

ROLE OF EARLY INTERVENTION STRATEGIES FOR CHILDREN WITH NEURODIVERGENT NEEDS

Rahul kumar, Tannu Tanwar, Mohit Kumari

E-Mail Id: rahulverma31101999@gmail.com

Department of Psychology, Central University of Haryana, Mahendragarh, Haryana, India

Abstract- Early Intervention plays a critical role in supporting children with developmental variations and disabilities by providing timely and targeted support to enhance their developmental outcomes and quality of life. The purpose of this study was to study the effect of early childhood intervention in improving children with neurodivergent needs. Early intervention plays a critical role in supporting children with developmental variations and disabilities by providing timely and targeted support to enhance their developmental outcomes and quality of life. This approach emphasizes recognizing and addressing developmental challenges as early as possible, thereby mitigating potential social, behavioral, and learning difficulties that may arise later. Key strategies in early intervention include speech and language therapy, orthotic devices, neurodevelopmental therapy, and individualized educational programs. The principles guiding early intervention involve early identification of concerns, a family-centered approach, individualized planning, evidence-based practices, and interdisciplinary collaboration.

The impact of early intervention is significant, contributing to improved cognitive abilities, social skills, physical health, and overall quality of life. It also provides economic benefits by reducing the need for more intensive services later and enhancing productivity. Effective early intervention not only addresses immediate developmental needs but also fosters long-term success, demonstrating its importance in promoting developmental progress and well-being for children with neurodevelopmental disorders.

Keywords: Neurodivergent needs, Early intervention Strategies, Quality of Life.

1. INTRODUCTION

The term “Neurodivergent” describe that people whose brain difference affect how their brains work. Neurodiversity is the concept that variations in brain function and behavior—such as those seen in autism, ADHD, dyslexia, and similar conditions. Addressing neurodiversity needs involves recognizing and accommodating the unique strengths and challenges associated with these conditions (s, T. (2010), Singer, J. (1999)).

Early intervention involves identifying developmental variations or disabilities in young children at an early stage to address their needs promptly. This proactive approach can significantly enhance a child's life by minimizing potential social, behavioral, or learning challenges they may encounter later on. It aims to identify children who might face developmental obstacles early on, ensuring that interventions are implemented when the child's developing brain is most receptive to change.

Bricker et al. (1984) defined early intervention as efforts aimed at eliminating existing or anticipated deficits in children during the first 36 months using therapeutic or educational interventions.

Dunst (1985) defined early intervention as the “provision of support to families of infants and young children from members of informal and formal social support networks that impact both directly and indirectly upon parent, family and child functioning

Early intervention refers to the systematic process of providing support and specialized services to children and individuals at the earliest stages of development to mitigate potential developmental delays or disabilities. The rationale behind early intervention lies in the notion that timely and appropriate interventions can significantly enhance a person's developmental outcomes and quality of life.

Children with disabilities may require intervention and support if they exhibit difficulties in various domains. For instance, challenges in oral language skills may manifest as slow speech development, pronunciation issues, or difficulties in understanding and using language effectively. Similarly, struggles with reading and writing skills could include slow word recognition, phonological awareness deficits, and challenges in understanding the structure of written language.

Cognitive difficulties might involve struggles with memory, sequencing, or understanding abstract concepts like size and shape. Motor skill issues could present as clumsiness, poor coordination, or difficulties with fine motor tasks. Social behavior challenges might include trouble interacting with peers, managing emotions, or maintaining attention and focus.

Identifying these early signs is crucial for providing timely support and intervention tailored to each child's specific needs. By recognizing and addressing developmental variations early, caregivers and educators can help children navigate challenges more effectively, enhancing their overall development and well-being.

2. PRINCIPLES OF EARLY INTERVENTION

2.1 Early Identification

Prompt identification of developmental concerns is crucial. Screening tools and assessments help identify children at risk or those already exhibiting delays (American Academy of Pediatrics. (2019)).

2.2 Family-Centred Approach

Recognizing the family as the primary influence in a child's life, interventions are designed to empower families and involve them in decision-making processes (Dunst, C. J., Trivette, C. M., & Deal, A. G. (2011)).

2.3 Individualized Planning

Interventions are tailored to meet the specific needs of each child or individual, taking into account their strengths, challenges, and cultural background (Guralnick, M. J. (2011)).

2.4 Evidence-Based Practices

Interventions are grounded in research and proven strategies that have demonstrated effectiveness in improving developmental outcomes (Odom, S. L., Collet-Klingenberg, L., Rogers, S., & Hatton, D. D. (2010)).

2.5 Collaboration Across Disciplines

Effective early intervention involves collaboration among professionals from various fields, including educators, therapists, healthcare providers, and social workers (Baer, M. D., & Crais, E. R. (2006)).

3. OBJECTIVES OF THE STUDY

Early interventions are strategies taken at the early stages of a problem to address issues before they become more severe. The objectives of early interventions can vary depending on the context, but they generally include: Hodapp, R. M., & Burrell, L. (2004)

3.1 Prevention

Addressing issues before they develop into more significant problems. For example, in healthcare, early interventions might aim to prevent the onset of chronic diseases by promoting healthy behaviors. The goal is to mitigate or eliminate potential developmental delays or difficulties at an early stage, promoting healthier developmental trajectories and enhancing overall well-being. (Hodapp, R. M., & Burrell, L. (2004)).

3.2 Minimizing Impact

Reducing the severity and impact of a problem once it has emerged. In education, early interventions might help students with learning difficulties catch up with their peers and avoid long-term academic struggles (McCarton, C. M., & Jeffrey, L. (2008)).

3.2 Improving Outcomes

Enhancing overall outcomes for individuals by addressing issues early. In mental health, early interventions might aim to improve the quality of life for individuals experiencing symptoms of mental health disorders before they escalate (Guralnick, M. J. (2011)).

3.3 Supporting Development

Helping individuals reach their full potential by addressing developmental delays or difficulties early on. This is especially important in child development, where early support can significantly impact future success (Campbell, S. B., & von Stauffenberg, C. (2009)).

3.4 Strengthening Resilience

Building skills and strategies that help individuals cope with challenges. For example, early interventions in social skills or emotional regulation can strengthen resilience in children and adults (Masten, A. S., & Wright, M. O. D. (2010)).

3.5 Facilitating Early Learning

In educational settings, early interventions can support children's cognitive, social, and emotional development, setting a strong foundation for future learning (Ramey, C. T., & Ramey, S. L. (2004)).

3.6 Enhancing Family and Community Support

Providing families and communities with the tools and resources they need to support individuals effectively. This might involve training, resources, or support networks (Dunst, C. J., Trivette, C. M., & Deal, A. G. (2011)). Sharkey MA, et. al (1990), on the effect of early referral and intervention on the developmentally disabled infant, (evaluation at 18 months of age) reports that at 1 year and 6 months of age, the children in the earlier referred group showed greater developmental progress in acquisition of skills. The results show that, at least in the short term, there is a critical age of onset of intervention to achieve the most benefit for the developmentally disabled child. Family physicians should be alert to early warning signs of neurological deficits in order to obtain early treatment for these children.

Parush S, Hahn-Markowitz J (1997), examined the long-term effect of an early prevention program on mother's knowledge, attitudes, and practices with regard to their children's development. Results indicate that, KAP scores of the intervention group were higher than the scores of the control group, suggesting that the prevention program helped mothers acquire greater knowledge and more appropriate attitudes and practices about child development. They concluded that this study supports the theory that the effect of a primary prevention program during the first year of a child's life can be sustained for 1 years to 2 years.

Bruce L. Baker (2003) concluded a study on "Early intervention", the purpose of this review study in two areas of early intervention for children with developmental disabilities, and for children considered at risk for developmental problems. The conclusion was that despite much encouraging evidence for early intervention effectiveness with autism. Summary comprehensive early intervention programs can be quite effective for young children with developmental disabilities, as well as for children who are at risk due to biological or environmental factors.

Varma, Seeta S, Ansari, Rubeena j (2017), concluded a study on early childhood intervention programmes in improving learning capacities for children with development delays. The purpose of this research was to study the effect of early childhood intervention programs in improving learning capacities for children with developmental delay. The Developmental Assessment System (MDPS) were used for assessing the learning capacities through early childhood intervention. The study comprised of 300 children with developmental delay where the result shows that there are significant differences between pre and the post test scores of early childhood intervention programme on children with developmental delay and found the effective improvement in learning capacities.

Adnan Ahmad, Hafiz Tahir Jameel, Farhan Sarwar (2021), in their study impact of Early intervention Services through inclusion for children with autism spectrum disorder. Early intervention services are a source of provision that need base service to reduce the risk factor. These children can benefit from early intervention services in the form of inclusive system. Through inclusion, these children have established social relationship with their peers. Inclusion through early intervention significantly affects the reconstruction of social and communication skill in children with ASD. It was found that there is a need for a certain mechanism to involve a shadow teacher which may be more beneficial to intervene students with ASD in an inclusive setting.

Slavica Maksimovic, Masa Marisavljevic, Nina Stanojevic (2023), in their study on Importance of Early Intervention in reducing autistic symptoms and speech and language deficits in children with autism spectrum disorder. They examine early intervention is more effective in the reduction in autistic symptoms and language deficits in children aged 36-47 months old when compared to children 48-60 months old. The sample consisted of 29 children diagnosed with ASD who were admitted for integrative therapy. This study highlights the importance of emphasizing the exact age when using the term early intervention and early development in future studies and practice.

3.7 Impact of Early Intervention

Early intervention refers to proactive strategies and services provided to individuals, especially children, at the first signs of developmental delays or difficulties. The impact of early intervention is well-documented across various domains. (Campbell, F. A., & Ramey, C. T. (1994))

4. COGNITIVE DEVELOPMENT

4.1 Enhanced Learning Abilities

Early intervention can help develop cognitive skills such as problem-solving, memory, and attention, which are crucial for academic success and daily functioning ((Campbell, F. A., & Ramey, C. T. (1994)).

4.1.1 Reduced Cognitive Gaps

Addressing issues like delayed language development or learning disabilities early can prevent widening cognitive gaps between children and their peers.

4.2 Social Skills and Relationships

4.2.2 Improved Social Interaction

For children with social or communication difficulties, early intervention can improve their ability to interact with peers, build relationships, and navigate social situations (M. J. (2001)).

4.2.3 Enhanced Emotional Regulation

Early support can help children learn to manage their emotions effectively, leading to healthier interactions and relationships.

4.3 Physical Health and Well-being

4.3.1 Preventive Care

Early intervention can include preventive care measures, like vaccinations or screenings, which help prevent or mitigate health issues before they become severe (Shonkoff, J. P., & Phillips, D. A. (Eds.). (2000)).

4.3.2 Better Long-term Health Outcomes

Addressing health conditions early can prevent complications, improve overall health, and reduce healthcare costs over time.

5. ECONOMIC IMPACT

5.1 Cost Savings

Investing in early intervention often results in cost savings by reducing the need for more intensive services later. For example, early educational support can decrease the need for special education services (Karoly, L. A., Kilburn, M. R., & Cannon, J. S. (2005)).

5.2 Increased Productivity

By addressing issues early, individuals are more likely to achieve their full potential, contributing positively to the economy through increased productivity and reduced dependence on social services.

6. QUALITY OF LIFE

6.1 Increased Independence

Early intervention can help individuals achieve greater independence in their daily lives, whether through enhanced cognitive abilities, improved physical health, or better social skills (McCartney, K., & Phillips, D. A. (Eds.). (2006)).

6.2 Enhanced Family Well-being

Families benefit from early intervention through reduced stress and improved dynamics. Support systems and resources provided to families can help them manage challenges more effectively.

7. EDUCATIONAL SYSTEMS

7.1 Better Integration

Early intervention helps integrate students with special needs into mainstream educational settings by providing the support they need to succeed (Odom, S. L., & Wolery, M. (2003)).

7.2 Teacher and School Support

Educators and schools' benefit from early intervention through targeted strategies and resources that help manage diverse classroom needs.

8. COMMUNITY IMPACT

8.1 Stronger Communities

By improving outcomes for individuals through early intervention, communities benefit from a more capable and inclusive population, fostering a sense of belonging and participation (Yoshikawa, H., & Weisner, T. S. (2008)).

8.2 Reduced Societal Burden

Early intervention can decrease the long-term societal burden of untreated developmental, educational, or health issues, leading to a more balanced and equitable society.

8.3 Autism Spectrum Disorder (ASD)

Autism Spectrum Disorder is defined as a neuro-developmental disorder characterized by communication problem, lack of social interaction, and repetitive behaviour that recur with atypical or narrow interest. Associated symptoms in ASD are decreased or increased sensory sensitivity, hyperactivity, attention and behavioural problems and emotional, mood disturbances which make ASD life-long neuro-developmental disorder.

From early childhood to late one, ASD leads to great limitations in the acquisition of neurodevelopment, a decrease in intellectual potential, linguistic weaknesses and severe delays in social life and school learning. The effects of ASD are prolonged throughout the cycle of life, negatively impacting the most diverse contexts and stages of development of children and adolescents, and in the final stages of adolescence and adulthood, may bring together a collection of abnormalities with different consequences on affective life, emotional, academic and various subjective breakdowns (Vannucci et al., 2014).

8.4 Early intervention for ASD

Early intervention for autism spectrum disorder (ASD) is crucial in supporting the developmental progress of children with ASD. These strategies typically aim to improve communication, social skills, and adaptive behaviors. Here are some commonly used early intervention strategies for ASD (Lovaas, O. I. (1987))

8.4.1 Applied Behavior Analysis (ABA)

ABA is a widely used intervention that focuses on reinforcing positive behaviors and reducing problematic ones. It involves breaking down skills into smaller, manageable tasks and teaching them systematically. Discrete Trial Training (DTT) is a structured teaching technique used primarily in Applied Behavior Analysis to teach new skills

and behaviors to individuals with autism spectrum disorder (ASD), Pivotal Response Training (PRT) is a behavioral intervention developed for individuals with autism spectrum disorder and other developmental disabilities (Lovaas, O. I. (1987), Koegel, R. L., Koegel, L. K., & Carter, C. M. (1999)).

8.4.2 Early Start Denver Model (ESDM)

ESDM is a comprehensive early intervention for young children with ASD, integrating ABA principles with developmental and relationship-based approaches. Naturalistic teaching, parent involvement, and structured activities tailored to the child's developmental level (Dawson, G., Rogers, S., Munson, J., Smith, M., Winter, J., Greenson, J., & Donaldson, A. (2010)).

8.4.3 Speech and Language Therapy

Focuses on improving communication skills, including speech production, language comprehension, and pragmatic language use. Use of visual supports, augmentative and alternative communication (AAC) devices, and structured language exercises. Effective in improving verbal and non-verbal communication skills (Paul, R., & Norbury, C. F. (2012)).

8.4.3.1 Occupational Therapy (OT)

Occupational Therapy helps children develop skills for daily living and motor functions, such as fine and gross motor skills, sensory processing, and self-care. Sensory integration therapy, motor skills training, and adaptive techniques for daily activities. Supports improved functioning in daily activities and helps manage sensory sensitivities (Miller, L. J., Anzalone, M. E., Lane, S. J., Cermak, S. A., & Osten, E. T. (2007)).

8.4.3.2 Social Skills Training

Social skills training aims to teach children with ASD how to interact appropriately with peers and adults. Role-playing, social stories, and group interactions to practice social skills in a structured setting. Helps in improving peer relationships and understanding social cues (Bellini, S., & Peters, J. K. (2008)).

8.4.3.3 Parent Training and Support

Equips parents with strategies and skills to support their child's development and manage challenging behaviors. Parent education programs, behavioral management strategies, and stress management techniques. Empowers parents, improves family dynamics, and enhances the effectiveness of interventions (Sanders, M. R., & Mazzucchelli, T. G. (2012)).

8.4.3.4 Early Childhood Education Programs

Specialized programs integrated into preschool settings that focus on developmental and educational needs. Individualized education plans (IEPs), structured classroom environments, and inclusion with typically developing peers. Promotes socialization, academic skills, and behavioral development in a structured environment (Hestenes, L. L., & Carroll, D. (2000)).

8.4.3.4 Natural Language Acquisition Programs

Programs designed to support language development through natural interactions and daily routines. Teaching language within the context of everyday activities, using functional communication training. Improves communication skills by embedding learning into real-life contexts (Tager-Flusberg, H., & Kasari, C. (2013)).

8.4.3.5 Sensory Integration Therapy

Addresses sensory processing issues by helping children tolerate and respond to sensory input in a more adaptive way. Activities designed to stimulate sensory processing, such as swinging, brushing, or playing with textured materials. It can improve sensory processing abilities and reduce behavioral challenges related to sensory issues (Miller, L. J., Anzalone, M. E., & Lane, S. J. (2009)).

9. GLOBAL DEVELOPMENT DELAY (GDD)

According to DSM-5, Global developmental delay referred as a neuro-developmental disorder as its name implies when an individual fails to meet expected development milestones in several areas of intellectual functioning. Symptoms are Delay in motor skill, language and communication delay, difficulty in social skill, etc. Miller, L. J., & Schoen, S. A. (2020).

9.1 Individualized Family Service Plan

Individualized Family Service Plan is a plan developed for children under three years of age that outlines specific goals, services, and supports needed for the child and family. It is tailored to the child's unique needs and includes input from healthcare providers, therapists, and family members (Guralnick, M. J. (2011)).

9.2 Behavioural Therapy

Behavioral therapy uses techniques such as positive reinforcement and structured teaching to help children develop appropriate behaviors and coping strategies (Cooper, J. O., Heron, T. E., & Heward, W. L. (2020)).

9.3 Developmental and Educational Interventions

Programs designed to enhance cognitive, social, and academic skills through structured learning activities and individualized educational plans (Shonkoff, J. P., & Phillips, D. A. (Eds.). (2000)).

9.4 Parental Training and Support

Educating and supporting parents to effectively engage in their child's development, implement strategies at home, and advocate for their child's needs (Sanders, M. R., & Mazzucchelli, T. G. (2012)).

9.5 Multidisciplinary Approach

Coordination among various professionals, including paediatricians, developmental specialists, and therapists, ensures a comprehensive approach to the child's needs (Odom, S. L., & Wolery, M. (2003)).

9.6 Attention Deficit Hyperactivity Disorder (ADHD)

Attention deficit hyperactivity disorder (ADHD) is a disorder of childhood and adolescence characterized by a pattern of extreme pervasive, persistent and debilitating inattention, overactivity and impulsivity. ADHD affects approximately 5-7% of children worldwide, with a significant proportion continuing to experience symptoms into adulthood. It can impact various aspects of life, including academic performance, social relationships, and occupational functioning. (Hinshaw, S. P., & Melnick, S. (1995)).

10. EARLY INTERVENTION STRATEGIES FOR ADHD

10.1 Parent Training and Support

Training programs for parents focus on strategies to manage ADHD symptoms at home, improve discipline, and create structured environments. Parents learn techniques for reinforcing positive behavior and managing disruptive behaviors (Sonuga-Barke, E. J. S., & Edwards, S. K. T. D. G. L. (2013)).

10.2 Educational Interventions

Educational strategies include creating individualized education plans (IEPs) that provide accommodations such as extra time on tests, modified assignments, and a structured classroom environment. Teachers use behavioral management strategies and instructional modifications tailored to the child's needs (Hartmann, L. K., & John, A. K. R. (2017)).

10.3 Cognitive Behavioral Therapy (CBT)

CBT helps children with ADHD develop coping strategies, organizational skills, and problem-solving techniques. It focuses on changing negative thought patterns and behaviors that contribute to difficulties (Antshel, K. D., & Collins, M. H. F. O. (2019)).

10.4 Social Skills Training

Social skills training helps children with ADHD improve their interactions with peers. Programs focus on teaching appropriate social behaviors, communication skills, and how to manage social situations (Barkley, B. S., & Murphy, K. A. B. K. (2018)).

10.6 Medication

Stimulant medications (e.g., methylphenidate, amphetamines) are commonly used to manage ADHD symptoms. Non-stimulant medications (e.g., atomoxetine) are also prescribed in some cases. Medication is typically combined with behavioral interventions for optimal results (Swanson, J. W., & Catts, L. D. M. T. (2020)).

10.7 Cerebral Palsy

Cerebral palsy (CP) is a group of neurological disorders that affect movement, muscle tone, and motor skills. It is caused by damage to the brain's motor areas during fetal development or infancy, leading to a range of physical and functional impairments. The severity and specific symptoms of cerebral palsy can vary widely among individuals. (Bax, M., Tydeman, C., & Flodmark, O. (2006))

11. EARLY INTERVENTION STRATEGIES FOR CEREBRAL PALSY

11.1 Speech and Language Therapy

This therapy addresses communication difficulties and swallowing problems. Therapists work on language development, articulation, and social communication skills (McFadyen, B. J., & Friel, J. M. (2020)).

11.2 Orthotic Devices and Equipment

Orthotic devices, such as braces or splints, are used to support and improve the function of limbs. Custom orthotics can help manage spasticity, support weakened muscles, and improve gait (Bax, M., Tydeman, C., & Flodmark, O. (2006)).

11.3 Neurodevelopmental Therapy

Neurodevelopmental Therapy focuses on improving motor control and functional skills through guided movement patterns. Therapists use techniques to help children learn more effective movement strategies and reduce abnormal patterns (Bobath, K., & Bobath, B. (1990)).

11.4 Early Educational Interventions

Early educational programs are tailored to the child's developmental needs and may include individualized education plans (IEPs) or specialized learning strategies to support cognitive and academic development (Guralnick, M. J. (2017)).

11.5 Family Training and Support

Educating and supporting families is critical for the effective implementation of therapeutic interventions at home. Training focuses on caregiving strategies, home exercises, and navigating resources and support systems (Rosenbaum, P., Paneth, N., Leviton, A., Goldstein, M., & Bax, M. (2007)).

11.6 Medical Management and Medication

Medications may be prescribed to manage spasticity, pain, or other symptoms associated with cerebral palsy. This can include muscle relaxants or ant spasticity drugs (Hutton, J., & Pharoah, P. O. D. (2006)).

CONCLUSION

The concept of neurodiversity emphasizes recognizing brain differences as a natural and valuable aspect of human diversity rather than as deficiencies or disorders. This perspective is integral to early intervention, which focuses on identifying and addressing developmental variations or disabilities in young children as early as possible. Early intervention aims to provide timely support to mitigate potential developmental, social, behavioral, or learning challenges, enhancing a child's overall development and quality of life. Research underscores the importance of early intervention in various developmental contexts. Early referral and intervention have been shown to facilitate significant developmental progress and skill acquisition in children with developmental disabilities. Studies reveal that early intervention can improve outcomes across multiple domains, including cognitive development, social skills, and overall well-being. For example, early intervention in autism spectrum disorder (ASD) has demonstrated effectiveness in reducing autistic symptoms and improving social and communication skills. The principles of early intervention include early identification of developmental concerns, a family-centered approach, individualized planning, evidence-based practices, and collaboration across disciplines. These principles ensure that interventions are tailored to each child's unique needs and are supported by research-proven strategies. Objectives of early intervention encompass prevention, minimizing impact, improving developmental outcomes, supporting growth, strengthening resilience, facilitating early learning, and enhancing family and community support. Effective early intervention not only addresses immediate developmental needs but also lays a strong foundation for future success, both academically and socially. Early intervention strategies are critical for addressing specific developmental disorders such as Global Developmental Delay (GDD), attention deficit hyperactivity disorder (ADHD), and Cerebral Palsy. Each condition requires tailored intervention strategies to address the unique challenges and support the individual's development effectively. Early intervention is a vital component in supporting the development of children with neurodevelopmental disorders. By recognizing and addressing developmental issues promptly, early intervention enhances the potential for positive outcomes and improves the overall quality of life for affected individuals. The evidence supporting the effectiveness of early intervention highlights its significance in fostering developmental progress and achieving long-term success.

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