Ecological Inventory: An Approach for Assessment of Children with Intellectual Disability

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Abstract

Assessment of children with intellectual disability is necessary to determine their eligibility for special educational services. As cognitive and adaptive behaviors are essential parts of the definition of intellectual disability. The main purpose of this paper is to review of different major tests, scales and instruments which are used for assessment of these children. This paper also present critical arguments against using intelligence tests and adaptive scales developed in other technically advanced countries of the world and use in Pakistan. Ecological approach is discussed in detail as best approach for need assessment of functional skills and programming for children with intellectual disability.

Key Words: Assessment, intellectual disability, Ecological inventory

Introduction

The recent development in education and training of children with intellectual disability has been the development of functional, age appropriate and community referenced goals and objectives (Myreddi & Narayan 1998). Learning of functional and age appropriate skills would help a child with intellectual disability to acquire those skills that are necessary for independent living in the community. Functional program is different from the regular education curriculum as the later is more examination-oriented while the former comprises daily living skills. Learning activities in functional curriculum maximize student's independence, self-direction and satisfaction in a very day life (Heward, 2006).

This paper reviewed of some major instruments used for diagnosis, assessment of children with intellectual disability in Pakistan. Intellectual disability is a condition of restricted or incomplete development of the mind which is specially characterized by

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slow or incomplete development of skills manifested during a particular developmental phase which contribute to over all level of intelligence i.e. language, motor and social skills. American Association on Intellectual disability revised the definition of intellectual disability in 2010. Intellectual disability is characterized by significant limitations both in intellectual functioning and adaptive behavior as expressed in conceptual, social, and practical skills, which are apparent prior to the age of 18.

The effects of intellectual disability vary considerably from one person to other, just as the range of abilities varies considerably among people who do not have intellectual disability. About 90 percent will be mildly affected and will be only a little slower than average in learning new information and skills. The remaining 10 percent of people with intellectual disability, those having IQs fewer than 50, will have serious limitations in functioning (Gallagher, J. et al 2000). However, with the help of early intervention, a functional education and appropriate supports as an adult, all of them can lead satisfying lives in the community.

People with intellectual disability may have other disabilities as well. Examples of these coexisting conditions include cerebral palsy, seizure disorders, vision impairment, hearing loss, and Attention Deficit Hyperactivity Disorder (ADHD). Children with severe intellectual disability are more likely to have additional disabilities than the children with mild intellectual disability (Gallagher, J. et al, 2000).

Diagnosing the children with intellectual disability

The American Association of intellectual disability (2002) process for diagnosing and classifying a person as having intellectual disability contains three steps and describes the system of support which a person needs to overcome his limits in adaptive skills. The first step in diagnosis is to have a qualified person giving one or more standardized intelligence tests and a standardized adaptive skills test, on an individual basis. The second step is to describe the person's strengths and weaknesses across four dimensions. The four dimensions are: Intellectual and adaptive behavior skills; Psychological/ emotional considerations; Physical/ health/ etiological considerations and environmental considerations

Strengths and weaknesses may be determined by formal testing, observations, interviewing key people in the individual's life, interviewing the individual, interacting with the person in his or her daily life or a combination of these approaches. The third step requires an interdisciplinary team to determine required supports across the four dimensions. Each support identified is assigned to one of four levels of intensity - intermittent, limited, extensive, and pervasive. Intermittent support refers to support on an "as needed basis." An example would be the support that is needed in order to find a job for a person in the event of a job loss. An individual may need intermittent support occasionally over the lifespan, but not on a continuous daily basis.

Limited support may occur over a limited time span such as during transition from school to work or in time-limited job training. This type of support has a limit on the time that is needed to provide appropriate support for an individual. Extensive support in

a life area is assistance that an individual needs on a daily basis that is not limited by time. This may involve support in the home and/or support in work. Intermittent, limited and extensive support may not be needed in all life areas for an individual. Pervasive support refers to constant support across environments and life areas and may include life-sustaining measures. A person requiring pervasive support will need assistance on a daily basis in all aspect of life (Heward, 2006).

Assessment of children with intellectual disability

Assessment of a child with intellectual disability\ intellectual disability is necessary for assessing eligibility for special educational services at a minimum; the assessment process should include an assessment of the child's cognitive and adaptive or community living skills functioning, and an evaluation of the family, home, and classroom to establish goals, resources, and priorities.

According to Sattler (1992) there are four kinds of assessment, norm-referenced tests, interviews, observations, and informal assessment, complement each other and form a firm foundation for making decisions about children. The use of more than one assessment procedure provides riches of information about the child, permitting the evaluation of the biological, cognitive, social, functional and interpersonal variables that affect the child's current behavior. In the diagnostic assessment of children, it is also necessary to obtain information from parents and other significant individuals in the child's environment. For school-age children, teachers can play a vital role in providing information. For pre-school children, parents are the best source in providing information. According to current definition of intellectual disability, the assessment of children with intellectual disability is based on intelligence tests and adaptive behavior skills. A brief review of intelligence scales and adaptive behavior measures is presented below.

Intelligence scales

Wechsler Primary and Pre-school Scale of Intelligence-III *(*WPPSI-III) (Wechsler, 2003): The WPPSI-III is used for children ranging in age of two years six months to seven years three months. The WPPSI-III has been normed on USA sample of 1700 children from the ages of two years two months to seven years three months. The WPPSI-III contains the following 14 subtests: Block Design, Information, Matrix Reasoning, Vocabulary, Picture Concepts, Symbol Search, Word Reasoning, Coding, Comprehension, Picture Completion, Similarities, Receptive Vocabulary, Object Assembly, and Picture Naming (Wechsler, 2003). The subtests can be combined to measure verbal IQ, performance (fluid) IQ, processing speed quotient, general language composite and a full scale IQ. The verbal IQ, performance IQ and full scale IQ are taken from the core subtests. The other scores involve optional or supplemental subtests and are not required.

Wechsler Intelligence Scale for Children-III (WISC-III) (Wechsler, 1991): This test is used to evaluate the intellectual abilities for children ranging in age from 6 years to 17 years of age. Intellectual abilities include verbal IQ, performance IQ, full scale IQ, verbal comprehension, perceptual organization, freedom from distractibility and

processing speed. Order of administration of the tests is as follows: 1)Picture completion; 2) Information; 3) Coding; (4) Similarities; 5) Picture Arrangement; 6) Arithmetic; 7) Block Design; 8) Vocabulary; 9) Object Assembly; 10) Comprehension; 11) Symbol Search (Optional); 12) Digit Span (Optional); 13) Mazes (Optional).The limitation of Wechsler scale include: 1) This instrument cannot be used with severely disabled children (IQ's below 40) and, with younger children. 2) It may need to be administered over two sessions due to the length of time required to complete the assessment.

Stanford-Binet: Fourth Edition: This is appropriate for use on individuals ranging in age from 2 to 23. It is comprised of 15 subtests, though only 6 subtests including: Vocabulary, Comprehension, Pattern Analysis, Quantitative, Bead Memory, and Memory for Sentences, are used with all groups. The other 9 subtests; Picture Absurdities, Paper Folding and Cutting, Copying, Repeating Digits, Similarities, Form-Board Items, Memory for Objects, Number Series, and Equation Building are administered on the basis of age. *Stanford-Binet has* three types of scores: 1) Age scores (or scaled scores), 2) Area scores (general intelligence, crystallized intelligence and short-term memory, specific factors, and specific factors plus short-term memory), 3) Composite Score (similar to the Full-Scale IQ of the Wechsler).

McCarthy Scales of Children's Abilities is used with children between the ages of 2 ½ years and 8 ½ years. It contains six scales: Verbal Scale, Perceptual-Performance Scale, Quantitative Scale, Memory Scale, Motor Scale, and General Cognitive Scale. In addition to compliant a General Cognitive Index (GCI), the McCarthy Scales provide several ability profiles; verbal reasoning, non-verbal reasoning, number aptitude, short-term memory, and coordination.

Adaptive behavior

Adaptive behavior is an important and necessary part of the definition and diagnosis of intellectual disability. It is the ability to perform daily activities required for personal and social sufficiency (Sattler, 1992). Systematic assessment of adaptive behavior focuses on how well individuals can function and maintain themselves independently and how well they meet the personal and social demands imposed on them by their cultures. In this study ecological inventory method of assessment was used which pinpoints specific environment and tasks which a child is expected to learn. There are more than 200 adaptive behavior measures and scales, the most common scale is the Vineland Adaptive Behavior Scales (Sparrow, Balla, & Cicchetti, 1985).

Bayley –III Scales of Infant and Toddler Development, 3rd Edition: The Bayley Scales of Infant and Toddler Development is an assessment instrument designed to measure physical, motor, sensory, and cognitive development in babies and young children with ages ranging from 1-42 months. It involves interaction between the child and examiner and observations in a series of tasks. The main purpose of this scale is to identify the child's developmental competencies and deficits in very young children across five

major developmental domains areas including: Cognitive, Language, Motor, Social-emotional and Adaptive behavior (Braaten, 2007).

The Differential Ability Scales-II (DAS-II): This scale is providing a comprehensively analysis of children's learning abilities. Use profile analysis to identify a child's strengths and weaknesses, to develop appropriate IEP goals, intervention strategies, and monitor progress. This scale consists of a battery of individually administered cognitive and achievement tests. , which is subdivided into three age levels: lower preschool (2 ½ years to 3 years & 5 months), upper preschool (3 ½ years to 5 years& 11 months), and school age (6 years to 17 years& 11 months). It consists of 20 subtests, 17 cognitive and 3 achievement subtests yielding an overall cognitive ability score and achievement scores. Differences between cognitive abilities and between cognitive ability and achievement can be explored. The main advantages of DAS is to built-in mechanism for assessing significantly delayed children who are over the age of 3 ½ years. It can also provide information of similar instruments *(Elliott, 2007).*

Vineland Adaptive Behavior Scales-II (VABS-II): The Vineland-II measures personal and social skills used for everyday living. This is used to identify individuals who have intellectual disability, developmental delays, brain injuries, and other impairments. The age ranges from birth to age 90 years (Survey interview, Expanded Interview, Parent/Caregiver Rating Form), 3year to 21years 11months (Teacher Rating Form), birth to 18 years 11months & low-functioning adults (Interview Edition, Survey Form and Expanded Form), and 3 to 12years 11 months (Classroom Edition). The VABS-II consists of four forms: 1) Survey interview, 2) Parent/Caregiver Rating Form, 3) Expanded Interview and, 4) Teacher Rating Form.

Survey Interview: administered to a parent or caregiver in a semi structured interview format; designed to provide a targeted assessment of adaptive behavior. Parent/Caregiver Rating Form: covers the same content as the Survey Interview in a rating scale format. Expanded Interview: administered in a semi structured interview format; designed to provide a more comprehensive assessment of adaptive behavior and assist with the preparation of educational and/or treatment programs. The Expanded Interview can also be used as a follow-up to obtain more information about deficits suggested by the Survey Interview. Teacher Rating Form: questionnaire completed by the teacher; designed to assess adaptive behavior of a student in the classroom. Vineland-II analyses skills and behaviors in four domains such as 1) communication, 2) Socialization, 3) Daily Living Skills, 4) Motor Skill.

Adaptive Behavior Scale- 2nd edition *(ABS-2)* developed by the American Association on Intellectual disability (AAMR), assesses the ability of individuals who are mentally retarded, emotionally maladjusted, or developmentally disabled. The AAMR- ABS adaptive behavior domains have two types of items, either "circle the highest level" or "yes/no." Some items are worded negatively, and can be somewhat confusing. Maladaptive behavior items are rated never, occasionally, or frequently. There is, however, no measure of relative severity. Items such as, "blames own mistakes on

others" receive the same weight as "chokes others". It is available in two versions, one for residential and community settings (ABS-RC:2) and the other for schools. Adaptive Behavior Scales - Residential and Community – 2 is a cognitive evaluation system designed for use by individuals with autism, behavior problems, or cognitive disabilities. The ABS-RC:2 is divided into two parts. Part 1 focuses on personal independence and is designed to evaluate important coping skills for daily living. Part 2 deals with social behavior and includes 8 domains that relate to the manifestation of personality and behavioral disorders (Sparrow, S. S., Cicchetti, D. V., & Balla, D. A. (2005).

Adaptive Behavior Scale-School: Second Edition (ABS-S:2) is a cognitive evaluation system designed to be used by children with cognitive disabilities, autism, or behavior problems. It can be used to assess the functioning of children. Both versions assess the manner in which individuals cope with the natural and social demands of their environment.

Behavior Assessment System for Children –Second Edition (BASC-2) is a norm-referenced diagnostic tool designed to assess the behavior and self-perceptions of children and young adults' with ages 2 to 25 years. The BASC-2 is a behavioral assessment tool that can be used - for treatment program planning, evaluation, and intervention and to assist with differential diagnoses when used in conjunction with the *DSM-IV.* The BASC-2 is a multidimensional and multi-method tool since it measures numerous behavioral and personality characteristics through several report based measures. On the Parent and Teacher Rating Scales the tool consists of following 16 primary measurement areas, however, not all 16 areas are measured: Activities of Daily Living; Functional Communication; Adaptability; Hyperactivity; Aggression; Leadership; Anxiety; Learning Problems; Attention Problems; Social Skills; Typicality; Somatization; Conduct Disorder; Study Skills; Depression and Withdrawal(Nihira, Leland, and Lambert,1993).

*Adaptive Behavior Assessment System - Second Edition (ABAS- I*I) is a norm referenced tool designed to assess adaptive skills in individuals from birth to 89 years of age. The tool measures 10 skill areas: 1) Communication, 2) Community use,3) Functional-Academics, 4) Home Living, 5) Health and Safety, 6) Leisure,7) Self-Care, 8) Self-Direction, 9) Social and, 10) Work (Optional). The ABAS-II is used to assess an individual's adaptive skills: 1) To assist in the diagnosis and classification of disabilities and medical/clinical disorders, 2) for the identification of adaptive skill strengths and difficulties in a person's daily living environment, 3) for the identification of service needs in treatment or intervention programs, 4) for research related to adaptive skill progression (i.e., intervention program evaluations. (Nihira, Leland, and Lambert, 1993).

Ecological inventories

Ecological inventories are used to identify the common, daily, functional tasks non-handicapped and handicapped persons; in particular environments are required to perform (Baine, 1991). Ecological inventories are the tools, which were developed on the basis of information collected from parents, and teachers on prescribed diaries,

observation of retarded and non-retarded child and interview with parents and teachers. In the first phase domain of environment was selected and then sub environments of each domain were identified and the tasks of each sub environment were enlisted.

Ecological inventories are used to identify the common, daily, functional tasks of person with and without intellectual disability, in particular environments, are required to perform (Baine, 1991). The methods of ecological inventories discussed are based on modification and extension of procedure described by Sobsey (1987), and Baine (1991). Ecological inventories are the tool, which are develop, on the basis of information collected from different sources such as: parents, and teachers through prescribed diaries and interviews, observation of children with and without intellectual disability by researcher. In the first phase an environment is selected and then sub- environments of each environment are identified and enlisted the tasks related to sub-environments are enlisted. Following steps were followed for developing the ecological inventory of each child with and without intellectual disability (Baine, 1991).

Step-1: Identification of a child with intellectual disability and a child without intellectual disability (Who is younger brother/sister/ cousin of child with intellectual disability) for whom the ecological inventory is being designed. The ecological inventories of children without intellectual disability are developed first, and then ecological inventories of children with intellectual disability will be developed.

Step-2: Selection of environments for ecological inventory: In this step, the purpose of selecting environments and a brief introduction of the environments are given. With the help of parents and teachers different environments of each will be identified: Home, Community and School. Sub- environments will be identified with the help of parents and teachers.

Steps-3: The information about environments and sub-environments and their related functional tasks may be collected by using the four sources:

1. Diaries for parents
2. Diaries for teachers
3. Interview sessions with parents and teachers
4. Observation conduct by researcher through Observation Record Form.

- Specifically designed diaries will be given to the parents and teachers and they will be advised to identify environments, sub-environments and their related functional tasks performed by their children with and without intellectual disability. Parents and teachers will fill in the diaries by identification of environments and sub environment with their related tasks performed by the children in those environments during the period of fifteen days.

- Interview sessions with parents and teachers will be the supplement of the information collected through diaries from parents, teachers and observation by

researcher. Frequencies performance of each task by the children will be recorded as: hourly (H), daily (D), weekly (W), monthly (M) and yearly (Y) basis. Performance of tasks by children was recorded according to their frequencies, in different environments and sub environments

Steps-4: On the basis of information collected in the above steps the researcher will consolidate the ecological inventory of each child and share it with parents. Home inventory will be listed in the first and school inventory was listed at the end.

Step-5: Tasks required performing in different environment and sub-environments will be identified. Relative importance of each task can be estimated with consultation of parents using Task Importance Rating Scale.

Steps-6: Developed ecological inventories can be shared with experts for validation. Finally tasks will be organized into a catalogue according to environments and sub-environments. The detail catalogue one developed ecological inventory is provided at Annexure-1.

Discussion

Intelligence tests and adaptive scales reviewed earlier are commonly used in developed countries for assessment of children with intellectual disability. These instruments have reliability, validity and also full the criteria of good test but they also have some limitations. These instruments/ tests can not be used in Pakistan due to different social and cultural conditions. We can not use on these assessment instruments due to following reasons: 1) There is difference in culture and environment between our country and developed countries. So tests and assessment instrument in the field of special education are not ecologically valid due to these differences, 2) the environment specific tasks are different in Pakistan comparing with developed countries and due to modification and translation of tests many essential tasks are changed or missed which affect the quality of the test. Norms established in the developed countries can not be used in developing countries, 3) when a large number of adaptation and modifications takes place in borrowed tests, the standardization process should be done on native sample, and 4) In our country, there are social, cultural and environmental differences between one region and other regions so, the norms set in one region are not valid in other region of same country Then how can we consider norms of advanced countries as valid in our country? In this case, there is dire need such instruments and tests which are appropriate with the norms and environment of one's society and can easily adapted according to the situation. In developing countries there is short of skillful person who can developed tests with high qualities. In this case there is only one approach which is ecological valid for each region and group is Ecological inventory approach.

This approach is useful, essential and more appropriate for designing instruments, which helps in need assessment and educational programming and training of children with intellectual disability as well as not only in developing countries but also in advanced

countries. Through this approach parents, teachers work together and develop the inventories of each child which is more easy and suitable for further planning and programming of the children with intellectual disability of any region.

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Annexure-1

Ecological inventory

Introduction of the child

Asif was 8 years old having one brother and two sisters. He was the eldest son of his parents. Asif was living in a rural area. His father, Muhammad Asghar, works in a factory. His mother was a housewife with no education. As observed by researcher, her attitude toward her children was casual. At the time of Asif's birth, the age of her mother was 16 years. As also observed by researcher, the interpersonal relationship among family members were not too good. There was not any disability like that of Asif in their family history. Education of his father was up to five years of schooling and family's monthly income was Rs.5000/-. According to Pakistani standard, this level of income and education is considered as in low socio economic level. His mother reported delayed delivery at the time of Asif's birth. He had problem in motor activities and he was diagnosed with cerebral palsy. He was unable to sit and to walk independently and chew his food properly.

1-Environment: Home

1A Sub environment: Kitchen (D)

1Aa	1	Eats food (D).
1Ab	2	Drinks water (D).
1Ac	3	Approaches kitchen area by crawling (D).
1Ad	4	Sits without support (H).
1Ae	5	Sits and crawls in the kitchen for food (H).
1Af	6	Crawls and stands to holds utensils in the kitchen (D).
1Ag	7	Moves sitting to standing position (D).

I Aa Skill Area: Eating Food / Feeding (D)

Sr. No	**Functions**	**Performance level**		
		0	**1**	**2**
1	Focuses on food			
2	Grasps food			
3	Brings food to mouth			
4	Bites off food			
5	Finishes last bit of food			
6	Chews food			
7	Holds spoon			
8	Scoops food on spoon			
9	Removes food from spoon with lips			
10	Opens mouth for food			
11	Swallows food easily			

1Ab	**Skill Area: Drinking water (D)**
1	Sucks milk from bottle.
2	Sips from straw.
3	Holds glass of water.
4	Drinks water from glass.

1Ac	**Skill Area: Sitting and Crawling (H)**
1	Controls head
2	Sits properly
3	Moves from sitting to standing position

1Ad	**Skill Area: Crawling and Standing (H)**
1	Grasps the familiar things
2	Moves toward an object
3	Holds the object
4	Stands up
5	Stands with the help of wall
6	Maintains balance while standing

1Ae	**Skill Area: Sits and crawls in the kitchen (H)**
1	Sits beside chair
2	Stands up on knees
3	Stand up by holding hair
4	Stands up by holding chair

1B	**Sub environment: Washroom**
1Ba	Approaches toilet as per need (D).
1Bb	Changes dress (D).
1Bc	Communicates with other in toilet area (D).
1Bd	Washes body (D).
1Be	Cleans the teeth (D).
1Bf	Combs hair (D).
1Bg	Washes the toilet area (W).
1Bh	Greets others people in the area (D).