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INTELLECTUAL DISABILITY: PREVENTION OF RISK FACTORS AND EARLY INTERVENTION

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ABSTRACT:

Intellectual disability (ID), formerly referred to as mental retardation, is a neurodevelopmental disorder defined by significant limitations in intellectual functioning and adaptive behavior, with onset during the developmental period. The condition is classified into mild, moderate, severe, and profound categories according to the ICD-10, based on IQ levels and functional abilities. ID can result from a wide range of genetic and environmental factors, including disorders such as Down syndrome, Fragile X syndrome, and fetal alcohol syndrome, as well as antenatal, perinatal, and postnatal influences. Early detection through developmental screening and prompt intervention are critical for improving outcomes. Primary prevention focuses on public education, genetic counseling, quality antenatal care, and avoiding risk factors such as advanced maternal age and teratogen exposure. Community awareness and supplementation programs, such as folic acid and iodine, have demonstrated effectiveness in reducing incidence. Secondary prevention emphasizes early diagnosis, curative interventions, and training for health professionals to ensure timely care. Despite advances in understanding and prevention, challenges remain in the consistent implementation of these strategies. A comprehensive, multidisciplinary approach involving public awareness, professional training, and health system strengthening is essential to reduce the prevalence and impact of intellectual disability.

Key words: *Intellectual, genetic, behaviour, causes, primary, prevalence, awareness.*

INTRODUCTION:

Intellectual disability (ID), previously referred to as mental retardation (MR), is characterized by below-average general intellectual functioning that originates during a child's developmental period and is associated with deficits in adaptive behavior. It is a neurodevelopmental disorder marked by significantly impaired intellectual functioning and adaptive behavior, with an IQ below 70 and challenges in activities of daily living (ADL). According to ICD-10, intellectual disability is defined as incomplete development of the mind, typically manifesting during childhood, resulting in impaired skills and a reduced overall level of intelligence.

The diagnosis of intellectual disability in a child can elicit a wide range of emotional responses from parents and the broader family system. For some families, the diagnosis is perceived as a crisis requiring substantial psychological adjustment and may contain elements of harm, loss, and vulnerability. Others may view the birth of a child with a disability as an unfortunate event, which can also foster psychological growth in some family members. The initial parental response often involves emotional upheaval, which may gradually transition into a period of adjustment and eventual reorganization of family routines and daily life.

Intellectual and adaptive functioning deficits are increasingly recognized as a global concern in society today. Conditions such as Down syndrome and Fragile X syndrome frequently coexist with intellectual disability. As outlined in the Persons with Disabilities (PWD) Act, 1994, intellectual disability is an incomplete or arrested development of the mind, characterized by subnormal intelligence. The disorder is associated with limitations in adaptive skills including communication, self-care, social skills, health, safety, and work, and it is manifested before the age of 18 years.[1]

The American Association on Intellectual and Developmental Disabilities (AAIDD), formerly known as the American Association on Mental Retardation (AAMR), defines intellectual disability as significantly below-average general intellectual functioning that is accompanied by concurrent impairments in adaptive behavior, with onset during the developmental period. This functional definition emphasizes the interaction between an individual's abilities, their environment, and the need for supportive systems. According to the 1992 AAMR definition, intellectual disability must manifest before the age of 18 and involves substantial limitations in

current functioning. These limitations must be present in at least two or more adaptive skill areas, such as communication, self-care, home living, social skills, community use, self-direction, health and safety, functional academics, leisure, and work. Similarly, the American Psychiatric Association (2000) describes intellectual disability as significantly sub-average intellectual functioning, along with notable limitations in adaptive functioning in areas such as self-care, work, health, and safety.[2]

Children with intellectual disabilities experience limited intellectual growth, which restricts their functional capacity compared to typically developing children. As a result, their social functioning is often affected, and the extent of this impact is closely related to the degree of impairment. While brain pathology is a primary contributing factor, other influences can also hinder these children's ability to adapt within a typical social environment. In everyday life, a child's disability can present significant challenges for the entire family, affecting various aspects of family dynamics. In our country, the substantial proportion of the population living with different types of disabilities presents a significant challenge for society as a whole—one that requires proper and adequate attention.[3]

CLASSIFICATION/TYPES OF MENTAL RETARDATION:

The International Classification of Diseases, 10th Edition (ICD-10), categorizes intellectual disability (previously termed mental retardation) into four distinct levels based on severity:

Mild Intellectual Disability:

- Represents approximately 85% of those with intellectual disabilities.
- IQ scores range from 50 to 69.
- Individuals can often acquire academic skills up to the 6th grade level.
- They are generally self-sufficient and may live independently with community and social support.
- Physical characteristics are typically similar to those of their peers.
- These children are considered educable.

Moderate Intellectual Disability:

- Accounts for about 10% of the population with intellectual disabilities.
- IQ scores range from 35 to 49.
- Overall development is slower than in typically developing peers.
- Individuals can perform work and self-care tasks with moderate supervision.
- Communication skills often develop during childhood, and these individuals can function successfully in supervised community settings such as group homes.
- They may have additional disabilities and difficulties with motor coordination.
- They are described as trainable but do not benefit from standard educational programs.

Severe Intellectual Disability:

- Comprises around 3-4% of individuals with intellectual disabilities.
- IQ scores range from 20 to 34.
- Individuals may learn basic self-care and communication skills.
- Associated challenges often include motor problems or significant speech and language deficits.
- Severely affected individuals can work in highly supervised environments and require ongoing support for daily living throughout adulthood.

Profound Intellectual Disability:

- Represents 1-2% of the population with intellectual disabilities.
- IQ scores are below 20.
- Many individuals have additional physical disabilities.
- With appropriate training, some can acquire basic self-care skills.

This classification helps guide educational planning, care, and support for individuals at each level of intellectual disability.[4]

Intellectual disability can result from a wide range of causes, some of which are known while others remain unidentified. When the underlying cause is determined, targeted interventions can often help prevent or lessen the impact of cognitive disabilities, but meaningful progress requires proactive steps to implement these solutions. According to The Arc, an advocacy organization for individuals with intellectual disabilities, several hundred causes have been identified; however, for approximately one-third of affected individuals, the cause

remains unknown. The most common known causes include Down syndrome, Fragile X syndrome, and fetal alcohol syndrome.[5]

Intellectual disability can result from a variety of genetic and environmental factors. Genetic disorders associated with intellectual disability include Down syndrome, Klinefelter syndrome, Tay-Sachs disease, galactosemia, microcephaly, and congenital hypothyroidism. Antenatal factors—those occurring before birth—such as neural tube defects, Rh incompatibility, infections, exposure to drugs, and irradiation, can also contribute to the development of intellectual disability. Perinatal factors, including birth injuries, hypoxia, and cerebral palsy, play a significant role during or immediately after birth. Postnatal factors, such as head injuries, accidents, encephalitis, and exposure to physical or chemical agents, can further increase the risk. Additionally, maternal malnutrition, protein-energy malnutrition (PEM), iodine deficiency, consanguineous marriages, and pregnancies occurring after the age of 40 are important contributing factors.[6]

Primary prevention of intellectual disability involves both general and specific measures aimed at addressing genetic and environmental factors to eliminate or reduce damage to developing organs and systems. Quality antenatal care can significantly lessen the impact of maternal conditions on the developing fetus. Pregnancy and genetic counseling should be readily available at primary health centers. All pregnant women should have access to regular check-ups, particularly during the first trimester, to allow for timely interventions. Expectant mothers should be advised to avoid drugs, alcohol, and tobacco, and efforts should be made to protect them from emotional trauma and depression. Advanced maternal age increases the risk of intellectual disability, particularly Down syndrome, in newborns. Therefore, women should be informed about the risks associated with pregnancy after the age of 40. Comprehensive counseling on family planning should be provided to married couples, and educational programs on nutrition and diet, especially for mothers, should be organized.[7]

An essential component of primary prevention is educating communities about the risk factors associated with pregnancy and early childhood. Ensuring good antenatal care and avoiding exposure to teratogens—such as certain hormones, iodides, and antithyroid drugs—is crucial during pregnancy. Public awareness campaigns that highlight the dangers of alcohol, tobacco, and drug use during pregnancy have been shown to reduce the risk of brain damage in developing fetuses. Prenatal folic acid supplementation, now widely recommended, plays a key role in preventing neural tube defects and related cognitive impairments. Additionally, iodine supplementation initiatives, such as the universal iodization of table salt, have led to significant reductions in intellectual disability caused by iodine deficiency in many countries.[8]

Secondary prevention targets the early detection and timely intervention of mental health disorders. At this stage, the individual already has a diagnosed disorder, and the goal is to identify the condition early to enable prompt intervention. Screening, such as for depression or suicide risk, plays a crucial role in secondary prevention by allowing for early action and potentially preventing more severe outcomes. Services like suicide hotlines and crisis centers also fall under secondary prevention, providing support to individuals with existing mental health challenges and helping to mitigate the risk of escalation. In these situations, connecting with a social worker or trained suicide prevention specialist can be instrumental in managing and alleviating the crisis.[9]

When a child is identified as having intellectual impairment, the immediate priority is early detection and intervention. Screening for delayed developmental milestones—by comparing them to typical milestones—enables the identification of intellectual disabilities based on the degree of delay. This approach is particularly effective for detecting moderate to profound impairment. Early and accurate diagnosis is crucial, as timely stimulation and continuous reinforcement within the first months or years can help address developmental challenges. Secondary prevention also includes curative measures and public education to promote the use of health services. Training should be provided to all health personnel to enhance early recognition and prevention. Skilled personnel and village health workers can manage routine deliveries, while complex cases should be referred to specialists to address risks such as prolonged labor and birth asphyxia, which can contribute to intellectual impairment.[7]

CONCLUSION:

Certain environmental and nutritional causes of Intellectual Disability can be prevented through increased public awareness, comprehensive training for healthcare professionals, genetic counseling, adequate prenatal care, and early detection with prompt intervention. However, effective primary and secondary prevention of the underlying conditions remains a significant challenge. There is a need to review current strategies, as they are often discussed but not consistently implemented in daily practice. Strengthening the application of these preventive measures is essential to reduce the incidence of intellectual disability.

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