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Cognition in Children with Autism

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Abstract:

As per the Rights of Persons with Disabilities Act, 2016 (RPWD Act), autism is considered as one of the predominant disability. However, its official recognition in India starts from 1999 when the National trust Act was released by the Government of India and four types of disabilities entered under this act. Various seminars and symposiums were organized to discuss the varied nature of autism but its uniqueness is still hidden. Autism is a developmental disorder characterized by difficulties with social interaction and communication, and by restricted and repetitive behavior. The present article will discuss in-depth the assessment strategies used in autism, cognitive impairment and strength found in children with autism and early intervention programs to reduce the occurrence of autism. Intelligence tests along with the assessment of adaptive behavior play very prominent roles to identify the level and severity of autism.

Keywords: Autism, cognition, disability, early intervention.

Cognition in Children with Autism

Introduction:

Autism is a disorder leading to handicapping condition that compromises the social, adaptive, language and cognitive abilities of the child. The symptoms manifest during infancy and especially before the three years of age as atypical developmental patterns.

For children to progress normally, social, affective, cognitive components of development must be integrated. In autism, there is poor integration of these components. The mental processes such as thinking, remembering, use of language, problem-solving, and concept formation are referred to as cognition. Therefore cognition is the intellectual activity of the individual. These processes are functional components of intelligence. Therefore autistic children exhibit a typical profile of intellectual abilities that tends to be uneven. The specific cognitive functions become evident in psychometric assessment of intellectual and cognitive abilities. Even the very intelligent autistic children experience difficulty with concept formation, reasoning, abstract thinking, and insight.

Assessment of Intelligence:

Clinical methods of assessing intelligence in autistic children depend on the mental and chronological age of the child. There is no particular intelligence test that can diagnose autism.

Assessment techniques that measure both static intelligence and the ability to gain from training can provide an accurate measure. For children below three years of age, the Bayleys Scale of Infant Development (BSID) which consists of the Mental Development Index (MDI) and Psychomotor Development Index (PDI) can be used.

A variety of standardized verbal and non-verbal intelligence tests are used to measure the intellectual abilities of pre-school children with autism. Most of the studies have widely used the Wechsler Scales of Intelligence. The Wechsler Scales of Intelligence are devised to measure such functions as expressive vocabulary, verbal reasoning, abstraction, memory, attention span, concentration, visuomotor integration, and motor speed. The sub-scales on Wechsler scales also provide a measure of Fluid and Crystallized abilities that are important factors of intelligence.

Fluid intellectual ability is believed to be innate and not influenced by learning or experience. It is probably the most influenced by heredity and biological factors, tends to peak early in life and declines with age. Crystallized ability is acquired and influenced significantly by environmental experience, learning, and culture. It tends to stay the same throughout most of life. Block designs and object assembly are good measures of fluid intellectual ability while vocabulary and comprehension are good measures of crystallized intellectual ability. Early poor performances on measures of fluid ability are predictive of intellectual deficits.

The Kaufman Assessment Battery for Children (K-ABC) is also being used for assessing the sequential and simultaneous processing abilities. Task-related to picture completion, block design and object assembly measure simultaneous processing abilities while tasks like picture arrangement, digit span, coding and mazes measures sequential processing abilities. There is a strong correlation between sequential processing abilities and verbal comprehension in autistic children as it is related to the development of cognitive linguistic functions.

Functional assessments are also being used for varied research purposes and for designing intervention strategies.

A thorough understanding of cognitive processes is essential for designing effective intervention strategies. Therefore it is essential to know the strengths and deficits that are present in children with autism.

Deficits in cognition found in children with autism:

Children with autism generally develop adequate Piagetian sensory-motor performance for the overall mental age level. They also display adequate knowledge of object permanence and object use. Deficits are obvious in symbolic representation i.e. use of objects to represent another object. For example, using paper as a duster, this is because symbolic play is dependent on social experience, which is severely impaired in these children. It is also attributed to higher cognitive demands. The kind of tasks that are relatively easy for autistic children includes object permanence, tool use and sorting of objects into categories.

Attention:

Attention deficits are evident due to the lack of responsivity as children with autism are passive and stare in space. These children do not process information adequately, though they may have intellectual potential. They show a low level of arousal and attention because they fail to develop the processes that allow them to select the relevant features of a stimulus in learning tasks. Because they do not attend to what information is available to the processed, these children fail to develop effective thinking and learning. Impairment in attention is also seen because these children are over selective or over-focused. This is to say that these children attend only part of a given clue or attend to unusual features of the stimuli. Abnormal response to the sensory stimulus is characterized by avoidance of stimuli. Hyperactivity is another feature in autistic children which is because of difficulty in the regulation of attention.

Sensation:

Difficulty in modulating the input of sensory information results in sensory hypersensitivity. Specific sensitivities to auditory stimuli such as mechanical noises, school bells or baby cry may be present. They may be sensitive to odors and food textures which may result in restricted dietary intake. Sensory problems like sensory fumbling in a few children may be caused by underlying neurological deficits. Systems that process visuospatial problems are intact. Therefore using the visual mode of thought is present in most of the children. However, visual fixation patterns are abnormal. These children also display sensory hyposensitivity. The self-stimulatory behaviors (rhythmic, repetitive movements) in every sensory modality indicate sensory processing problems.

Memory:

Autistic children display normal short-term memory and rote memory while memory for verbal materials is substantially impaired. Studies in this regard indicate that these children are able to recall sentences than recall a group of given words. Research also shows that these children have deficient memory for faces while memory for objects in relatively intact. The tendency to repeat the end of the phrases is seen predominantly.

Categorization:

It is a mental process that allows individuals to integrate new information with previous experiences. This ability is impaired in children with autism who display repetitive behaviors, difficulty in understanding new situations and generalization from one situation to another. Repetitive behaviors serve as a means of achieving a sense of control due to an impaired adaptive coping mechanism. The specific social impairments result from an inability to process social information because of its novel, unpredictable nature. The impaired generalization abilities are due to the tendency to attend to idiosyncratic and irrelevant cues during learning.

Social cognition:

The social deficits are the most striking clinical manifestations of autism. During infancy these children may be extremely passive babies requiring little attention or they may be very irritable, difficult to feed, have irregular sleep patterns and resist cuddling. Certain cognitive processes and social processes intertwine and therefore it is essential to study the vital aspects of social cognition. Autistic children have difficulty in integrating cognition and social activity. These children smile and gaze less frequently and therefore unable to sue the cause of the caregiver. Therefore these children do not share emotional experiences. Because of this, autistic children do not involve in social pretend play, which requires imitation and involves social and emotional representations.

Higher-level cognitive functions:

Higher-level cognitive functions are the executive functions of the brain which include planning, impulse control, and inhibition of incorrect responses and flexibility of thought, action and organized search. They are defined as the inability to maintain appropriate problem solving set for the attainment of a future goal. Many children with autism often appear rigid and inflexible, become distressed over trivial changes in the environment and insist on following routines. They focus on narrow interest engaging in stereotypical behavior and have trouble in inhibiting responses. They are unable to apply and use the language store of information meaningfully.

Language:

Difficulty in the language is one of the greatest concerns in children with autism. Language comprehension is an end product of a series of linguistic, cognitive and social information. Cognitive deficiency at the information input level like the malfunctioning of attention/arousal mechanism, difficulty in attributing meaning and deficits in symbolic representation limits the information available for cognitive processing. Despite the delayed onset of speech, there is delayed acquisition of speech sounds in verbal autistic children. Autistic children tend to emphasize on word order rather than meaningful content and so they fail to use meaning to guide their comprehension. These children are unable to use language appropriately for sharing or requesting turn-taking, initiation and maintaining the conversation. These children also tend to learn nouns easily because they can be associated with pictures. Words with no concrete meaning like ‘put’, ‘in’, and ‘on’ have to be seen in writing in order to be remembered. The thought process is associational and not logical and they tend to overgeneralize a concept. For example, they use a particular word like water to indicate food.

Strengths in cognition found in children with autism:

Cognitive strengths in children with autism are evident in visuospatial skills, problem-solving and sorting into categories, which encompass a gamut of perceptual abilities. This aspect of perceptual-cognitive strengths is found in the entire spectrum of autism, which can be potentially

used for educational intervention. High functioning autistic children show remarkable abilities like attention for numbers, calendar dates, musical notes, and mathematical calculations. In the performance domain, these children tend to perform tasks on object assembly and block design, which are related to perceptual-motor integration. Motor skills are also generally performed well.

Early intervention:

Keeping in view the heterogeneity of the symptoms manifested by children with autism, varied therapeutic methods are being devised. It is essential to arrive at some sort of estimation of the child's functional cognitive capacity, which facilitates planning treatment approaches. The understanding of how autistic children differ from other children supports intervention for young children with autism. Extra stimulation specially termed as compensator stimulation is essential for developing adequate skills.

If the intervention is started at an early age the child can be helped to cope better because the child will not have to unlearn poor ways of coping with the handicap like throwing temper tantrums or being obsessed with play materials. Naturalistic teaching techniques are beneficial as they help to sustain motivation by improving the quality of responses, active participation, and initiation. Intensive early intervention programs like the Lovaas method by Dr. Lvar Lovaas emphasize on one to one intervention that focuses on the acquisition of compliances, development of imitation and development of pre-academic skills and use of language functionally. While intrusive methods like forced eye contact work well with some children but may cause withdrawal in some children due to sensory overload.

The use of visual stimulation such as bright colors is useful for children who do not have sensory processing problems. Neutral colors and subdued colors can be used for children with sensory jumbling and mixing. Sensory integration methods like the application of pressure and rubbing with a brush can also be used. Using reinforcers related to the task and using stimulating materials of the child's choice is an important motivating factor. Physical prompting and shaping techniques can be used to teach the child to respond fast to commands involving gross motor activities and later to more complex instructions. At all times it is essential that the activities involved are the ones that are relevant to the child's daily environment.

Cognitive meditational behavioral management:

It is based on Piaget's description of cognitive development that emphasizes meditational teaching strategies. One such curriculum is the BRIGHTSTAR, which places emphasis on metacognitive development (thinking about one's own thinking and learning to generate). This program derives its theoretical base from Feuerstein's theory of structural cognitive modifiability (SCM). This theory of SCM assumes that there is a finite number of logical processes of logical thought that are so fundamental that they can be applied in the understanding of an infinite variety of contents. Mediated learning experiences refers to a manner in which parents or

cognitively competent persons help children to understand the broader generalized meaning of their experiences.

Therefore, theories of cognitive development provide a useful perspective for designing an intervention to treat cognitive-processing deficits. The difficulties that children encounter in thinking, perceiving, attending and problem-solving can be directly addressed by activities specifically designed to develop cognitive processes.

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