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Early Recognition and Intervention Approaches Used for Autism Spectrum Disorder

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Abstract

Social communication, behavior, and sensory processing difficulties characterize the complicated neurodevelopmental disorder known as autism spectrum disorder (ASD). For impacted children, improving outcomes and changing developmental trajectories need early diagnosis and intervention. This review explores the current understanding of ASD's causes and risk factors, emphasizing the role of both genetic predispositions and environmental influences in early brain development. It highlights the importance of recognizing early warning signs, utilizing validated screening tools, and involving parents, educators, and healthcare professionals in the diagnostic process. The paper further examines a range of evidence-based early intervention strategies—including behavioral, educational, therapeutic, and technological approaches—that are most effective when implemented during the first years of life. Additionally, the review discusses demographic disparities in diagnosis and access to care, underscoring the need for equitable and accessible early identification systems. By consolidating existing knowledge and emerging practices, this paper aims to support more timely, personalized, and impactful interventions for children with ASD and their families. Recent breakthroughs in non-invasive brain stimulation methods, including transcranial magnetic stimulation (TMS) and transcranial direct current stimulation (tDCS), have demonstrated significant therapeutic potential in autism spectrum disorder (ASD).

Keywords

Autism Spectrum Disorder (ASD), Early Detection, Behavioral Therapy, Neurodevelopmental Disorders

1. Introduction

ASD is a complex neurodevelopmental disorder characterised by persistent chal-

lenges in social interaction and behavioural regulation. The name of the condition spectrum shows the high variability in the symptoms and severity, some of them having to get significant help in their everyday life, whereas others manage to live fully independently, with little to no help. ASD normally occurs in the early childhood years, and in most cases, the symptoms are present at least before the age of three [1]. CDC estimates that about 1 in 36 children in the US suffer from ASD and its incidence has continued to increase in the last 20 years. Good measures of increased awareness increased diagnostic methods, and an extended-diagnostic criteria explain this upward trend that points towards an increasing societal importance of the disorder in the area of public health.

It is of paramount importance to diagnose ASD early on since it will give time to intervene when a child is still at the prime stage of his/her development. It has always been found that the sooner ASD is diagnosed, the better the dynamics of the intervention to help a child develop his or her communication skills, enhance his or her thought processes, and social behaviour. Initial childhood years signify a period of enhanced neuroplasticity where the brain is hyper-receptive to training and behaviour changes [2]. Addressing the problem during this time could cause a radical change in a child's developmental course, minimizing the symptom severity, and improving long-term outcomes in learning, work, and life quality.

Although the necessity to implement early detection is rather obvious, many children end up diagnosed either after the age of four or even later, frequently due to unawareness about the issue by care providers or low availability of specialized services or misconceiving the early symptoms. This problem may result in lost opportunities for assisting and a higher pressure on families and support systems [3]. Disadvantages in early detection are more numerous in the case of a rural low-income or minority population, where the inequality in access to healthcare and culturally sensitive diagnostic equipment exists [4]. The existing difficulties underpin the critical necessity of screening and diagnostic systems that should be accessible, efficient and culturally acceptable.

Early intervention measures are a crucial aspect of tackling the heterogeneous needs of children with ASD. Such posing strategies consist of numerous approaches, such as behavioral therapy, educational assistance, speech and occupational therapy, and the utilization of assistive technologies. Such interventions, started at an early age, can have substantial developmental benefits and lower the lifelong support requirements. Since the awareness and research on ASD are still developing, the early-identification-and-intervention systems also have to keep up with the trends and appropriately address children so that they can reach their potential in time [5]. Novel therapeutic approaches encompass non-invasive neurostimulation techniques such as transcranial direct current stimulation (tDCS) and transcranial magnetic stimulation (TMS), which have started to exhibit efficacy in enhancing cognitive and behavioral outcomes in children with ASD.

Structure of the Paper

The structure of this paper is as follows: Section II overviews Understanding Au-

tism Spectrum Disorder. Section III discusses Early detection of ASD. Section IV outlines Early Intervention techniques for ASD. Section V provides a literature and case study evaluation, and Section VI comes to a close by outlining potential future paths.

2. Understanding Autism Spectrum Disorder

The neurological and developmental condition known as ASD affects children's social and cognitive abilities, leading to difficulties with communication and social interaction, repetitive behaviours, sensory problems, and limited interests. Autism is characterised as a "developmental disorder" due to the fact that symptoms often manifest during the first two years of a person's life. Additionally, autism is referred to as a "spectrum" disorder due to the wide variety of disorders it contains and the widely variable intensity of symptoms that people experience. Rather than being a scale from mild to severe autism, the autism spectrum (as shown in Figure 1) indicates the range of functioning experienced by people with autism. Services and treatments for ASD may help alleviate symptoms and improve everyday functioning, although the illness itself can last a person's whole life. It may be challenging to diagnose ASD in adults since some of its symptoms might be confused with those of other mental health conditions, such attention-deficit/hyperactivity disorder (ADHD) or anxiety disorder.

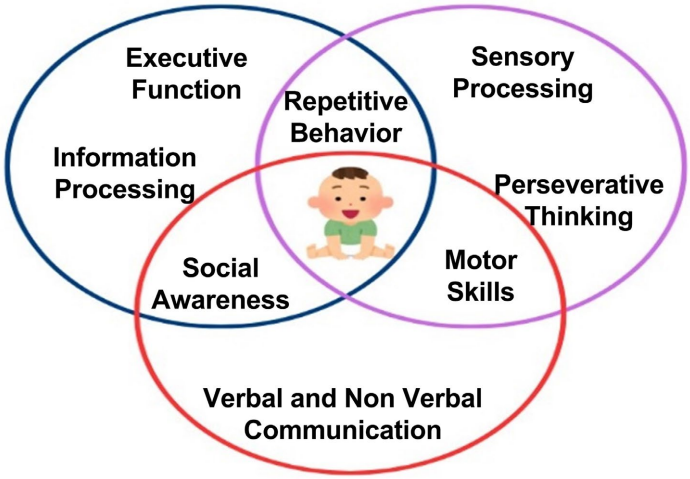

Figure 1. Diagnostic framework for autism spectrum disorder (ASD).

Diagnosis can and should be made as early as possible because symptoms of ASD tend to appear in a very insidious manner, which cannot be discerned unless applied on a developmental model. The identification of these early features is a basis for the early and effective intervention that could have a beneficial influence on the final outcomes.

2.1. Causes and Risk Factors of ASD

The causes of ASD are perceived to be multifactorial, meaning a combination of

a genetic and environmental influence, which influences early planning of the brain. These risk factors can be identified, and they will allow screenings to focus on them and help develop early detection procedures [6] [7]. The risk factors of ASD are as follows below:

1) *Genetic Factors*

The factor that contributes significantly to the development of ASD is genetics. Extensive body of evidence such as twin and family studies has established that heritable factors are major risk enhancing factors. Although autism is not the result of a particular gene, there are numerous, quite a number of variations in the genes that cause the complex nature of the condition, both inherited and spontaneous.

- **High heritability:** According to estimates of twin and family research, the genetic factor is between 50 and 90 percent of ASD risk. This highly heritable factor indicates that ASD tends to run in families, regardless of differences in severity.
- **Gene mutations:** ASD is associated with certain gene mutations and chromosome imbalance, yet it depends on CHD8, SHANK3, or NRXN1. Particularly in domains associated with behaviour and communication, these alterations have the potential to impede brain development.
- **Family history:** The risk of developing ASD is much higher among children who have a sibling with ASD. This grouping in families is suggestive of underlying common genetic susceptibility and establishes the necessity of sibling surveillance of those in affected families.
- **Polygenic influence:** ASD is not a gene disorder, but a disorder caused by a combination of genetic variations. Taking together, these minor genetic variations could enhance the comprehensive threat of ASD.

2) *Environmental Factors*

ASD may also be influenced by environmental risk factors, especially those that interfere with brain development in the prenatal and early postnatal life. These predisposing factors can interact with genetic predisposition and augment the probability of occurrence of autism.

- **Exposure to environmental toxins:** Exposure to contaminants during pregnancy to contaminants such as air pollution, pesticides, or heavy metals, may lead to inflammation or oxidative stress of the undeveloped brain, increasing the risk of ASD.
- **Nutritional deficiencies:** Slightly greater risk of ASD has also been linked to insufficient maternal intake of folic acid during the initial trimester of pregnancy. Neural tube developed through folic acid and its presence is important to develop a healthy brain.

2.2. Prevalence and Demographics of ASD

The rate of ASD has not been strongly fluctuating but has been gradually climbing the scale, not with a definite increase in the real patients, but with the enhance-

ment of awareness and diagnostic procedures. The concept of prevalence and demographic tendencies is essential to formulate comprehensive early detection approaches [8]. Autism Spectrum Disorder (ASD) extends its influence on an increasingly large number of people across the world. Males are almost four times more often than girls to be diagnosed with ASD, according to emerging Figures, and one out of every 36 children has been predicted to have the illness [9] [10]. This female effect could be attributed to underdiagnosis as females tend to present less obvious symptoms. Another factor causing variations is prevalence difference by region and group.

2.3. Impact on Individuals and Families

ASD does not just have an influence on the person diagnosed; it has an impact on the family and support networks. Children with ASD can have problems with academic achievements, social skills, and general functioning. The level of the impact differs with how pronounced the disorder is and how available early interventions services. Families may have emotional, financial and logistical problems. Parents can be in trouble during controlling the behaviour of their child, understanding healthcare systems, and getting the right therapies [11]. Sibling members may feel unimportant or overburdened. These stress factors demonstrate how family-based interventions methods and support mechanisms are required.

The greater effects of ASD on the quality of life support the point that early detection and intervention are urgently needed. With early intervention, communication abilities, behaviour issues and family strengths can be enhanced and can make families better equipped to nurture their child in the best way possible [12].

3. Early Signs and Symptoms of ASD

In ASD, early signs and symptoms start to manifest between birth and two years. Signs of ASD in young children can be displayed in numerous ways and vary in severity. Early signs can include delayed speech and language skills, limited eye contact, lack of response to their name, lack of interest in social interactions or peer play, and repetitive behaviours such as hand-flapping, rocking, and fixations on toys [13]. Some children may demonstrate atypical behaviours in response to sensory experiences, which may involve hypersensitivity to sounds or textures. A child's actions may go unrecognised as early indicators of ASD. In order to enhance developmental outcomes, it is crucial that professionals, including parents and carers, be able to recognise early indications.

3.1. Importance of Early Diagnosis of ASD

ASD should be diagnosed early because it is essential in adjusting the developmental trajectory of the affected children. By diagnosing ASD in the early years of life, it is possible to provide a treatment intervention at the most critical stage of brain development, exposing the child to the high potential and minimizing the length of the development challenges [14]. Early detection of ASD helps in:

- **Maximizes brain plasticity:** The first years constitute a time of brain development and neural plasticity. When interventional procedures take place at this stage, they make therapies more effective to enhance communication, learning, and behaviour.
- **Enables timely access to support services:** An early diagnosis of ADHD helps children to kick-start evidence-based treatments, including speech therapy, ABA, or occupational therapy, which performs better when initiated early.
- **Improves long-term developmental outcomes:** The earlier a child is diagnosed, the better their improvement as far as the language, social skills, and cognitive abilities are concerned personal improvement.
- **Reduces family stress and enhances planning:** Concerned families can get an early knowledge of the diagnosis which enables them to know what needs are important to their child and have access to resources so that they can plan educational and behavioural assistance, decreasing the uncertainty and the emotional toll.
- **Prevents escalation of symptoms:** Late identification can result in intensified behavioural and social problems, which are also more difficult to cope with as a child matures and may demand more aggressive interventions in the future.

3.2. Developmental Milestones and Early Warning Signs

Observation of the development milestones may give some early indications of abnormal development in relation to ASD. Some common Red Flags by 12 - 24 months are:

- No babbling, pointing, or gesturing at the age of 12 months.
- No one-word constructions by 16 months and 2-word results by 24 months.
- Bad eye contact or no smiling at all.
- Slight reaction to being called by name or not responding to gestures.
- The existence of habitual actions, such clapping, rocking, or toy organisation.
- Being over/under sensitive to sounds, lights or textures.

These early signs are not definitive, but their presence should prompt further screening and evaluation [15] [16].

3.3. Emerging Technologies in the Detection of ASD

The recent technology has ushered in a few new tools that could be applied in early diagnosis of ASD. These innovations will help enhance the accuracy of screening, screening accessibility, and the level at which diagnosis is made fast. This is achievable by incorporating digital platform, artificial intelligence, and machine learning in order to track early behavioural patterns efficiently. It is creating mobile apps, computer vision and wearable applications to pick up the small signs of development that might not be apparent during a normal visit to the clinic [17]. These technologies can bring future help to the early diagnosis of ASD, particularly in underserved regions or remote communities.

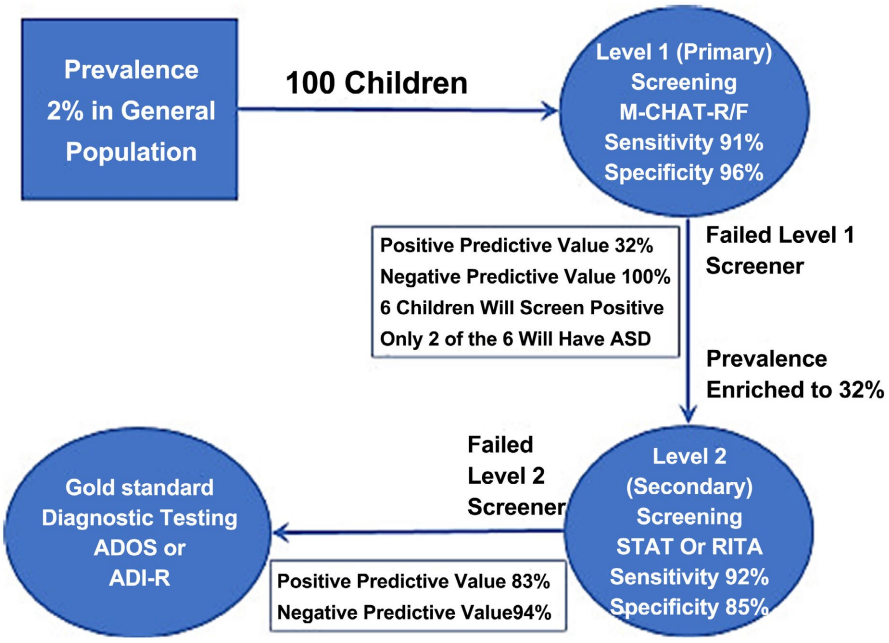

Figure 2. Stepwise screening and diagnostic process for early detection of autism spectrum disorder.

Figure 2 shows that in order to optimise the predictive value of screening, a multilayer screening method is required. Only a moderate positive predictive value can be obtained from a primary (Level 1) screener, but it may also enrich the population, allowing for a significantly greater positive predictive value from a secondary (Level 2) screener [18]. The following are the techniques:

- Machine learning algorithms can be trained against video footage or voice recordings or eye-tracking data to identify autism-related behaviour.
- AI has the capability of assisting with the scaling of early screening in underserved regions through a remote and inexpensive manner.
- Such apps as Conga, Autism AI, and others enable parents to check the behaviour at home and get feedback [19].
- There are apps that incorporate gamified interface that can help toddlers through the track of development indicators.
- Non-invasive measures that track movement patterns, eye trackers or biometric responses will help to provide early warning of abnormal development.

Such technologies provide hope in promoting accessibility, objectivity, and efficiency of screening of ASD, especially in under-resourced environments.

4. Early Intervention Strategies for ASD

Early intervention is support and services offered to children with ASD and usually before the age of three. The best time to start utilizing these strategies is when the child is still young and recently diagnosed because after neuroplasticity has taken place, it is much harder to recover and improve the development outcomes of communication, social behaviour, and cognitive functioning. An effective in-

tervention at this critical window is likely to make the core symptoms milder and better adaptive skills that would be required on a daily basis [20].

There is a broad spectrum of interventions that consists of behavioural therapies, educational programs, speech and occupational therapy as well as parent-mediated approaches that may all be tailored to the needs of a particular child. There is evidence that long-term school readiness, emotional regulation and independence can be produced by early intensive and consistent early support. In addition, early help could relieve a family and require fewer care services in their later years of life. With the development of research, other tools that would increase the availability and efficacy of early support systems, like technology-assisted intervention or family-based care models, emerge [21].

4.1. Goals and Benefits of Early Intervention

Babies or children with ASD can benefit most by having an intervention as early as possible in life when the brain is not only more accepted but is also at it's prime to receive change. Not only will the goal be to reduce the severity of core symptoms, but also to provide children and families with the tools towards their long-term success [22]. The primary goals of early intervention are to:

- **Improve communication, social skills, and adaptive behaviour**: Enhance language, nonverbal signals, companionship involvement, and social daily life.
- **Reduce challenging behaviours and improve self-regulation**: Use positive behavioural techniques in teaching children how to address frustration, change, and sensory factors.
- **Support independence in daily life and enhance school readiness**: Privilege children by developing elementary skills towards scheduled learning activities and concentration.
- **Empower families through education, training, and support**: Involve caregivers as active partners in therapy, promoting consistent support at home and in the community.

4.2. Benefits of Early Intervention Include

- Increased language learning and intellectual gain.
- Higher educational achievements and socialization over the long term.
- Fewer demands of intensive service in old age.
- Better parent-child interaction and less caregiver stress.
- More possibility of a more self-sufficient, more gratifying lifestyle.

4.3. Types of Interventions ASD

ASD can be treated with early intervention, that is defined as a multi-disciplinary intervention when the intervention depends on the developmental needs of the child. Some of the significant categories of intervention strategies are also discussed in Table 1, which are popular in aiding children with ASD during their early years are as follows:

Table 1. Overview of the main early intervention strategies for ASD.

Intervention type	Description	Primary focus	Typical implementation
Behavioral interventions	Systematic teaching of desirable behaviors and reduction of challenging behaviors using reinforcement techniques (e.g., Applied Behavior Analysis).	Social, adaptive, and problem behaviors	20 - 40 hours/week in structured settings; one-on-one therapist-child work
Educational programs (TEACCH)	Structured classroom-based instruction using visual supports, organized routines, and tailored activities to teach cognitive and communication skills.	Academic readiness, routines, self-management	School or center-based; integrated within general or special ed.
Speech & occupational therapy	- Speech Therapy: Enhances verbal/non-verbal communication, comprehension, pragmatic language skills, and AAC for nonverbal children. - OT: Builds fine motor, self-help, and sensory-integration skills.	Communication; motor & daily living skills	1 - 3 sessions/week each, in clinic or home; may involve AAC devices
Pharmacological approaches	Medications used to manage co-occurring symptoms (irritability, aggression, anxiety, ADHD, sleep problems) rather than core ASD features.	Behavior regulation, mood, attention, sleep	Prescribed and monitored by pediatrician/psychiatrist

- **Behavioural Interventions:** One of the most studied strategies in early autism treatment and the most effective strategies of behavioural interventions. The most noticeable one is ABA, which teaches desirable behaviour through the use of reinforcement techniques and reduces problem behaviour. ABA can be very structured, involving 20 - 40 hours of therapy a week, and is usually provided in high-structure environments.
- **Educational Programs:** Educational interventions deal with learning cognitive and communication skills in the prearranged education setting. The TEACCH program (Treatment and Education of Autistic and Related Communication-Handicapped Children) involves visual support, highly structured routines and more personalized activities to ensure that children assimilate their environment more effectively.
- **Speech and Occupational Therapy:** Verbal and occupational therapies have to form crucial elements of early ASD intervention. The priorities of speech therapy are to enhance verbal communication, comprehension and pragmatic language skills. It often involves the use of AAC in youngsters who are unable to speak for themselves. Occupational therapy (OT) is more concerned with helping patients improve their fine motor skills, sensory integration, and self-help abilities (such as dressing and feeding themselves).
- **Pharmacological Approaches:** Even though pharmacological therapies fail to treat the underlying symptoms of autism, these therapies are used as supportive treatment to control other associated disorders. Two medications that have been authorised by the FDA for the treatment of irritability and aggressiveness in children with ASD are risperidone and aripiprazole [23]. Other drugs can be helpful in controlling anxiety, the problems of attention deficit, hyperactivity, or sleeping disorders.
- **Neurostimulation Approaches:** Neurostimulation techniques, including tran-

scranial direct current stimulation (tDCS) and transcranial magnetic stimulation (TMS), are developing as novel intervention tools. Recent systematic reviews and empirical investigations indicate that these strategies can improve cognitive functions, social skills, and behavioral management in individuals with ASD. Luckhardt *et al.* (2021) underscore the potential of tDCS for alleviating symptoms, stressing the necessity for enhanced methodological uniformity [24].

Zemestani *et al.* (2022) exhibited notable enhancements in theory of mind, emotional control, and behavioral results subsequent to prefrontal tDCS in children with ASD [25]. Osório and Brunoni (2019) similarly validated the overall safety and feasibility of tDCS in pediatric populations with ASD [26]. Non-invasive neurostimulation is increasingly being investigated as a treatment adjunct in ASD [27]-[29].

4.4. Technological Interventions for ASD

In the treatment of ASD, technology is increasingly becoming noticeable in early intervention since it provides tools that are more exciting and affordable, and it also changes according to the specific requirements of different children. The key Intervention Technologies are:

1) *Robot-Assisted Therapy*

Social and emotional learning in ASD children is being assisted by such robot models as NAO or Kaspar. Such robots provide desired communications between human and robot, as the robot has the same specifications, easy to predict and safe to communicate, as opposed to people communication, which may be overwhelming. The key advantages of Robot-Assisted Therapy are:

- Assist in eye contact, taking and understanding of emotions.
- Promote interactions with the combination of play and imitation activities.

2) *Digital Tools and Mobile Applications*

Mobile apps and digital programs provide flexible ways to support learning, communication, and behavior management. Proloquo2Go, Otsimo, Virtual Reality are examples of Digital tool and mobile applications.

- **Proloquo2Go:** Assists nonverbal children in communicating using symbols and text-to-speech.
- **Otsimo**: Offers educational games for social and cognitive skills.
- **Virtual Reality (VR)**: tools simulate real-life social situations, helping children practice in a low-risk, controlled environment.

3) *Telehealth Services*

Telehealth has enhanced the availability of early intervention particularly to rural families or underserved families.

Such technological resources are not the independent therapies but effective adjuncts to conventional therapy. They assist in personalizing interventions and making them more involved, particularly in cases where early access is vital to the development [30].

5. Literature Review

This section reviews literature highlights advancements in early ASD detection using technologies like fMRI, AI, and eye-tracking, alongside studies on risk factors such as heavy metal exposure. It also evaluates the effectiveness of diagnostic tools, intervention timing, and therapy outcomes, emphasizing the importance of early, personalized approaches.

Abhinav Chaitanya *et al.* (2025) investigation into the potential of cutting-edge computer methods for ASD detection, including DL and ML. Using fMRI data by the ABIDE dataset, have created a method to reliably differentiate between persons with ASD and those who are normally developing (TD). The prevalent illness known as ASD has an impact on how kids interact and communicate. Verbal and nonverbal communication difficulties, repetitive habits, and trouble interacting with others are just a few of the ways that ASD may show itself. These challenges may greatly affect a child's capacity to build connections, engage in daily activities, and function in social situations [31].

Dow and Wang (2025) investigates the present level of knowledge about the DSM-5 criteria for diagnosing ASD in young children. The paper assesses the possibilities of transdiagnostic approaches to early intervention and looks at how well current diagnostic procedures work. Method: The Psychology and Behavioural Sciences Collection, MEDLINE, and PsycINFO were used to do a systematic literature review that centred on peer-reviewed research [32].

La-Ane *et al.* (2025) explored the links among heavy metal exposures and ASD in school-aged children by Makassar, Indonesia. The study used an unpaired case-control design, with 30 children diagnosed with ASD and 30 children serving as controls, ranging in age from 6 to 11 years. The concentrations of mercury (Hg), lead (Pb), and cadmium (Cd) were determined from hair samples using ICP-MS. A number of possible confounding factors were elicited from parental questionnaires, such as household income, duration of exclusive breastfeeding, genetic predisposition to autism spectrum disorder, dietary habits, skin-lightening cream use, and exposure to cigarette smoke [33].

The groundbreaking research by Berryhill *et al.* (2014, 2017, 2018) highlights the potential and drawbacks of tDCS, highlighting individual variances and variations in stimulation regimens [34]-[36]. Building on these results, new research indicates that children with ASD may experience significant neurophysiological changes as a result of repeated tDCS sessions over the left DLPFC, which improve EEG complexity and functional brain connections (Kang *et al.*, 2018, 2024) [37].

Zhang *et al.* (2024) they begin by suggesting an UASN that can dynamically determine the impact of each stimulus seen by various subjects. Then, they develop a contrastive image-viewing paradigm and gather data on preschoolers' eye movements to uncover the visual behaviours of children with ASD accurately. In particular, in UASN, the uncertainty of every stimulus is calculated and used to train models more effectively and streamline the personalised diagnostic process [38].

Yang *et al.* (2024) detail the development of ASD diagnostic tools throughout time and provide an overview of publicly accessible datasets, broken down into behavioural and multimodal sets. Additionally, the article outlines the advantages and disadvantages of using AI in motion analysis for ASD identification. It gives academics studying ASD a comprehensive and organised summary of the subject. The development of more accurate methods of early diagnosis is of paramount importance due to the rising prevalence of ASD. The article offers a comprehensive overview of DL methods and video-based motion analysis for the early detection of ASD. This study provides an in-depth evaluation of the field's generally accepted procedures and approaches [39].

Table 2: Summary of Key Studies based on Early Detection for Autism Spectrum Disorder

Table 2. Summarizes the related work on autism spectrum disorder, including the focus study, technique, major findings, limitations, and future.

Reference	Study focus	Method/approach	Key findings	Limitations & future work
Abhinav Chaitanya *et al.*, (2025)	Use of DL/ML with fMRI for ASD detection	fMRI data from ABIDE dataset; DL and ML models	High accuracy in distinguishing ASD from TD individuals using brain imaging	Requires more diverse datasets for generalization and validation
Dow and Wang, (2025)	Evaluation of DSM-5 criteria and transdiagnostic approaches	Systematic literature review from MEDLINE, PsycINFO, PBSC	DSM-5 methods are useful but transdiagnostic methods may improve early intervention	Further empirical testing needed for transdiagnostic models
La-Ane *et al.*, (2025)	Link between heavy metal exposure and ASD	Case-control study in Indonesia; Hair sample analysis (ICP-MS)	Elevated Hg, Pb, Cd levels correlated with ASD risk; multiple environmental confounders identified	Small sample size; recommends larger-scale, longitudinal studies
Zhang *et al.*, (2024)	Eye-tracking and uncertainty-based deep learning in ASD screening	Proposed UASN model with contrastive image-viewing paradigm; eye movement data	Personalized diagnosis enabled through uncertainty estimation; eye-tracking useful for ASD traits	Needs real-world clinical validation and larger datasets
Yang *et al.*, (2024)	Review of AI and DL in video-based ASD detection	Systematic review of motion analysis, behavioral & multimodal datasets	AI and DL show promise for early ASD detection through movement patterns	Standardization and dataset diversity remain key challenges
Maksimović *et al.*, (2023)	Effectiveness of early intervention based on age groups in ASD	Comparative study on 29 ASD children in integrative therapy; assessed using GARS-3 and ESLD subscale	Children aged 36 - 47 months showed greater reduction in autistic symptoms and better speech–language outcomes compared to 48 - 60 months group	Small sample size; recommends further studies with larger groups and long-term follow-up

Maksimović *et al.*, (2023) investigate the intervention's emphasis on early intervention, or the practice of beginning therapy at a young age in order to help a

child reach his or her full potential. They aimed to determine whether early intervention reduced autistic symptoms and language deficits more effectively in children aged 36 - 47 months compared to children aged 48 - 60 months, because autistic symptoms and language deficits impact other areas of development in children with ASD and occur at an early age. A total of 29 youngsters hospitalised for integrated treatment with an ASD diagnosis made up the sample. Children aged 36 - 47 months (G1) and those aged 48 - 60 months (G2) made up the two age groups that participated. They used the GARS-3 to gauge the likelihood of autism symptoms, and the subscale ESLD to evaluate speech-language skills [40].

6. Conclusion and Future Work

Autism Spectrum Disorder (ASD) requires early diagnosis and treatment so that the development is better and the quality of life may improve. Early diagnosis, backed by validated screening measures, greater awareness, and interdisciplinary practice leads to the availability of effective early interventions at the time that a child is most neuroplastic. Behavioural therapies, educational programs, and technological advances as evidence-based strategies have demonstrated a positive influence in enhancing communications, social performances, and adaptive behavior. Nevertheless, socioeconomic divide, cultural stigmatization, shortage of professional services, and inconsistency of diagnostic instruments remain as preventive obstacles to equal treatment and prompt care. Future studies require the creation of culturally accepting and readily implementable screening procedures, particularly the underserved and rural communities. It is also necessary to pursue personalized technology-based intervention with the artificial intelligence, mobile health apps, and telehealth systems. Prospective studies of long-time effects of early-intervention on a variety of settings and population will be needed. Promoting training of healthcare professionals and educating the population will also help enhance the system of early recognition and assistance to children with ASD and their families. Subsequent study must examine the therapeutic efficacy and appropriate protocols of non-invasive neurostimulation techniques, like tDCS and TMS, necessitating larger scale randomized controlled trials to determine their clinical applicability in early intervention for ASD [41].

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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