

# Pediatric Care Using IT-Based Approaches and Digital Insights for Early Autism Diagnosis

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**Abstract:-** Physical limits in children must be identified as soon as feasible so that appropriate help and intervention may be provided to promote their overall development and quality of life. This abstract offers a strategy for diagnosing and assisting physically challenged early school-age children.

The research employs a complex screening method that includes physical exams, developmental milestones, and parental observations. This comprehensive approach tries to identify a wide range of physical abnormalities, including sensory inadequacies, mobility difficulties, and musculoskeletal illnesses. Furthermore, it takes into account each child's individual requirements and skills in order to correctly tailor therapy. Regular school health inspections, in which experienced healthcare specialists assess children's physical abilities and developmental progress, aid in early detection.

Parents are critical to this process because they may provide important information about their child's daily experiences and any challenges that may be identified. Collaboration between educators, healthcare providers, and parents is actively encouraged in order to develop a full understanding of each child's specific needs.

Communication and behavioral issues are part of the complex, lifelong illness known as autism, sometimes known as autism spectrum disorder (ASD). Because it is a spectrum condition, it affects individuals differently and to varying degrees. By age 2 or 3, it often manifests.

Autism sufferers experience communication issues. They struggle to comprehend the thoughts and emotions of others. They find it difficult to communicate themselves as a result, whether through gestures, facial expressions, touch, or speech.

Learning difficulties may be present in those with autism. Their skill growth could be inconsistent. For instance, individuals could struggle with communication yet excel in areas such as music, art, arithmetic, or memory. As a result, individuals could perform

particularly well on tasks that require analysis or problem-solving.

Autism is currently being identified in more kids than ever before. However, rather than more children having the disease, the most recent figures may be higher as a result of changes in the diagnosis process.

## I. INTRODUCTION

The birth of a child is without a doubt the most lovely and momentous event in every parent's life. Many parents have great aspirations for their children's future, but when faced with the potential of having a child with special needs or an intellectual impairment, they experience a range of emotions, including grief, resentment, humiliation, and concern for the child's future. Raising such a child necessitates emotional fortitude and adaptation. In addition to the usual expectations placed on all children, the child with mental retardation has unique requirements, and parents may get overwhelmed by their educational, financial, and medical responsibilities.

Early detection of mental problems in children, particularly those in the first grade, is a vital component in ensuring children's well-being, growth, and academic progress. Mental impairments encompass a wide range of issues that can have an impact on a child's social, emotional, and cognitive development. If these deficits are discovered early enough to allow for rapid diagnosis and help, children can excel in school and in life.

The coordinated maturation of the numerous functioning areas of the brain is critical to human survival in society. However, in our real world, there is a group of people who have particular intellectual impairments, and for children, intellectual disability or general developmental delay is an illness that jeopardizes their physical and mental well-being. This potentially congenital disease is presently a hot topic all around the world. It primarily refers to a mental function deficiency, an uncommon disorder in children under the age of 18, characterized by a distinct lack of intellect or adaptive conduct.

This sickness has a specific etiology and clinical manifestations. Intellectual disability occurs at different rates in different groups across time. Its onset can occur on its own or in association with other conditions such as congenital abnormalities, epilepsy, and other ailments in certain young children. A test for autism spectrum disorder can be performed to evaluate it and identify whether or not it has any implications. External environmental influences as well as genetic factors both contribute to the disease's development.

When diagnosing mental problems in the early phases of development, it is critical to help first-graders' long-term wellness as well as their immediate needs. Early intervention is possible, and it can improve social and emotional development, academic success, and self-esteem. Finally, it offers these children the confidence they need to reach their full potential and live happy lives as productive members of their communities.



Fig 1 Early signs of Autism

Once a physical disability is identified, a unique intervention plan is developed to address specific concerns and enhance the child's physical and social development. This technique might include physical therapy, adaptive learning technologies, special education programs, and other resources. This proactive approach to detecting physical abnormalities in first-graders aims to improve the children's educational possibilities, social integration, and overall well-being. Early intervention not only benefits these children's personal development, but also contributes to a more welcoming and equitable learning environment for all students.

II. METHODOLOGY

Study Design: Survey-based retrospective

Sample Size: 3 Subjects

Study Subjects: Students with Autism and learning disabilities in Gurukul English Medium School.

The combination of IT-based techniques and digital insights for early autism diagnosis has resulted in substantial advances in the field of pediatric treatment. This revolutionary technique combines the power of information technology with clinical experience to diagnose and help children with autism spectrum disorder (ASD) at a critical point in their development. This method is distinguished by its data-driven, customized, and interdisciplinary nature, and it holds significant potential for improving early identification and intervention for children on the autism spectrum.

CHILD PSYCHOLOGY

Essential Subjects for Child Psychology



Fig 2 Child Psychology

A. Procedure

An observation was done for these 3 students. The observation was followed on the daily schedule of students. The procedure was:

- Data gathering and Integration: The process begins with the complete gathering and integration of numerous data sources, including as medical records, developmental milestones, behavioral observations, and information provided by parents. This information serves as the foundation for later studies.
- IT-Based Data Analysis: To uncover possible indicators and patterns linked with ASD, advanced data analysis techniques, including machine learning algorithms, are applied to the integrated data. These IT-driven insights aid with risk assessment early on.
- Screening Tool Development: Customized IT-based screening tools are created to examine critical developmental and behavioral features in children. These resources are intended for healthcare professionals, educators, and parents to utilize with ease.

- **Telemedicine and Remote Monitoring:** Telemedicine technologies provide remote consultations with pediatric doctors. The ability to remotely monitor children's progress, facilitated by a secure IT infrastructure, assures continuity of care.
- **Clinical Evaluation and Diagnosis:** Children who exhibit probable indications of ASD are subjected to rigorous clinical evaluations by a team of healthcare specialists. The information technology system assists physicians by giving access to previous data for accurate diagnosis.
- **Parent and caregiver involvement:** Through IT-enabled communication channels, parents and carers are actively involved in the process. To improve comprehension and give appropriate coping methods, educational tools and assistance are made available online.
- **Continuous Monitoring and Feedback:** Information technology systems deliver real-time updates to healthcare practitioners, caregivers, and educators. Continuous feedback loops are set up to track intervention progress and make appropriate modifications.
- **Interdisciplinary Collaboration:** A multidisciplinary team of doctors, psychologists, speech therapists, and IT professionals work closely together to guarantee a comprehensive approach to care.
- **Evaluation and Improvement:** The technique is constantly evaluated to determine the efficacy of IT-based approaches for early autism diagnosis and treatments. Iterative modifications are produced in response to feedback, fresh research, and technology breakthroughs.

<b>Children Name : Vinayak Naik</b>					
<b>DOB</b>	<b>16/06/2017</b>	<b>Age</b>	<b>6</b>	<b>DOA</b>	<b>24/06/2020</b>
<b>Name of school - Gurukul English Medium School</b>					
<b>Teacher Name - Isha Salunkhe</b>					
<b>Sr. No</b>	<b>Symptoms</b>	<b>Never</b>	<b>Often</b>	<b>Very often</b>	<b>Always</b>
1	Inattentive, easily distracted.		1		
2	Pronunciation problems			1	
3	Restless in the "squirmy" sence			1	
4	Forgets things He / She has already learned.		1		
5	Disturbs other children.	1			
6	Actively defies or refuses to with adults request.	1			

Fig 3 Detail analysis of Subject 1

*B. Data Representation and Analysis*

A total of 3 subjects were enrolled in the study. Data were collected on daily observation and encoded for computerized analysis. Descriptive analysis of the data was done using Excel. Tables were made using Microsoft Office Excel and figures were also plotted using Microsoft Office Excel.

*C. Demographic Details*

The 3 students are boys studying in 1<sup>st</sup> std of Gurukul English Medium School.

*D. Analysis of problems associated with students*

Autism in children, often referred to as autism spectrum disorder (ASD), is a complex neurodevelopmental condition that affects a child's social interactions, communication, behavior, and sensory processing. It is called a "spectrum" disorder because it encompasses a wide range of symptoms, abilities, and challenges.

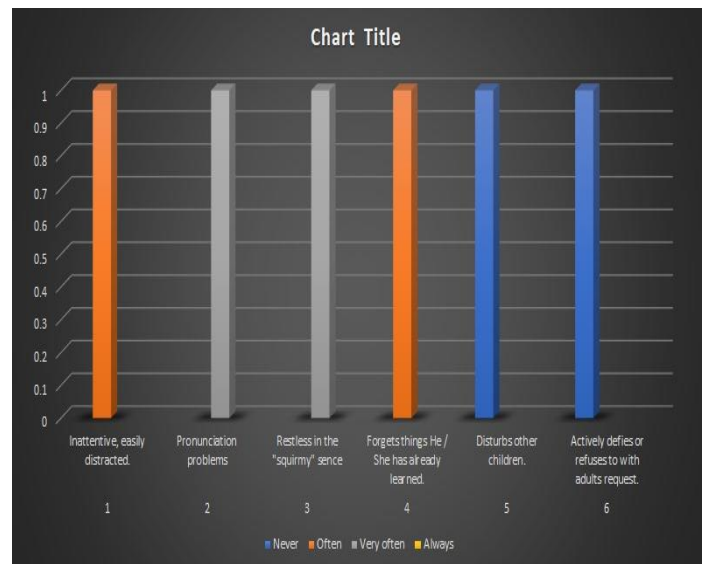


Fig 4 Graphical analysis of Subject 2

<b>Children Name : Kanay Rajoulkar</b>					
<b>DOB</b>	<b>22/10/2017</b>	<b>Age</b>	<b>6</b>	<b>DOA</b>	<b>24/06/2020</b>
<b>Name of school - Gurukul English Medium School</b>					
<b>Teacher Name - Isha Salunkhe</b>					
<b>Sr. No</b>	<b>Symptoms</b>	<b>Never</b>	<b>Often</b>	<b>Very often</b>	<b>Always</b>
1	Inattentive, easily distracted.			1	
2	Pronunciation problems				1
3	Restless in the "squirmy" sence		1		1
4	Forgets things He / She has already learned.	1			
5	Disturbs other children.			1	
6	Actively defies or refuses to with adults request.		1		

Fig 5 Detail analysis of Subject 2

<b>Children Name : Swaroop Jadhav</b>					
<b>DOB</b>	<b>23/03/2017</b>	<b>Age</b>	<b>6</b>	<b>DOA</b>	<b>24/06/2020</b>
<b>Name of school - Gurukul English Medium School</b>					
<b>Teacher Name - Isha Salunkhe</b>					
<b>Sr. No</b>	<b>Symptoms</b>	<b>Never</b>	<b>Often</b>	<b>Very often</b>	<b>Always</b>
1	Inattentive, easily distracted.				1
2	Pronunciation problems			1	
3	Restless in the "squirmy" sence				1
4	Forgets things He / She has already learned.				1
5	Disturbs other children.				1
6	Actively defies or refuses to with adults request.				1

Fig 7 Detail analysis of Subject 3

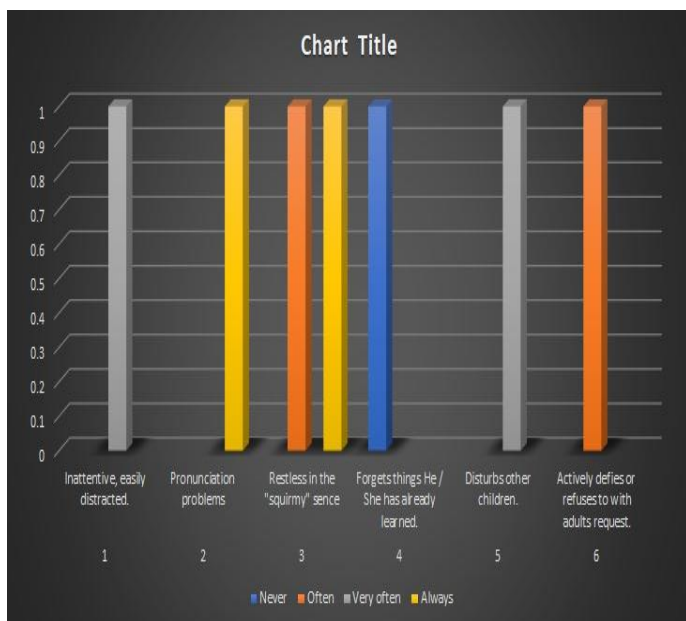


Fig 6 Graphical analysis of Subject 2

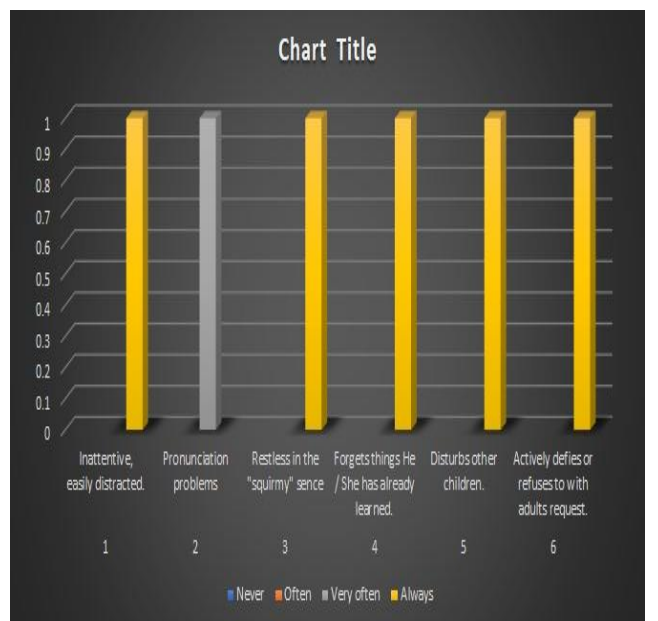


Fig 8 Graphical analysis of Subject 3

**III. CASE STUDY**

With an increase in Autism Spectrum Disorder (ASD) diagnosis (Centers for Disease Control and Prevention, 2015), practitioners must be familiar with techniques to enhance clients' lives and improve their occupational performance. Aside from sensory-based treatments, there is a scarcity of research that provides evidence-based solutions for the holistic occupation-based therapy of persons with ASD. There is also a scarcity of evidence that describes the important significance of occupational therapy treatment in ASD care. This hypothetical case study will describe ASD diagnostic criteria, suggested causes, prevalence and incidence, impact on client factors, comorbidities, and will conclude with a case study that describes a typical pediatric client with common ASD characteristics and includes insight on evidence-based evaluation and treatment. Autism Spectrum Disorder (ASD) is a life-altering condition with varied degrees of severity and symptoms. It must be identified early in life, generally before the age of six, and it is critical to avoid misdiagnosis by ruling out intellectual development problem and global developmental delay.

The case study here focuses on three subjects. The first instance concerns Vinayak Naik. He is an autistic youngster who cannot communicate. He does well in school but is not very engaged in athletics. However, his parents put in extra effort and force him to join in art and craft competitions. Overall, the youngster and his parents work hard to ensure the child's growth.

Another instance is Kanay Rajoulkar, a youngster with Autism and Communication Disorders. He is having difficulty speaking. According to research, the infant suffered from Laryngomalacia. Laryngomalacia is a congenital disorder that causes softening of the tissues above the larynx (voice box). Stridor (noisy or high-pitched breathing) is frequent in these newborns. In addition, the youngster is obese and unable to manage his temper. When someone teases him, he becomes aggressive, and he can't control his appetite.

Finally, Swaroop Jadhav has a unique case for research. This is a youngster with autism and behavioral issues. For trivial reasons, the youngster becomes hostile and hyper. He becomes agitated and is unable to sit well in class. If the teachers admonish him, he becomes hostile. The youngster has been requested to attend a special school.

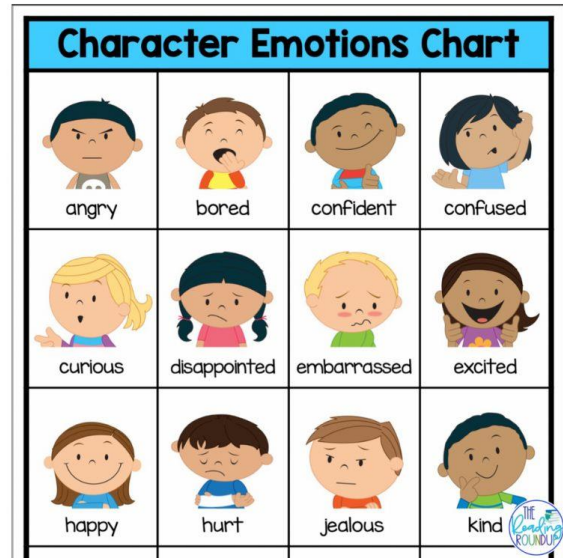


Fig 9 Mood swings chart of children

**IV. PROPOSED THEORIES**

Autism spectrum disorder (ASD) is a multifactorial neurodevelopmental illness with a complicated etiology. While the precise causation of autism is unknown, there are various hypothesized ideas and elements that experts have investigated in order to better understand its beginnings. These ideas are not mutually exclusive, and numerous variables are believed to contribute to the development of autism. Among the proposed hypotheses for autism are:

*A. Genetic Variables:*

Autism has a major hereditary component, according to research. Families with one autistic kid are more likely to have another child with the illness. Individuals with autism have been shown to have several unusual genetic mutations and chromosomal abnormalities. ASD has been linked to mutations in genes such as FMR1, SHANK3, and MECP2.

*B. Environmental Aspects:*

Some prenatal variables, including as maternal illnesses, exposure to certain drugs during pregnancy, and delivery difficulties, may raise the chance of autism. There is continuing study into the potential impact of environmental toxins in the development of autism, such as pesticides and air pollution. However, the connection is still complicated and not entirely understood.

**C. Factors Influencing Neurodevelopment:**

Neuroimaging research has shown changes in brain structure and connection in people with autism. These discrepancies may emerge throughout the early stages of brain development. According to some ideas, ASD may entail changes in synaptic function and connections in the brain, resulting in abnormal information processing.

**D. Dysfunction of the Immune System:**

Research on the involvement of immune system dysfunction in autism is underway. ASD patients have been observed to have aberrant immunological responses and inflammation in several investigations.

**E. Factors Influencing Epigenetics:**

Changes in gene expression that are not induced by changes in the underlying DNA sequence are referred to as epigenetic modifications. Some academics are looking into how epigenetic changes may impact autism risk.

**V. CONCLUSION**

Autism spectrum disorder (ASD) is a complicated neurodevelopmental illness characterized by a wide range of symptoms, talents, and difficulties. Every person is distinct, affected by genetic, environmental, and developmental variables. Early intervention is critical for better results, with focused therapy and support services assisting youngsters in developing necessary abilities. Genetic and environmental variables are also important contributions, and study into these complexity is continuing. Neurodiversity fosters tolerance and acceptance by acknowledging the unique skills and views of people with autism. Autism research is a constantly evolving topic, with continuing studies investigating genetics, brain development, environmental factors, and successful therapies. Individuals with autism and their families get resources and aid from supportive communities, educational institutions, and healthcare systems. The purpose is to improve the quality of life for people living on the island.

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Fig 10 Autism Issues

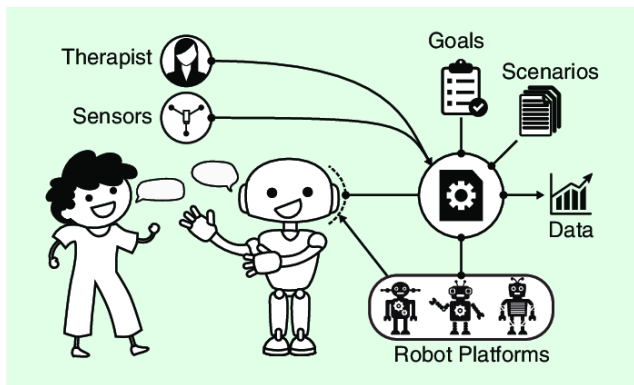


Fig 11 Autism Identification