



Autism Spectrum Disorder

What is Autism Spectrum Disorder?

Autism Spectrum Disorder (ASD) is a neurodevelopmental disorder, characterized by different degrees of impairment and deviance in the development of social communication, cognition and emotions, and presence of restricted, repetitive patterns of behaviours and interests as well as sensory processing problems. The symptoms fall into a spectrum of severity with associated intellectual, language, and neurodevelopmental impairment. With new diagnostic criteria in recent years, categories of Autistic Disorder, Asperger's Disorder, High Functioning Autism, Autistic Features, Atypical Autism and Pervasive Developmental Disorder Not Otherwise Specified are subsumed under the new diagnosis of "Autism Spectrum Disorder" (ASD) as one disorder.

The behavioural manifestation of the core features of children with ASD can vary greatly, with the following common clinical presentations:



(1) Deficits in social interaction:

Social interaction difficulties may vary from being aloof, passive to over-passionate, or odd mannered behaviours. Some of the very young children with ASD may only approach adults for addressing physical or biological needs, such as getting food or toys. For these, they may use others as mechanical aids to get what they need. Some may show aversion to physical contact and stiffen when held. They may show limited social relatedness and attachment with parents or close care-takers, and prefer to play alone and with little or no spontaneous sharing of interest, enjoyment and achievements. Older children may fail to initiate appropriate social signaling to others (e.g. socially directed smiles, eye to eye gaze), and lack response to others' signals in social situations. For those who have developed useful verbal language, communication is still often used for instrumental rather than social purposes. Apart from aloofness, some may attempt to socially relate as instructed by adults but with low social volition, while others with higher social intention may appear odd, over-passionate and self-centered.

(2) Deficits in non-verbal communication:

Children with ASD are weak in the use of non-verbal communication. Very young children with ASD may have difficulty indicating needs through pointing and eye-gazing. Limited facial expression and poor eye contact may render them to be seemingly rude, uninterested or inattentive in social

interactions. Some may speak with high-pitched voices, strange prosody or with robot-like monotone. Older children may have difficulty in understanding social cues from body language and tone of voice. The overall integration of verbal and non-verbal communication is weak.

(3) Deficits in relationship and friendship building:

Children with ASD lack adequate social skills to develop friendships with others. Many children with ASD have speech and language difficulties, such as weak fund of vocabularies, pronominal reversals, which affect their ability to converse effectively with peers and in friendship building. Even for those with intact language and who are eager to make friends, the weakness in empathy to understand others' thoughts and feelings creates a range of challenges. These include difficulties in processing complex social cues and understanding implicit social rules, regulating behaviour to match specific social context, following rules of the communication context, and understanding non-literal languages including jokes, idioms and metaphors. Friendships are often one-sided or based solely on shared special interests. Inappropriate attempts at social interchange are often interpreted as aggressive or disruptive behaviour as they may be socially immature, mechanical, awkward or overly passionate.

(4) Stereotyped or repetitive motor movement or use of objects / speech:

Restricted and ritualized patterns of verbal or nonverbal behaviours are common during early and middle childhood. During early childhood, common examples of non-verbal restricted and ritualized patterns of behaviour include lining of objects and repetitive opening and closing doors. Stereotyped body movements (stereotypies) such as flapping of hands, running back and forth, head banging, rocking of body, self-spinning, finger movements and grimacing may be present when these children become excited, distressed or agitated, and diminished through structured environments. Some children may repeatedly watch the same movie or read the same story book. Stereotyped verbal language may be rote and repetitive, lacking in functional communicative intent. The unusual speech pattern may include stereotyped words or phrases which are out of the context, immediate or delayed echolalia, repetitive questioning, and greeting rituals, and for some older children pedantic speech with vocabularies or phrase that are unusual for age or social group may be seen.

(5) Insistence on sameness:

Children with ASD often show insistence on sameness or excessive adherence to routines. Insistence on taking the same route, maintaining same arrangement for objects, eating a narrow range of food items, adopting rigid thinking patterns are some

common examples. Many respond to small changes in the environment with disproportionate distress, including change in routine, transition from one activity to another, and moving to new home/classes with changes of people and environment.

(6) *Fixated interest:*

Fixated or narrow interests are very common in children with ASD. Some demonstrate strong memory of information and data and fascination with numbers, bus routes, calendar and natural sciences. In early infancy and early childhood, commonly there is absent or minimal exploratory play or symbolic/fantasy play. Instead, the play is monotonous and repetitive, and lacking variation, such as spinning and lining activities. For older children, including those with high functioning, there may be limited imitation, creativity and imagination. They may have unusual preoccupation with parts of objects, or perseverative interests with particular topics, all leading to negative impact on their daily and social functioning.

(7) *Sensory issues:*

Some children with ASD have sensory processing problems of hyper- or hypo-reactivity to sensory input or unusual interest in sensory aspects of the environment. Some show apparent indifference to pain, heat or cold, adverse response to specific sounds or textures, excessive smelling or touching of objects, visual fascination with lights or movement (e.g. spinning objects).

They may present sensory seeking or avoidance behaviours to usual auditory, tactile, or vestibular stimulation, manifested as repetitive and compulsive behaviours.

How does ASD affect children?

ASD are life-long disorders. The syndrome can cause significant impact on parent-child relationships, peer relationships and adjustment to school and society. Children with ASD vary greatly in the overall functioning depending on the individual's age, language and intellectual development, as well as other factors such as treatment history and ongoing support.

Age:

Clinical features vary with age as the child's developmental repertoire changes. Symptoms are typically recognized during the second year of life (12-24 months of age) but may be seen earlier than 12 months if developmental delays are severe, or noted later than 24 months if symptoms are more subtle. Behavioural impairment appears most severe at two points throughout life: in early childhood (about 3-5 years old), and during and immediately after puberty (around 14-17 years old). Diagnostic criterion features are most obvious in early childhood while non-criterion (associated) features appear gradually later. While the rigid behaviours of an autistic child may wane, social and communication interaction may be progressively more

strange and awkward in middle childhood when the social demands become more prominent. Some adolescents and adults with ASD might indulge in solitary web-based activities in order to reduce social interaction with peers. In face of challenges in daily, social, academic, and vocational life, or as a result of biological factors, some may develop symptoms of anxiety and depression which further debilitate their daily functioning.

Language development:

Individuals with ASD vary in their degree of language impairment, ranging from complete lack of speech to language delay, poor comprehension, poor response to calling of own name or to speech of others, echoed speech, or stilted and overly literal language. Many children with ASD present an uneven profile of language development. For example, some children with ASD may quickly develop very strong vocabulary in a particular area of interest. They may develop strong literacy skills (e.g. reading alphabets, words or characters) at very young age, but not truly comprehend what they have read. Some have very good memory and may repeat in inappropriate contexts for what they have heard from commercials and television programmes in form of echoed speech. Some capable children may be able to deliver an in-depth “monologue” about a topic of their interest, but may not be able to hold a two-way conversation about the same topic.

Intellectual development:

Recent prevalence study conducted by the Centers for Disease Control and Prevention (CDC) showed that 33% of children with ASD had intellectual disability, 24% were considered in the borderline range, while the rest were in the range of normal intelligence. Regardless of the level of general intelligence, verbal skills are usually weaker than non-verbal skills. Cognitive profile of children with ASD and average or even superior intelligence (i.e. “high functioning” individuals) is typically uneven, with difficulties in attention, complex language abilities, working memory and other executive skills, but with strengths in sensory perception, rote learning, visual-spatial problem solving and simple language skills.

Individuals with ASD usually present with rigid thinking style. They are weak in abstract thinking, organization and problem-solving skills. Some of them are weak in higher cognitive functioning, such as logical reasoning and executive functioning which lead to their deficits in self-management in daily life. Despite the well documented learning impairment in children with ASD, some individuals with ASD demonstrate superior perception, exceptional abilities and savant skills. These include a wide range of superior perceptual abilities in auditory and visuo-spatial tasks, specific knowledge in focused interests and savant abilities such as calendar calculation, hyperlexia, absolute pitch and synaesthesia.

Treatment history and ongoing support:

Early identification of ASD in children is reported to be associated with better outcomes. Early identification may result in early enrolment in appropriate intervention programmes and later successful inclusion in regular educational and community settings with typically developing peers. However, the presentation of social and communication difficulties in high-functioning children with ASD are usually subtler and might be masked by compensatory cognitive skills, often leading to delayed seeking of advice till school age or even beyond.

How common is ASD?

Increase in prevalence was increasingly reported in different countries, especially since the 2000s. Changing and broadening diagnostic criteria to include a spectrum of disorders, ability of the clinician to be attuned to looking for these symptoms, improved screening and reporting mechanisms and increased public awareness, are believed to affect the rates of ASD observed and recorded. Epidemiological surveys of ASD across countries differ in methodology and direct comparisons are difficult.

The latest estimates from the Centers for Disease Control and Prevention (CDC) in United States (US) in 2020 surveillance year was 1 in 54 children aged 8 years in multiple communities in the

US with ASD, having risen over the decade from 1 in 150 children aged 8 years at the 2000 surveillance year. A systematic worldwide review in 2012 on global epidemiological surveys revealed the prevalence estimates to be a median of 17/10,000 for Autistic Disorder, and 62/10,000 for all autistic spectrum conditions and features (Pervasive Developmental Disorders) combined.

For gender distribution, it has been known that ASD affects around 5 times more boys than girls. According to the CDC 2014 statistics, 1 in every 42 boys aged 8 were diagnosed of ASD, while there was 1 in every 189 girls aged 8 diagnosed of ASD.

What causes ASD?

Though the exact cause is still not fully delineated, ASD is now widely accepted to be a neurodevelopmental disorder that is highly heritable and resulting from multiple genetic and non-genetic causes. Heritability is demonstrated by the higher recurrence rate of siblings of children with ASD. About 10% of children with autism are also identified as having Down's syndrome, fragile X syndrome, tuberous sclerosis or other genetic and chromosomal disorder. However, empirical findings have refuted poor parenting as a cause and there is overwhelmingly strong evidence that the measles, mumps, and rubella vaccine is not associated with ASD.

Does my child really have ASD?

Through conducting detailed assessment on the core and associated features, the diagnosis of ASD could be established. However, the behavioural manifestation of each ASD varies with age and developmental stage. Sometimes, other disorders may present with features similar to ASD. These include intellectual disability, severe sensory impairment (hearing or visual), language-based learning disability with poor social adjustment, syndrome of early-onset epilepsy and speech regression (Landau-Kleffner Syndrome), attention deficit/hyperactivity disorder, obsessive compulsive disorder, selective mutism, and various neurodegenerative disorders. Thus, comprehensive assessment is indispensable to establish the diagnosis of ASD and exclude other possibilities. ASD could however occur together with the above or other disorder(s).

Do children with ASD have any coexisting conditions?

Intellectual disability and language problems are commonly found among children with ASD. Other common comorbidities include attention deficit/hyperactivity disorder, tics disorders, developmental coordination disorder, dyslexia, anxiety and depression. Other associated medical conditions include epilepsy, eating problems and sleeping problems.

What is the mainstay of treatment for children with ASD?

The current mainstay of intervention for ASD is to improve the overall functional status of the child through behavioural and educational training, social adjustment, as well as continual parental support.

Evidence-based intervention programmes:

These should focus on addressing the core deficits of ASD, including social communication, language, play skills, and adaptive behaviours. Early, intensive and sustained interventions with the use of multiple treatment modalities carried out in natural settings, and with active parental involvement, are proven to be effective. The following are treatment approaches with more evidence and efficacy:

(i) Behavioural approach:

This approach is based on the learning theory that behaviour is shaped by antecedents and reinforcement. Examples of programmes included Applied Behaviour Analysis (ABA) and Picture Exchange Communication System (PECS). Behavioural interventions should be considered to address a wide range of specific behaviours in children and young people with ASD, both to reduce symptom frequency and severity and to increase the development of adaptive skills. The approach involves breaking down complex skills or behaviours into smaller steps and

teaching individuals through the use of clear instructions, rewards, and repetition. On the other hand, PECS provides an alternative means of communication for children who have limited verbal language. It is a systematic process to enhance these individuals' intention and motivation of communication through the use of alternative means of communication with symbols (usually pictures).

(ii) Combined approach:

Some programmes have been developed using principles from both the behavioural and social/developmental approaches. Examples include: 1) TEACCH (Treatment and Education of Autistic and related Communications handicapped Children) emphasizes the use of structured environment and visual cues to enhance an ASD individual's understanding of environmental expectations and others' behaviours, in order to facilitate their learning; 2) SCERTS (Social Communication, Emotional Regulation and Transactional Support) emphasizes active engagement, environmental support in enhancing an individual's learning and communication motivation, as well as emotional regulation and problem-solving skills.

(iii) Relationship-based approach:

This approach is generally play-based and taught in the child's natural environment with parents playing the major roles in the intervention. Examples of this approach include Developmental,

Individual Difference, Relationship-Based Model (DIR) and Relationship Development Intervention (RDI). DIR / (Floortime) focuses on promoting development by encouraging children to interact with parents and others through play in a pleasurable atmosphere. This helps to facilitate children to reach milestones in their emotional development, enhance social awareness and establish intimate interpersonal relationship as well as expanding their learning experiences.

(iv) Socio-cognitive approach:

Examples include: 1) Social Stories are short descriptions of a particular situation, event or activity, which include specific information about what to expect in that situation and reasons behind. These strategies help children with ASD to understand others' perspective, learn appropriate social behaviours and build social skills; 2) Social Thinking are strategies that help an individual to build up social competencies to understand and interpret social information, including the thoughts, beliefs, emotions, perspectives, motives, intentions of others, so as to make appropriate social responses or action; 3) PEERS Program is teaching of appropriate social skills in group setting which emphasizes parents' involvement and enhances their instructional skills.

Yet all the above strategies should be used after detailed assessment, and cautious considerations of individual's needs of the children and their families.

Other approaches with limited evidence:

Other approaches may have limited evidence to support their theoretical bases or to demonstrate efficacy, and some could be harmful. These include: auditory integration therapy, lens and spectacles, special diets, mineral and vitamin supplements, secretin, detoxification (e.g. for lead and mercury poisoning) and treatment of infection (e.g. for overgrowth of virus/yeast/bacteria in intestinal tissue). Parents should exercise due interpretation and caution when considering these approaches.

Can ASD be treated by medication?

Medication has not been shown to be able to cure core social or communication impairments of ASD. However, reduction of some specific behaviours such as aggression, self-injurious behaviour, anxiety, stereotypes, compulsive behaviour, mood disturbances, hyperactivity, inattention, and sleep problems could enhance the child's ability to benefit from other educational and behavioural modification interventions.

What are the services for children with ASD?

Assessment & diagnosis:

Parents suspect children of ASD can approach private general practitioners and the Department of Health's Maternal and Child Health Service (preschool) or Student Health Service (school-age) for initial evaluation and further referral when

necessary. Professional assessment and diagnosis will be made by developmental behavioural paediatricians, clinical psychologists and child psychiatrists from the Child Assessment Service of the Department of Health and Child & Adolescent Mental Health Services of the Hospital Authority for children at risk. School personnel can also make relevant referral for the above services if deemed necessary.

Rehabilitation service & educational placement:

Training needs for children with ASD are usually diverse and individualized. Some may need cognitive training, speech, occupational and physiotherapies. Special training and educational provisions are available for preschool and school aged children with ASD. Based on individual's level of support needed, preschool children (aged 2 to 5) with mild disability can receive training in Early Education and Training Centre (EETC), On-site Preschool Rehabilitation Service (OPRS) and Integrated Programme in Kindergarten-cum-Child Care Centre (ICCC), while those who need more intensive support may be trained in Special Child Care Centre (SCCC). For school aged children with ASD, the choice of special schools or mainstream schools mostly depends on their cognitive ability. Special schools have additional resource teachers to implement specific programmes on behavioural management, as well as training of communication and social skills. For children with ASD in mainstream schools, additional support through special teaching and behavioural management should be provided.

Family support:

Family support through knowledge and skills dissemination as well as resources sharing and supportive counseling are vital for families with children with ASD. Government, non-government agencies, and various parent associations organize regular activities, workshops and talks catering for the needs of children and families with ASD. Parent associations and support groups and parent resource centres also play important supportive roles. Public education helps to enhance public awareness and understanding of the various challenges facing children with ASD and their families in different developmental stages.

Can children with ASD grow up normally?

The outlook of a child's subsequent development depends largely on the severity of ASD and the child's cognitive and language abilities. Unfavourable factors include: 1) presence of intellectual disability, 2) seizures, and 3) absence of functional speech by the age of 5-6 years. Adolescents and adults with ASD face challenges in social, academic, vocational and daily functioning. With early intervention, better understanding and acceptance from family and community, individuals with ASD can enjoy positive and rewarding lives.

Relevant Websites:

Education Bureau : Special Education Information Online

<http://sense.edb.gov.hk/en/index.html>

Parent and Public Education

<http://www.edb.gov.hk/en/edu-system/special/support/wsa/public-edu/index.html>

Hong Kong Education City : Inclusion Pavillion

<https://www.hkedcity.net/sen>

The National Autistic Society

<http://www.autism.org.uk>

Autism Society

<http://www.autism-society.org>

American Academy of Pediatrics

<https://www.aap.org>

National Institute of Mental Health

<http://www.nimh.nih.gov>

References:

- [1] American Psychiatric Association, APA (2013). Diagnostic and statistical manual of mental disorders (5th ed.). Washington, DC: American Psychiatric Association.
- [2] Centers for Disease Control and Prevention, CDC (2020). Prevalence and Characteristics of Autism Spectrum Disorder Among Children Aged 8 Years - Autism and Developmental Disabilities Monitoring Network, 11 Sites, United States, 2016. Morbidity and Mortality Weekly Report. Surveillance Summaries (Washington, D.C.: 2002), 69(4), 1–12.
- [3] Elsabbagh, M., Divan, G., Koh, Y. J., Kim, Y. S., Kauchali, S., Marcín, C., Fombonne, E. et al. (2012). Global prevalence of autism and other pervasive developmental disorders. *Autism Research*, 5(3), 160-179.
- [4] Levy, S. E., & Hyman, S. L. (2015). Complementary and alternative medicine treatments for children with autism spectrum disorders. *Child and Adolescent Psychiatric Clinics of North America*, 24(1), 117-143.
- [5] Maglione, M. A., Gans, D., Das, L., Timbie, J., Kasari, C., Technical Expert Panel, & HRSA Autism Intervention Research – Behavioural (AIR-B) Network (2012). Nonmedical interventions for children with ASD: recommended guidelines and further research needs. *Pediatrics*, 130 Suppl 2, S169-178.

- [6] SIGN 98 (2007). In SIGN 98. Edinburgh. Retrieved from <http://www.sign.ac.uk/guidelines/fulltext/98/>
- [7] Volkmar, F., Siegel, M., Woodbury-Smith, M., King, B., McCracken, J., State, M., & American Academy of Child and Adolescent Psychiatry (AACAP) Committee on Quality Issues (CQI) (2014). Practice parameter for the assessment and treatment of children and adolescents with autism spectrum disorder. *Journal of the American Academy of Child and Adolescent Psychiatry*, 53(2), 237–257.
- [8] World Health Organization, WHO (2016). International Statistical Classification of Diseases and Related Health Problems 10th Revision. ICD-10 Version: 2016. Retrieved from <http://apps.who.int/classifications/icd10/browse/2016/en>

