

Global Autism: Autism, Autism Etiology, Perceptions, Epistemology, Prevalence and Action

Review Article

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Abstract

Autism is a Neuro-Developmental Disorder affecting socialization and communication with stereotypic behaviors. The research Scientists all over world found that genetic and environmental factors are causes of Autism Spectrum Disorders. Over the past decade, worldwide Autism, advanced rehabilitation services and research estimates of increase between 50% to over 2000% in cases of Autism Spectrum Disorder diagnoses. The rise in diagnoses of Autism Spectrum Disorder impacts us all. The national prevalence of autism spectrum disorders in India is 1 out of 250 children (Posserud et.al (2010), The Autism Society 2010, Autism speaks (2008) and Wong (2007). The world seeks greater awareness and understanding of the complexities of the condition to provide evidence based rehabilitation interventions to Children with Autism Spectrum Disorders. The rehabilitation intervention includes Behavioral Management, Cognitive Training, Cognitive Behavior Therapy, Applied Behavior Analysis, Special Education, Speech & Language Therapy, Occupational Therapy, Physiotherapy, Play Therapy, Music Therapy and Parental Counseling. These rehabilitation interventions are evidence based strategies for the accommodation and support to Children with Autism Spectrum Disorder and their families. These rehabilitation interventions cover the major defected areas of social reciprocity, communication and repetitive behaviors of Children with Autism Spectrum Disorders. There is worldwide concern regarding the inclusiveness of Children with Autism in schools and in class rooms that will comfortably accommodate children with wide-ranging disabilities that include autism. A critical concern of teacher's responsibility for students learning in the inclusive classroom is their lack of knowledge and understanding of, as well as professional preparation for accommodating the characteristics and needs of students with Autism Spectrum (Bellini *et al* 2011).

Keywords: Autism; Autism Spectrum; Neuro-developmental Disability; Behavior; Perceptions; Epistemology & Prevalence.

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Introduction

Autism and Autism Spectrum Disorders (ASD) are among the most enigmatic and restricting disorders, given that affected individuals demonstrate alterations in three basic areas of development: reciprocal social interaction, verbal and non-verbal communication and flexibility in their selection of interests and behaviors. The peculiar characteristics that define ASD cause major disturbances in the family dynamics and generate needs in all areas and contexts of development (Altiere, 2006; Baker et al., 2005; Shu, 2009; Smith, Hong et al 2010). Autism Spectrum Disorder (ASD) is a set of complex neuro-developmental disorders that affect social, communication and behavioral development. The term spectrum implies range of severity from mild to severe

social dysfunction.

Other problems are frequently associated with the nuclear characteristics of autism. These include mental retardation (Sigman & Caps, 1997) and behavior problems such as stereotyped, self-injurious or aggressive conduct (Bryson, 1996; Hastings, 2003) that persist in the long term (Einfeld, Tonge & Rees, 2001). These problems, depending on the severity and frequency with which they occur, will affect the development of individuals with autism and the well-being and adaptation of their parents to a greater or lesser extent (Herring, et al., 2006; Lecavalier et al., 2006; Pozo et al., 2006; Tomanik et al.2004).

According to the widely accepted classification systems, namely Diagnostic Statistical Manual-IV (DSM- IV) and International Classification of Diseases-10 (ICD-10), Autism Spectrum Disorders are grouped under the category of Pervasive Developmental Disorders (PDD). Pervasive developmental disorders (PDDs) are characterized by slow, limited and atypical

Developmental processes with onset in the early years of life. The condition leads on to disabilities in virtually all the psychological and behavioral sectors with prominent disturbances in social, communicative and cognitive spheres. PDDs include the prototypic

Childhood autism, Rett's syndrome, Childhood Disintegrative Disorder (CDD), Asperger's syndrome and atypical autism. Except for one additional category (hyper kinetic stereotyped movement disorder in ICD-10), the disorders included in ICD 10 (World Health Organization, 1992) and DSM IV (American

Psychiatric Association, 1994) are identical.

The definition of autism in DSM-IV and ICD-10 are conceptually identical. It characterizes autism by deficits in three areas: 1) Delay in communication, 2) Repetitive and stereotypic behavior patterns, and 3) Delay in speech and language abilities. A child with Autism often has problem understanding the connection between mental states and actions. Autistic children have difficulty in understanding emotions. It is a developmental disability with onset in early years causing delay in different areas of development of children. Autism is generally detected in early childhood and persists throughout the person's life.

The most striking feature of Persons with autism is their inability to relate to others. They may show abnormal interest in objects rather than people. They may not maintain eye contact with others. They remain aloof and asocial. They resist change and insist on sameness. They typically exhibit limited interests and stereotyped behavior.

Persons with autism have difficulty in engaging in meaningful conversation. Their speech may be delayed or distorted. Echolalia is a common feature. Some persons may have extraordinary or 'savant' ability likes photographic memory, extraordinary performance in music, mathematics and computers. However, research shows that about 60% of persons with autism have low levels of intelligence (Fred, 2007).

History

The term 'autism' stems from the Greek root 'autos' meaning 'self'. Historically, Bleuler in 1911 first coined the term autism as detachment from reality by way of social withdrawal. Autism was first described by Leo Kanner in 1943 in his classic report of 11 children with "autistic disturbances of affective contact" (Kanner, 1943). A Viennese pediatrician A. Ronald while working in Darjeeling, India, in 1940's came across some abnormal/difficult children. The description given by Ronald bears similarity to Kanner's observation. Ronald also made a note of the fact that the problems of such children extended to the whole of their mental personality. Thus it is heartening to note that one of the earliest descriptions of autism came all the way from India. Hans Asperger (1944) referred to autistic psychopathy as Asperger syndrome. Research studies by Rogers (1998) Baker (2004) and Couteur et al., (2008) concluded that the criterion of social withdrawal from people is the most important characteristic of autism.

Etiology

For effective prevention and early intervention, it is desirable to have thorough understanding of the causative factors of autism spectrum disorders (ASD). Autism spectrum disorders are multifactorial with many risk factors acting together to produce the condition. Research evinces a wide range of genetic and environmental causes which are highlighted below.

Brain Development

Research into the causes of autism spectrum disorder has advanced in tandem. With the aid of modern technology like Computerized Tomography (CT), Single Photon Emission Computed Tomography (SPECT) and Magnetic Resonance Imaging (MRI), scientists have recently studied structure and function of brain of children with autism. Post mortem and MRI studies have shown

that many brain structures are implicated in autism. This includes the cerebellum, cerebral cortex, limbic system, corpus callosum and basal ganglia. Children with autism have enlarged ventricles, some have hypoplasia of the cerebellar verm and others have abnormalities of brain stem nuclei. Other studies suggest that people with autism have abnormal levels of serotonin, dopamine and other neurotransmitters in the brain.

Recent research studies have shown that the etiology of autism may be abnormal brain development in infancy. Research evidence suggests irregularity in several regions of the brain. This growth dysregulation hypothesis suggest that autism could result from the disruption of normal brain development in early fetal development caused by defects in genes that control brain growth and regulate how neurons communicate with each other (Belmonte et al, 2004).

Research evinces that sudden, rapid head growth in an infant may be an early warning signal that may lead to early diagnosis and effective intervention or possible prevention of autism. ASDs are associated with known genetic causes in 10-15% of cases. The most common causes include fragile x syndrome, phenylketonuria, congenital rubella, tuberous sclerosis and various cytogenetic abnormal findings.

Genetics

Genetic factors are also important in the etiology of autism. The complex inheritance package suggests polygenic influence in ASD. Chromosomal abnormalities and other neurological problems are more common in families with autism. Identical twins are much more likely than fraternal twins to have autism. Siblings of ASD have ten times more risk than general population.

Research is now being conducted all over the world to determine specific genes that increase the likelihood of someone developing autism. Research shows that genes encoding neuroligins are mutated in autism. The International Molecular Genetic Study of Autism Consortium has pinpointed four chromosomes which play critical roles in autism. The chromosomes identified are numbers 2, 7, 16 and 17. Chromosome 7 is known to be associated with many language disorders and chromosome 2 plays an important role in early brain development. These findings are further demonstrated by research showing dyslexia patients also have abnormalities on these chromosomes.

Vaccinations

Parent may first become aware of autistic symptoms in their child around the time of routine vaccination, and this has given rise to theories that preservatives in vaccines can cause autism. Aside from vaccines now being implicated in triggering mitochondrial dysfunction and possibly autism as a result, it has been proposed thimerosal, a mercury based preservative used in measles-mumps-rubella (MMR) vaccine may be a causative factor in autism (Bernard et al, 2002). Many large scale studies have now been done that have failed to show a link between thimerosal and autism.

Environmental Factors

Environmental factors that have been claimed to contribute or exacerbate autism include certain foods, infectious disease, heavy metals, solvents and phenols used in plastic products, pesticides, alcohol, smoking, drugs and vaccines. Apart from these, any sig-

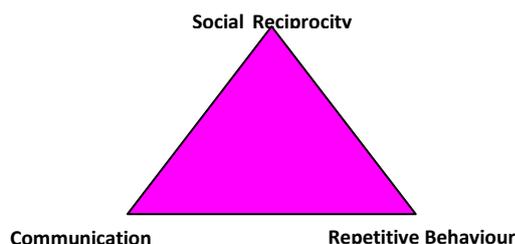
nificant factors in prenatal, natal and postnatal life can also cause abnormalities in development of children.

A number of other possible causes have been suspected but not proven. They involve Digestive Tract Changes, Diet, Mercury or Lead Poisoning, and body's inefficient use of Vitamins and Minerals.

Characteristics of Autism Spectrum Disorder

The main characteristics in the definition of autism involve core deficits in three main areas of development, namely, social reciprocity, language & communication and repetitive behavior.

Triad of Impairments



Communication Deficiencies

As the expression “pervasive disorder” suggests, autism alters some functional areas like language, behavior and social interaction and communication. Children with autism exhibit qualitative impairments in social interaction, qualitative impairments in communication and restricted repetitive and stereotyped patterns of behavior (APA, 1994). Communication impairments are usual in children with autism. Verbal language can be delayed or completely absent. These delays or unavailable abilities are not substituted by other ways of communication such as gestures or mime, as they could be. Even if children with autism acquire adequate speech they encounter difficulties in initiating or sustaining a conversation with others or they use language in stereotyped and idiosyncratic ways (APA, 1994). For instance they may lack understanding of body gestures or tone of voice or they can repeat words automatically, without understanding their meaning, a condition called echolalia.

Social Interaction Deficiencies

Social interaction is another area in which children with autism encounter difficulties. In order to have feelings of social belonging and community integration children with autism require social interaction skills. Typically developing children possess social interaction skills from early days of life and thus they gaze at people, they turn toward voices, they smile, exhibit facial expressions and grasp a finger, being in this way social beings from early days of life. As opposed to typically developing children, children with autism often face difficulties in initiating and maintaining eye contact and in joint attention; they are not spontaneous when it comes to sharing enjoyment, interests or achievements with other people. Children with autism also lack social and emotional reciprocity (APA, 1994). They lack understanding the way other individuals think and feel. They lack “theory of mind”, which is the ability to understand other people's mental states, like thoughts, beliefs, desires, intentions etc. (Baron-Cohen, Hadwin & Howlin, 2002).

Restricted Repetitive Behaviors

Restricted repetitive and stereotyped patterns of behaviors are another characteristic of children with autism. These children often flap their arms or walk on toes. They may be attracted to specific features of a toy and spinning the wheel of a toy car rather than use it for pretend play. Some children may have rigid patterns of behavior like lining up toys in a specific way or might follow the same routine everyday and often when these patterns of behavior are not followed children might protest with tantrum (Smith, 2006).

Even if children with autism face difficulties in communication, social interaction and behavior they usually present some unique abilities like strong visual skills, good memory of details like math facts, trains schedule, baseball statistics, long term memory, computer and technology skills, musical ability or interest, intense concentration and focus on a preferred activity, artistic ability, mathematic ability, ability to read at an early age (even if they do not necessarily comprehend it), strong encoding and honesty (Autism Speaks, 2008).

Cognitive Deficiencies

It is well known that persons with autism have cognitive deficiencies. They generally display cognitive deficits in terms of attention, complex memory, knowledge of self and other, meta-cognitive abilities, abstract thinking and problem solving skills. These deficits are implicated in language difficulties and social interactions.

The most rudimentary of cognitive process, attention is a prerequisite for development of more complex cognitive processes. It is quite common for persons with autism to have attention difficulties, inability to focus and at times, associated hyperactivity. These individuals generally have inattention or ‘selective attention’ leading to problems of encoding, processing and recalling the information necessary for learning.

Perspectives of memory functioning in children with autism suggest that they have good rote memories. Autistic savants display exceptional memories for certain kinds of material.

People with autism tend to understand the world in more concrete terms. They have difficulty in comprehending abstract ideas, like idiomatic speech and metaphorical expressions. Persons with ASD are often characterized as having meta-cognitive and executive process deficiencies because they have difficulty in transfer of learning to new situations.

It has been frequently observed that majority of children with autism have low levels of intelligence. However, savant abilities or amazing abilities may be present in some people with autism.

Theory of Mind

Individuals with autism are characterized as lacking insights into their own minds as well as the minds of other people. Many of the social impairments are due to their inability to comprehend mental states, namely thoughts, beliefs and attitudes of other people. They also have difficulty in understanding their own emotions and those of others. Hence, autistic persons are often viewed as low in emotional intelligence or emotional competence.

Children with autism have difficulty in thinking about their own cognitive states and mental processes as well as those of others; hence they have a meta-cognitive deficit.

Perception of The Problem

The perception of disability has been assessed by different research scientists from different parts of the world. Bristol (1987) assessed mother's definitions of the stressful situation resulting from their child's disability through a self-blame variable i.e. the degree to which the mother blames herself for her child's disability and a catastrophe variable i.e. the degree to which the mother perceives her child's disability as a family catastrophe. The results demonstrated that these two variables are the best predictors of depression and marital satisfaction. Similarly, Saloviita et al. (2003) showed that the most important predictor of parental stress is a negative definition of the situation.

However, other studies have measured positive aspects that protect the family from stress and reduce the impact of the disability such as: a) hardiness (Ben-Zur et al.2005; Gill & Harris, 1991; Weiss, 2002); b) self-efficacy (Hastings & Brown, 2002); c) ambiguous loss (Boss, 1988, 1999); and d) sense of coherence (Olsson & Hwang, 2002). The sense of coherence (SOC) has been shown to be a protective factor in stress research in studies focused on family resilience across different contexts and disorders (McCubbin et. al.1998).

The origin of the SOC concept can be found in the theory of salutogenesis proposed by Antonovsky (1979, 1987). SOC is conceptualized as a "global orientation that expresses the extent to which one has a pervasive, enduring though dynamic feeling of confidence that: 1) the stimuli deriving from one's internal and external environments in the course of living are structured, predictable, and explicable (comprehensibility); 2) the resources are available to meet the demands posed by these stimuli (manageability); and 3) these demands are challenges worthy of investment and engagement and that life make sense emotionally"(1987, p.19).

Antonowsky (1979) sought to explain the relation between life stresses and health in the theory of salutogenesis by what he calls the sense of coherence (SOC). SOC was defined as: "a global orientation that expresses the extent to which one has a pervasive, enduring, though dynamic, feeling of confidence that one's internal and external environments are predictable and that there is a high probability that things will work out as well as can reasonably be expected" (p. 132).

The salutogenetic perspective proposed by Antonowsky (1987) suggests that SOC enables people to resolve tension in a health-promoting manner, to reflect about their external and internal resources, to identify and mobilizes them and to promote effective coping by finding solutions.

SOC is conceived as a personality characteristic or coping style, an enduring tendency to see one's life space as more or less orderly, predictable, and manageable. This theoretical model suggests that individuals develop a generalized way of looking at the world as more or less coherent. This sense of coherence tentatively appears in childhood; it becomes more definitive during adolescence, becoming fully developed around age 30 (Antonowsky & Sagy, 1986).

The results of several studies showed that SOC acts as a mediator in the relation between autistic symptom severity and parenting stress (Mak et al., 2007; Pozo et al.2006) and in the relation between children's behavioral problems and parents' perceptions of family quality of life (Pozo, 2010). The parents of children with autism and other disabilities will improve the perception that the course of life is structured, predictable and explicable, that resources are available to meet the demands and that these demands are challenges worthy of investment and engagement.

Diagnosis

Diagnosis of PDD is largely clinical. DSM IV and ICD -10 have defined autism almost similarly. India follows ICD -10 diagnostic criteria. The criteria for the diagnosis of PDD are strict and they help in the diagnosis of mainly severe cases. Since cases of autism spectrum disorders may visit any doctor, most commonly pediatricians, who are not very familiar with the diagnostic criteria of ICD or DSM, it is possible that milder cases of PDD are missed. However, it was observed that 937 professionals, belonging to three different categories, pediatricians, psychiatrists and psychologists; generally agreed about necessary characteristics needed for diagnosis of autism (Daley, 2002). In an another survey by Action for Autism, about one-third of 677 pediatricians endorsed the outdated view of autism being more common in higher socio-economic families and occurring a result of cold rejecting parents. 60% of them believed that emotional factors played a major role in the etiology and half agreed that autistic children would "outgrow" the autism (www.autismindia.org). These observations highlight the need for training health professionals who are involved in care of persons afflicted with autism.

Epistemology And Prevalence of Asd/Pdd

Autism spectrum disorders are not rare. ASDs are found across all cultures. Autism is found throughout the world in all racial, ethnic and social groups. According to Centres for Disease Control and Prevention report (2006), estimates of prevalence range from 2-6 cases per 1000. By the turn of 21 century, the prevalence of autistic disorder has risen by 10-20 folds (Chakrabarti & Fombonne, 2005). These statistics show that autism affects boys 3 to 5 times more often than girls (Fombonne, 2006).

Autism tends to run in families. The concordance rate of autism is higher in monozygotic twins. In dizygotic twins, the concordance rate was found to be 9% while it was 60% in monozygotic twins (Belmonte & Carper, 2006).

Epidemiological studies of autism conducted in many countries show a marked increase in prevalence rates over time (Coo et al, 2007). Increased awareness, changes in definition and diagnostic criteria and improved screening tools and services explain upward trend of rates in recent decades (Montiel and Joaquin, 2008).

Similar trends have been observed in our country. A prevalence rate of one in every 250 children (Action for Autism, India 2007) was reported in India. Viewing India's current population, this means there are more than 2 lakh persons with autism in the country.

The prevalence of ASDs over time poses unique challenges because of the complex nature of these disorders, a lack of biologic markers for diagnosis, and changes in clinical definitions over time. The WHO global prevalence of autism is 1 in 500. Boys

are four times more likely to have autism than girls. From one in 10,000 children ten years ago in India, the prevalence is 3-4 per 1,000 live births now. The incidence rate is approximately 1 in 90,666 or 11,914 people in India. According to estimates, over 2 million people are living with autism in India. Every year, the National Institute for the Mentally Handicapped, Secunderabad, registers approximately 100-125 new cases, which is much higher than compared to five years ago.

Several researchers have claimed that autism is rare and is not reported from places such as India (Lotter, 1980; Sanua, 1984). This notion probably stems from the fact that there hasn't been even a single attempt to find out prevalence rates of PDD in general population in the Indian subcontinent. A handful of general population studies which have calculated childhood psychiatric morbidity haven't reported the data for autism spectrum disorders. There are however, a few clinic based prevalence studies, case series and case reports which show that health professionals do see cases of PDD. It is possible that early literature reporting prevalence of childhood schizophrenia, psychoses and mental retardation included misdiagnosed cases of autism. As the diagnostic criteria for PDD became more refined, the number of studies reporting autism cases increased.

The earliest report of clinic prevalence of infantile autism was by Hoch, a trained psychoanalyst, in 1967. In an Indian Council of Medical Research funded study done at a private missionary hospital she found 2.9% cases were of infantile autism. No diagnostic criteria were used. All the cases were diagnosed clinically (Hoch, 1967). One must note that autism at that time was explained and understood more in psychological/ psychodynamic terms than biological. Subsequently, a series of seven cases were reported from a mental retardation clinic at NIMHANS, Bangalore. The sex ratio of the cases was 1.33:1 and they had an age range of 3 to 12 years (Narayanan, 1978).

In a retrospective chart review between 1980 and 1982, Malhotra & Chaturvedi (1984) found only 4 cases, which met ICD-9 criteria for childhood psychotic disorders. The authors included infantile autism cases under this category. The clinical or socio-demographic characteristics of the cases were not mentioned.

Srinath and co-workers (Srinath et al, 1989) from NIMHANS, Bangalore did a retrospective review of cases registered from 1981 to 1984 in the child psychiatry clinic. A total of 31 cases met the ICD-9 criteria for autism. Out of these cases only 17 fulfilled the criteria laid down by DSM III, which probably reflects the difference in approach to the diagnosis between two classificatory systems. The cases ranged from 2.5 to 14 years of age. Males constituted the bulk (M: F=7.5: 1), which is higher than that reported internationally. Most were from well to do families. None had faced or were facing adverse psychosocial situations. All developed symptoms by 30 months. Two patients had co-morbid seizure disorder (Srinath et al, 1989).

There have also been attempts by Indian researchers to look for autistic features and autism in children with mental retardation. This is not surprising as it is well known that mental retardation is co-morbid with autism in up to 70% of cases. International studies have found rates ranging between 0.6% (Lotter, 1978) and 12.8% (Wing & Gould, 1979). Kar et al (1993) in a study from north eastern part of India found co-morbid autistic disorder in 13% of 55 mentally retarded children. Purkayastha et al (1997) found comorbid autism in 4.7% of 874 patients of mental retar-

ation. In another study (Kar et al, 1997) done at child psychiatry clinic of Central Institute of Psychiatry, Ranchi, 96% cases of mentally retarded children had some autistic features.

Bharath et al (1997) from National Institute of Mental Health and Neurosciences, Bangalore, reviewed inpatients admissions over a 1 year period in the child psychiatry unit. Using ICD-9 criteria 6 cases out of a total of 143 met the criteria for autism. Reason for in patient admission was observation, diagnostic clarification, counseling of parents and initiation of treatment.

Childhood Autism Rating Scale's score was in severely autistic range in 62.5% of cases. About 25% of cases had normal development up to at least 18 months of age and after that there was regression in the areas of language and behavior. It is possible that other PDDs like Rett's syndrome and Childhood disintegrative disorder may have been misdiagnosed as autism (Singhi & Malhi 2001).

Malhotra et al (2003) compared the socio-demographic and clinical profile of PDD patients registered at CAP Clinic, PGIMER, and Chandigarh between 1989 and 1999. Out of 2942 cases 46 cases (1.6%) met ICD-10 criteria for different PDDs. 22 cases were of typical autism, 12 cases each were of CDDs and other PDDs. 5 cases met criteria for atypical autism, 4 were of Asperger's syndrome and the rest were of Rett's syndrome (n=2) and PDD unspecified (n=1). Relatively high proportion (26%) of cases of CDD is notable as it has been suggested that CDD is only about one-tenth as common as autism. Seventy eight percent of the total sample was male, all exhibited classical symptoms and temperamental variations were noted in the areas of activity, rhythmicity and attention span in most of the cases. Comparisons between the three groups of typical autism (n=22), CDD (n=12) and other PDDs (n=12) on various socio-demographic and clinical parameters showed significant differences on various socio clinical parameters like socioeconomic status, onset of illness age at onset, temperamental variables, neurotic traits, delay in milestones and intelligence quotient (Malhotra et al, 2003).

Young Shin Kim, et-al (2011) in their study entitled "Prevalence of Autism Spectrum Disorders in a Total Population Sample" conducted the first population-based autism prevalence study in Korea and the targeted population were children 7-12 years of age from elementary schools, as well as children in the same age group enrolled in the Disability Registry between September 2005 and August 2006. The investigators used a two-stage design for case identification. The study was conducted in four steps i.e. screening, sampling, diagnostic assessment, and quality control of best-estimate diagnoses. Best-estimate diagnostic reliability and validity were examined and maintained throughout the study. The prevalence of ASDs was estimated to be 2.64% with 1.89% in the general-population sample and 0.75% in the high probability group.

Elsabbagh & et-al (2012) in their study "Global prevalence of Autism and other pervasive developmental disorders" reviewed all available evidence on the global prevalence of autism. In addition to reviewing studies they also identified country and region specific publications. This resulted in over 600 studies that were evaluated by the authors to provide estimates of prevalence.

Ali Al Zahrani in 2013 in his study "Prevalence and clinical characteristics of Autism spectrum disorders in school age children in TAIF-KSA" used the same methodology which was used by

Young Shin Kim, et-al in his study "Prevalence of Autism Spectrum Disorders in a Total Population Sample". They also used a two stage design for case identification. The study proceeds in three steps which were Screening, Sampling, and Diagnostic Assessment. For the study the targeted population was children of 7-12 years of age from TAIF elementary schools, as well as children in the same age group enrolled in the Disability Registry.

Williams et al in 2005 in his study "Systematic Review of Prevalence Studies of Autism Spectrum Disorders" conducted a meta-analysis review of 42 ASD prevalence studies published between 1966 and 2003. Meta-regression was used to explore the influence of various methodological factors and population characteristics on estimated prevalence. Their investigation identified a high degree of heterogeneity amongst the studies with an overall random-effects estimate of prevalence across all of the studies of 7.1/10,000 for typical autism and 20.0/10,000 for all ASDs.

Honda et.al (1996) in their study "Cumulative incidence of childhood autism: a total population study of better accuracy and precision" established a conceptual model of a Community Oriented Clinical System called Discovery Model (Detection and Intervention system in the community for very young Children with Developmental Disorders) for early detection and early intervention of Developmental Disorders including autism. In this model a routine health check up of 18 month old children was carried out which served as Initial Screening and aimed at detection of all cases of childhood autism.

John Wray etal (2006) in their study "The Prevalence of Autism in Australia: Can it be established from existing data" calculated national prevalence of Autism Spectrum Disorders for children in the Australian population by a consistent method of case ascertainment to collect data across several data sources, including the health, disability and education sectors as well as the Autism Associations in each Australian state and territory. There was a considerable degree of variation in prevalence figures from these different sources of data, however, using the Commonwealth Government's own Centre link data, the core finding is that there is an estimated prevalence of autism spectrum disorders across Australia of 62.5 per 10,000 for 6-12 year old children. This means there is one child with an ASD on average in every 160 children in this age group which represents 10,625 children aged between 6 and 12 years with an ASD in Australia.

School Integration of Children With Autism

Although children with autism are different in many ways from typically developing children, this doesn't mean that these differences are "wrong" and these children should be excluded from general education system and segregate in special institutions. School is an essential institution for the development of any child, including a child with autism and even if children with autism are different from typically developing children we should learn to value difference in order to integrate these children in our society and community. Like Smith (2006, p 435) declared, "It is imperative that students with autism experience normative, programmed, and supported interactions with typically developing peers. Such inclusion provides these youngsters with appropriate role models, where they can observe how others behave and interact with each other". We would like to emphasize that although observation of other children's behavior is beneficial for children with autism, the educational process of these children need to be as structured as possible.

Ruble and Dalrymple (1996) argued that individuals with autism benefit most from accommodations in their surroundings and from a complex network of social and family supports. Likewise, Billington (2006) argued for a partnership model for evaluating the success supports and therapeutic measures. Every individual deserves the opportunity to learn and reach his fullest potential. A sense of belonging is essential in every child, even in children with autism.

Children with autism do not learn through developmentally typical teaching practices (verbal instruction, imitation of educators and peers, independent learning). Often, they do not benefit from instruction that is not clear, specific and concrete. Therefore, teachers should help children with autism to develop skills like attention (by focusing on salient aspects of the environment), motor imitation, expressive language, receptive language and comprehension, play skills and social interaction skills. For school children with autism consistent structure, support of functional communication, education on social skills and a functional and positive approach to supporting behavior are important elements of the educational process. There are some key features that in order to be effective, every educational program for children with autism should incorporate features like generalization plans, predictable and routine schedules, functional approaches to address problem behaviors, supports for program transition and family involvement and support.. (Smith, 2006)

Teachers should communicate instructions and consequences carefully using direct statements, avoiding using slang or metaphors or only verbal cues and by using pronouns carefully. Positive participation should also be fostered in children with autism by providing them feedback about the appropriateness of responses, by telling the individual when the behavior is proper, by translating time into something tangible and visible, by enhancing verbal communication with pictures or illustrations and by using concrete examples. (Smith, 2006)

A commonly used technique in classrooms where children with autism participate is functional behavioral assessment. Behavior problems such as physical aggression, self-injury or tantrums are critical barriers in effective social and educational development (Horner et al., 2000, Riechle, 1990 Lord & McGee, ed., 2001) and such behaviors make children with autism vulnerable for exclusion. The research suggests that in order to obtain long-term outcomes regarding behavior problems, interventions should be focused on promoting positive and prosocial behaviors (Lord & McGee, ed., 2001).

Management of Autism Spectrum Disorders

Having understood the complexities of ASD in terms of the involvement of brain and genes during the infant's developmental period, it is important for us to deal with its various management strategies which are discussed below.

Autism Spectrum Disorders are generally not "curable," and chronic management is required. Although outcomes are variable and specific behavioral characteristics change over time, most children with ASDs remain within the spectrum as adults and regardless of their intellectual functioning, continue to experience problems with independent living, employment, social relationships, and mental health. The primary goals of treatment are to minimize the core features and associated deficits, maximize

functional independence and quality of life and alleviate family distress.

To date there is no cure for autism. However, there are a number of management strategies that can help people with autism to lead a better quality of life. There are two important aspects of management; one is that early intervention is important; another is that individualized and highly structured programmes give people with autism their best chance for progress.

Treatment of autism is usually multidisciplinary. Developmental and behavioral therapies are effective in dealing with children with ASD. In recent years, effective early intervention practices have reduced the devastating sequel of the disorder. It has been found that intervention such as applied behavioral analysis, speech and language therapy, physical and occupation therapy provided before age 3 in children with autism have a great impact on successful management (Scott, Myers and Plauche 2007).

Applied Behavior Analysis (ABA)

Applied behavior analysis (ABA) is the process of applying interventions that are based on the principles of learning. ABA methods are used to increase and maintain desirable adaptive behaviors, reduce interfering maladaptive behaviors, develop new skills, and generalize behaviors to new environments or situations.

Positive Behavioral Support (PBS) is an approach that tries to increase positive behaviors, decrease problem behaviour and improve the child's or adult's lifestyle. The PBS method focuses on the interactions between people with autism, their environment, their behaviour and learning processes to develop the best lifestyle for them.

Educational Intervention

Education has been defined as the fostering of acquisition of skills and knowledge to assist a child to develop independence and personal responsibility. It encompasses not only academic learning but also socialization, adaptive skills, communication, amelioration of interfering behaviors, and generalization of abilities across multiple environments.

Individualized Education Programmes (IEPs) properly designed and systematically practiced are an effective way to deal and prevent problem behaviors and learn appropriate adaptive skills in children with autism.

Structured Teaching

The Treatment and Education of Autistic and related Communication-Handicapped Children (TEACCH) method, developed by Schopler and Mesibov (1992) emphasizes on "structured teaching." Important elements of structured teaching include organization of the physical environment, predictable sequence of activities, visual schedules, routines with flexibility, structured work/activity systems. There is an emphasis on both improving skills of individuals with ASDs and modifying the environment to accommodate their deficits.

Psychoeducational Intervention

Psycho educational is a specialized form of education aimed at helping to learn and creating awareness about the range of emo-

tional and behavioral difficulties, their effects and strategies to deal with them.

Providing psycho educational to parents of children with autism is based on attachment theory, developed by John Bowlby and Ainsworth (1991). This theory focuses on the development of close emotional bonds in caregiver-infant relationships. Bowlby emphasized that attachment relationships continue to be of paramount importance throughout life, because attachment relationships play a primary role in regulating emotional distress by providing comfort and a feeling of security.

Developmental Models

Developmental models are based on use of developmental theory to teach young children. The Denver model, for example, is based largely on remediating key deficits in imitation, emotion sharing, theory of mind, and social perception by using play, interpersonal relationships, and activities to foster symbolic thought and teach the power of communication.

Speech & Language Therapy

A variety of approaches have been reported to be effective in producing gains in communication skills in children with ASD. Didactic and naturalistic behavioral methodologies like discrete trail teaching, verbal behavior, natural language paradigm, pivotal response training, milieu teaching have been found to be effective in improving the communication of autistic children.

The use of augmentative and alternative communication modalities, including gestures, sign language, and picture communication programs, often are effective in enhancing communication. The Picture Exchange Communication System (PECS) is used widely. The PECS method incorporates ABA and developmental pragmatic principles to teach the child communication skills.

Social Skills Training

Social skills are necessary to be a competent adult in any society. Joint attention training may be especially beneficial in young, preverbal children with ASDs, because joint attention behaviors precede and predict social language development.

Social skills training focuses on child's responding to the social overtures of other children and adults, initiating social behavior, and minimizing stereotyped behaviors while using a flexible and varied repertoire of responses, and self-managing new and established skills.

A social skills curriculum should target social skills groups, social stories, visual cueing, social games, video modeling, scripts, peer-mediated techniques. Play and leisure curricula supported primarily by descriptive and anecdotal literature are some of the methods through which the social skills of children with autism can be improved.

Occupational & Sensory Integration Therapy

Occupational therapy is provided to promote development of self-care skills and academic skills. Occupational therapists also assist in promoting development of play skills, modifying classroom materials and routines to improve attention and provide prevocational training. Sensory integration (SI) therapy often is

used alone or as part of a broader program of occupational therapy for children with ASDs. The goal of SI therapy is to remediate deficits in neurological processing and integration of sensory information so as to allow the child to interact with the environment in a more adaptive fashion.

Psychopharmacology

Medications can be effectively used to treat associated medical conditions like epilepsy, tuberous sclerosis, allergies, bipolar disorders, depression and sleep disorders. Medicines are often used to deal with severe behaviour problems like self-injurious behaviour or hyperactivity.

Diet

Some children with autism appear to respond to Gluten-Free or Casein-Free (GFCF) diet (Elder et al, 2006). Gluten and Casein are food proteins. Gluten is found in grains, particularly wheat, and casein is found in milk and dairy products. There are three main mechanisms through which gluten and casein are thought to cause symptoms in individuals with autism; they are food hypersensitivity, food intolerance and opiate-like effects.

Some people with autism and PDD may develop allergies when there is an abnormal immune response to proteins such as gluten and casein. When given these food products they may develop abdominal pain and respiratory problems because of food intolerance and the other reason which was found is that they cannot properly digest gluten and casein. These undigested products form substances and also may act like opiates in their bodies. This "drug" substance alters the person's behavior, perceptions, and responses to his environment. The implementation of a GFCF diet involves removing all sources of gluten and casein from a person's/child's diet.

Family Support

Management should focus not only on the child but also on the family. Parents play a key role in effective management of ASD. Having a child with ASD has a tremendous adverse impact on the family. Parents and siblings of children with ASDs experience stress and depression. Supporting the family and ensuring its emotional and physical health is an extremely important aspect of overall management of ASD.

Professionals can provide support to parents by educating them about ASDs, assisting them in obtaining access to resources, providing counseling and guidance by giving them emotional support and training and involving them as co-therapists.

The need for support is longitudinal, although the specific needs may vary throughout the family life cycle. One of the chief strategies for helping families raise children with ASDs is helping to provide them with access to needed ongoing supports and additional services during critical periods and/or crises.

New Action Plan of Indian Government For CwASD

In New Delhi, India representatives from 8 countries formulated an extensive regional coalition to address autism spectrum disorders (ASD). The participated countries were India, Bangladesh,

Thailand, Bhutan, Myanmar, Nepal, Sri Lanka, and Timor-Leste, as well as Autism Speaks and the World Health Organization (WHO). Members from all 8 countries helped in the establishment of the South Asian Autism Network (SAAN) in New Delhi, India. The meeting (February 12, 2013) was hosted by the Ministry of Health and Family Welfare of India, with support from the Bangladesh High Commission in India. Sonia Gandhi, President of the Indian National Congress, addressed the urgent need to improve policy on autism spectrum disorders. India has probably over 8 million children with autism spectrum disorder. According to Sonia Gandhi the formulation of public policy has not kept pace but now SAAN will play a major role in bringing up a revolutionary change in the mindset of society. Mothers of children with ASD and other development disorders suffer tremendously when thinking about the future of their children. Lifelong support is needed for children with autism spectrum disorders. According to Indian Health Minister Ghulam Nabi Azad, India needs greater collaboration on autism spectrum disorders (ASD) between the ministries of different countries in the region and increased coordination between the various ministries in India to compile data and training practices for professionals. According to Chairperson National Advisory Committee on Autism in Bangladesh Saima Wazed Hossain, Bangladesh Public have made its Government realize that in order to fully address the needs of children with autism spectrum disorders (ASD), Government approach has to be multi-faceted, comprehensive, and integrated with other community programs.

Conclusion

Autism spectrum disorders are neuro-developmental disorders characterized by triad of impairments in socialization, communication and repetitive behavior. According to ICD -10, autism spectrum disorders are grouped under the category of Pervasive Developmental Disorders, namely: autism, Asperger's syndrome, childhood disintegrative disorders, Rett's syndrome and PDD-NOS. ASDs are found across all cultures. Recent statistics show that autism affects males 3-5 times more often than females. As per one global study the national prevalence of ASD in India is 1 out of 250 children. Autism tends to run in families. The concordance rate of autism is higher in monozygotic twins. ASDs are multi-factorial having a wide range of genetic and environmental causes. Wide ranges of screening and diagnostic instrument for diagnosis of autism have been devised during the last decades. In recent years, Indian Scale for Assessment of Autism (ISAA) was developed at NIMH. It is a standardized tool with high degree of reliability and validity for issuance of disability certificate for persons with autism in India. A comprehensive management programme encompassing developmental, educational and behavioral therapies can help persons with autism to lead a better quality of life. The Government of India has taken now initiative to provide qualitative as well as quantitative rehabilitation services to persons with autism spectrum disorders (ASD) and improve their Quality of Life (QoL).

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