retardation. Most individuals with autism lack spontaneity, initiative, and creativity in the organization of their leisure time and have difficulty applying conceptualizations in decision-making in work (even when the tasks themselves are well within their capacity).The specific manifestation of deficits characteristic of autism change as the children grow older, but the deficits continue into and through adult lie with a broadly similar pattern of problems in socialization, communications, and interest patterns. Developmental abnormalities must have been present in the first 3 years of the diagnosis to be made, but the syndrome can be diagnosed in all age groups.

All levels of IQ can occur in association with autism, but there is significant mental retardation in some three-quarters of cases.

Includes:

Autistic disorder

Infantile autism

Infantile psychosis

Kanner's syndrome

Differential diagnosis : Apart from the other varieties of pervasive developmental disorder it is important to consider : specific developmental disorder of receptive language (F80.2) with secondary socio-emotional problems; reactive attachment disorder (F94.1) or disinhibited attachment disorder (F92.2); mental retardation (F70-F79) with some associated emotional/behavioral disorder; schizophrenia (F20-) of unusually early onset; and Rett's syndrome (F84.2).

Excludes:

Autistic psychopathy (F84.5)

F84.1 Atypical autism

A pervasive developmental disorder that differs from autism in terms either of age of onset or of failure to fulfill all three sets of diagnostic criteria. Thus, abnormal and/or impaired development becomes manifest for the first time only after age 3 years; and/or there are insufficient demonstrable abnormalities in one or two of the three areas of psychopathology required for the diagnosis of autism (namely, reciprocal social interactions, communication, and restrictive, stereotyped, repetitive behaviour) in spite of characteristic abnormalities in other area(s). Atypical autism arises most often in profoundly retarded individuals whose very low level of functioning provides little scope of exhibition of the specific deviant behaviours required for the diagnosis of autism; it also occurs in individuals with a severe specific developmental disorder of receptive language. Atypical autism thus constitutes a meaningfully separate condition from autism.

Includes :

Atypical childhood psychosis

Mental retardation with autistic features

F 84.2 Rett's syndrome

A condition of unknown cause, so far reported only in girls, which has been differentiated on the basis of a characteristic onset, course, and pattern of symptomatology. Typically, apparently normal or near normal early development is followed by partial or complete loss of acquired hand skills and of speech, together with deceleration in head growth, usually with an onset between 7 and 24 months of age. Hand writing stereotypies, hyperventilation and loss of purposive hand movements are particularly characteristic. Social and play development are arrested in the first 2 or 3 years. But social interest tends to be maintained. During middle childhood, trunk ataxia and apraxia, associated with scoliosis or kyphoscoliosis tend to develop and sometimes there are choreoathetoid movements. Severe mental handicap invariably results. Fits frequently develop during early or middle childhood.

Diagnostic guidelines

In most cases onset is between 7 and 24 months of age. The most characteristics feature is a loss of purposive hand movements and acquired fine motor manipulative skills. This is accompanied by loss, partial loss or lack of development of language; distinctive stereotyped tortuous wringing or "hand-washing" movements, with the arms flexed in front of the chest or chin; stereotypic

wetting of the hands with saliva; lack of proper chewing of food; often episodes of hyperventilation; almost always a failure to gain bowel and bladder control; often excessive drooling and protrusion of the tongue; and a loss of social engagement. Typically, the children retain a kind of "social smile", looking at or 'through' people, but not interacting socially with them in early childhood (although social interaction often develops later). The stance and gait tend to become broad-based, the muscles are hypotonic, trunk movements usually become poorly coordinated, and scoliosis or kyphoscoliosis usually develops. Spinal atrophies, with severe motor disability, develop in adolescence or adulthood in about half the cases. Later, rigid spasticity may become manifest, and is usually more pronounced in the lower than in the upper limbs. Epileptic fits, usually involving some type of minor attack, and with an onset generally before the age 8 years, occur in the majority of cases. In contrast to autism, both deliberate self-injury and complex stereotyped preoccupations or routines are rare.

Differential diagnosis : Initially, Rett's syndrome is differentiated primarily on the basis of the lack of purposive hand movements, deceleration of head growth, ataxia, stereotypic "hand-washing" movements, and lack of proper chewing. The course of the disorder, in terms of progressive motor deterioration, confirms the diagnosis.

F84.3 Other childhood disintegrate disorder

A pervasive development disorder (other than Rett's syndrome) that is defined by a period of normal development before onset, and by a definite loss, over the course of a few months, of previously acquired skills in at least several areas of

development, together with the onset of characteristic abnormalities of social, communicative, and behavioural functioning. Often there is a prodromic period of vague illness; the child becomes restive, irritable, anxious, and overactive. This is followed by impoverishment and then loss of speech and language, accompanied by behavioural disintegration. In some cases the loss of skills is persistently progressive (usually when the disorder is associated with a progressive neurological condition), but more often the decline over a period of some months is followed by a plateau and then a limited improvement. The prognosis is usually very poor, and more individuals are left with this condition differs from autism. In some cases **the** disorder can be shown to be **due** to some associated encephalopathy, but the diagnosis should be made in the behavioural features. Any associated neurological condition should be separately coded.

Diagnostic guidelines

Diagnosis is based on an apparently normal development upto the age of at least 2 years, followed by a definite loss of previously acquired skills; this is accompanied by qualitatively abnormal social functioning. It is usual for there to be a profound regression in, or loss of, language, a regression in the level of play, social skills, and adaptive behaviour, and often a loss of bowel or bladder control, sometimes with a deteriorating motor control. Typically, this is accompanied by a general loss of interest in the environment, by stereotyped, repetitive motor mannerisms, and by an autistic-like impairment of social interaction and communication. In some respects, the syndrome resembles dementia in adult life, but it differs in three key respects: there is usually no evidence of an identifiable

organic disease or damage (although organic brain dysfunction of some type is usually inferred); the loss of skills may be followed by a degree of recovery; and the impairment in socialization and by a degree of recovery; and the impairment in socialization and communication has deviant qualities typical of autism rather than of intellectual decline. For all these reasons the syndrome is included here rather than under F00-F09.

Includes:

Dementia infantilis

Disintegrative psychosis

Heller's syndrome

Symbiotic psychosis

Excludes :

Acquired aphasia with epilepsy (F80.3)

Elective mutism (F94.0)

Rett's syndrome (F84.2)

Schizophrenia (F20.-)

F84.4 Overactive disorder associated with mental retardation and stereotyped movements

This is an ill-defined disorder of uncertain nosological validity. The category is included here because of the evidence that children with moderate to severe mental retardation (IQ below 50) who exhibit major problems in hyperactivity and

inattention frequently show stereotyped behaviours; such children tend not to benefit from stimulant drugs (unlike those with an IQ in the normal range) and may exhibit a severe dysphoric reaction (sometimes with psychomotor retardation) when given stimulants; in adolescence the overactivity tends to be replaced by underactivity (a pattern that is not usual in hyperkinetic children with normal intelligence). It is also common for the syndrome to be associated with a variety of developmental delays, either specific or global.

The extent to which the behavioural pattern is a function of low IQ or of condition should be separately coded.

Diagnostic guidelines

Diagnosis depends on the combination of developmentally inappropriate severe overactivity, motor stereotypies, and moderate to severe mental retardation; all three must be present for the diagnosis. If the diagnostic criteria for F84.0, F84.1 or F84.2 are met, that condition should be diagnosed instead.

F84.5 Asperger's syndrome

A disorder of uncertain nosological validity, characterized by the same kind of qualitative abnormalities of reciprocal social interaction that typify autism, together with a restricted, stereotyped, repetitive repertoire of interests and activities. The disorder differs from autism primarily in that there is no general delay or retardation in language or in congnitive development. Most individuals are of normal general intelligence but it is common for them to be markedly clumsy; the

condition occurs predominately by boys (in a ratio of about eight boys to one girl). It seems highly likely that at least some cases represent mild varieties of autism, but it is uncertain whether or not that is so for all. There is a strong tendency for the abnormalities to persist into adolescence and adult life and it seems that they represent individual characteristics that are not greatly affected by environmental influences. Psychotic episodes occasionally occur in early adult life.

Diagnostic guidelines

Diagnosis is based on the combination of a lack of any clinically significant general delay in language or cognitive development plus, as with autism, the presence of qualitative deficiencies in reciprocal social interaction and restricted, repetitive, stereotyped patterns of behaviour, interests, and activities. There may or may not be problems in communication similar to those associated with autism, but significant language retardation would rule out the diagnosis.

Includes:

Autistic psychopathy

Schizoid disorder of childhood

Excludes:

Anakastic personality disorder (F60.5)

Attachment disorders of childhood (F94.1, F94.2)

Obsessive - compulsive disorder (F42.-)

Schizotypal disorder (F21)

Simple schizophrenia (F20.6)

F84.8 Other pervasive developmental disorders

F84.9 Pervasive development disorder, unspecified

This is a residual diagnostic category that should be used for disorders which fit the general description for pervasive developmental disorders but in which a lack of adequate information, or contradictory findings, means that the criteria for any of the other F84 codes cannot be met.