PROMOTING QUALITY OF LIFE AND WELL-BEING IN CHILDREN WITH NEURODEVELOPMENTAL DIVERSITY: STRATEGIES AND INTERVENTIONS

ANDREI DUMITRU*

padrefortete@yahoo.com

Abstract: *In contemporary society, where inclusion and respect for individual differences are increasingly emphasized, the conceptualization of neurodevelopmental diversity in children has shifted from a predominantly medical model – centered on diagnosis and deficit – to a social and humanistic framework. This paradigm shift prioritizes not only symptom management but, more importantly, the enhancement of quality of life and overall well-being.*

Children with neurodevelopmental differences – including autism spectrum disorder (ASD), attention-deficit/hyperactivity disorder (ADHD), learning disorders, and other cognitive variations – perceive and interact with the world in distinct ways. Consequently, fostering optimal developmental trajectories requires individualized, context-sensitive strategies that extend beyond traditional educational and clinical settings. The quality of life of these children is contingent upon a dynamic balance between familial emotional support, adaptive pedagogical practices, and access to evidence-based therapeutic interventions.

The present paper aims to examine practical strategies and support mechanisms that can transform the child's environment into a context of opportunity and growth. Particular attention is given to the integration of innovative approaches and the strengths-based perspective, which may contribute to reducing stigmatization and enhancing autonomy, resilience, and subjective well-being. The overarching objective is to identify a model of best practices in which neurodevelopmental diversity is not conceptualized as a limitation, but rather as an inherent dimension of human variability that warrants recognition, support, and professional care.

***Keywords*:** *neurodevelopmental diversity, quality of life, well-being, inclusive strategies, educational support, resilience.*

This study explores the multifaceted processes involved in promoting quality of life and well-being among children with neurodevelopmental diversity (e.g., ADHD, ASD, specific learning disorders), grounded in the premise that neurodivergence necessitates a person-centered rather than

*** Assoc. Professor PhD., National University for Science and Technology POLITEHNICA Bucharest, University Center of Pitesti.**

diagnosis-centered approach. In an increasingly complex educational and social landscape, transitioning from a deficit-oriented medical model to a support-oriented social model is essential.

Mental disability, ranging from mild to profound, is characterized by below-average intellectual functioning in conjunction with limitations in cognitive, social, communicative, and motor domains. Neurodevelopmental disorders in children constitute a heterogeneous group of conditions affecting the central nervous system, with significant implications for cognitive, emotional, and behavioral functioning, as well as for developmental trajectories and social integration.

This paper further addresses the definition and classification of these conditions, emphasizing the interplay between biological, psychological, and environmental determinants, as reflected in the clinical manifestations observed in children. A comprehensive understanding of these factors is critical for the design and implementation of individualized, evidence-based intervention strategies aimed at mitigating adverse outcomes and optimizing developmental potential.[1]

According to the World Health Organization (WHO), health is defined not merely as the absence of disease, but as a state of complete physical, mental, and social well-being. This holistic perspective is fundamental to supporting the optimal development of all children, particularly those with neurodevelopmental differences.

Optimizing health status and promoting quality of life in children with neuropsychic disorders through specific physiotherapy interventions represent a highly relevant topic in contemporary research, given the profound impact these conditions exert on family and social life.

Children facing such challenges often experience marginalization and stigmatization, which may significantly affect the development of self-esteem and social competencies. Within the social environment, differences in behavior and communication can generate prejudice and discrimination, further contributing to the isolation of both the child and their family from community support networks. In this context, the importance of early intervention and social inclusion programs becomes

[1], J., Ionescu, *Comprehensive Evaluation in Pediatric Neurorehabilitation*, Journal of Pediatric Medicine, 16(3), 2020, p. 88–104.

evident, as these approaches can help reduce integration barriers and foster a climate of acceptance and mutual respect.[2]

The increasing incidence of mental health issues among children, alongside rapid technological advancements that enable the development of more sophisticated assessment and monitoring methods, further underscores the relevance of this topic. Moreover, current public policies promoting inclusion and equal access to services highlight the necessity of personalized and integrated approaches. In this regard, the present research contributes to the development of adaptable intervention models applicable across diverse contexts, providing a solid scientific foundation for the implementation of effective rehabilitation programs.[3]

The rationale for this research is grounded in the need to comprehensively address the complex challenges faced by children with neuropsychic disorders. In the current context, where inequalities in access to specialized services and rehabilitation resources persist, the proposed intervention aims to offer practical and effective solutions for improving health outcomes. From a conceptual standpoint, this justification is based on two major directions: the scientific validity of physiotherapeutic methodologies and the social and emotional impact of individualized interventions.

The scientific validity of physiotherapy interventions is supported by numerous studies demonstrating the benefits of adapted physical exercise in stimulating neuroplasticity and improving motor functions. Recent research indicates that, when applied in a structured manner, these interventions can reduce levels of disability and enhance quality of life, thereby facilitating improved social integration for children with neuropsychic disorders. [4] Clinical observations further suggest that participation in individualized physiotherapy programs leads not only to motor improvements but also to positive changes in emotional well-being and self-confidence—key factors for balanced development. This relationship between physical activity and overall well-being justifies

---

[2] D. Constantinescu, *Personalized Kinetotherapy in Neurorehabilitation*, Rehabilitation Science Quarterly, 9(4), 2021, p. 102–118.

[3] S. Neagu, *Real-Time Monitoring in Pediatric Kinetotherapy.* Journal of Medical Technology, 14(2), 2022. p.61–76.

[4] O. Ionescu, et All., *The Importance of Kinetic Treatment for Integrating Children with SEN into Education*. BRAIN. Broad Research in Artificial Intelligence and Neuroscience, 11(4Sup1), 2020, p 113-124.

continued investment in the research and development of innovative intervention protocols.

From an ethical and social perspective, every child has the right to equal opportunities for development and active participation in community life, and interventions aimed at improving motor function contribute significantly to this objective. In the case of children with neuropsychic disorders, physical and emotional barriers may lead to social isolation and difficulties in educational and community integration. Therefore, the proposed intervention seeks to provide a continuous support framework that encourages active participation and enables children to realize their full potential. Beyond immediate improvements in motor performance, the long-term success of such interventions is reflected in enhanced adaptive capacities and social integration, ultimately contributing to the reduction of inequalities and the promotion of an inclusive society.[5]

A further essential argument supporting the rationale of this research project is the need for the continuous adaptation of methodology to the child's individual developmental trajectory. Due to the inherently heterogeneous nature of neuropsychic disorders, each child presents a distinct profile of needs and developmental potential. Accordingly, the planning of research stages should incorporate periodic assessments that allow for the ongoing adjustment of intervention programs. Such methodological flexibility is crucial for ensuring the long-term effectiveness of interventions, preventing regression, and adapting to the inevitable changes that occur throughout the developmental process. Empirical observations suggest that static approaches are insufficient in addressing the dynamic needs of children, whereas the integration of continuous feedback from multidisciplinary teams and family members a key determinant of intervention success[6].

Buhaş et al. (2020) highlight the limited number of studies focusing specifically on the quality of life of children with neuropsychic disorders, despite the complexity of these conditions. In Romania, such research is absent, with the majority of existing studies originating from the United States, Canada, and Western Europe. Researchers have often examined

[5] O. Manea, *Interdisciplinary Approaches to Special Needs*. Special Education Review, 10(4), 2020, p78–93.

[6] D. Constantinescu, *Personalized Kinetotherapy in Neurorehabilitation*, Rehabilitation Science Quarterly, 9(4), 2021, p. 102–118.

quality of life from the perspective of individuals with intellectual disabilities; however, due to limitations in cognition, social interaction, and communication, not all individuals are able to self-assess their quality of life reliably. For this reason, many studies have relied on proxy assessments provided by family members or care staff. Notably, discrepancies may arise between self-reported and proxy-reported evaluations. Nevertheless, quality of life fundamentally refers to the individual's subjective perception of their own experiences.[7]

Findings from the study conducted by Manfredi et al. indicate that, in children with neuropsychic disorders, postural control may be impaired due to imbalanced interactions among the sensorimotor, visual, and auditory systems. Altered proprioceptive perception—particularly evident in children with autism spectrum disorder (ASD)—necessitates specific postural and biomechanical adaptations. Body posture often reflects the child's psychological orientation toward the external environment, manifested through reduced expressivity and tendencies such as upward or downward gaze. Toe walking, frequently observed in children with ASD, has been interpreted as a possible expression of avoidance of environmental contact—minimizing physical interaction with the ground and, symbolically, with the external world.[8]

Within the field of functional rehabilitation in children with neuropsychic disorders, numerous challenges persist, continually prompting reflection, research, and the identification of effective strategies aimed at optimizing quality of life. Direct involvement in pediatric medical rehabilitation highlights the considerable developmental potential of each child, which is often constrained by physical and emotional barriers. These barriers, however, can be mitigated through carefully designed, individualized interventions.

The concept of health in children with neuropsychic disorders must be interpreted through a multidimensional lens that encompasses both physiological and psychosocial components. Health is therefore not solely measured by clinical parameters, but also by levels of autonomy, adaptive capacity, and subjective life satisfaction. This expanded perspective is particularly relevant in the context of neuropsychic disorders, as these

---

[7] S. Buhas, *The importance of physicalactivity in determining the quality of life of peoplewith mental deficiency*, Buletin of Transilvania University of Brasov, series IX: Sciences of Human Kinetics, 2020, p. 102

[8] Fr. Manfredi et al, *The Management of Toe Walking in Children with Autism Spectrum Disorder*: Cast and Go, Jurnalul Children, Vol 9, no 10, 2022, p. 1477.

conditions affect not only central nervous system functioning but also the child's interaction with the environment and interpersonal relationships. Within this framework, prophylaxis becomes an ongoing preventive process aimed at maintaining a balance between physiological and emotional factors, thereby contributing to the optimization of quality of life.[9]

The role of physiotherapy is particularly significant, as its specific interventions aim to stimulate neuroplasticity and improve motor functions affected by neuropsychic disorders. Contemporary theories in the field of neuroscience emphasize that physical exercise, when tailored to individual needs, can activate mechanisms of neural regeneration and reorganization, thereby contributing to the improvement of motor impairments and the enhancement of children's self-esteem. This theoretical perspective is grounded in the principle that controlled physical activity not only strengthens muscles and improves coordination, but also exerts a positive influence on emotional well-being through the release of endorphins and other neurotrophic factors, thus facilitating integrated development.[10]

Aim of the Study

The primary aim of this paper is to identify and implement interdisciplinary strategies (medical, psycho-pedagogical, and motor) designed to maximize the biological and psychosocial potential of children with neuropsychic disorders.

More specifically, the study pursues the following objectives:

- **Improvement of health status indicators:** Reducing secondary complications and increasing the level of functional independence through physiotherapy and occupational therapy programs.
- **Optimization of quality of life:** Facilitating social and school integration by developing communication skills and adaptive capacities to environmental demands.
- **Evaluation of intervention effectiveness:** Analyzing the impact of specific therapeutic approaches on the emotional and physical well-being of both the child and their family.

[9] J. Ionescu, *Comprehensive Evaluation in Pediatric Neurorehabilitation*. Journal of Pediatric Medicine, 16, 2020, p. 88–104.

[10] D. Constantinescu, *Personalized Kinetotherapy in Neurorehabilitation,* Rehabilitation Science Quarterly, 9(4), 2021, p. 102–118.

Research Hypotheses

- It is hypothesized that the implementation of a complex and individualized intervention program (including physiotherapeutic, psycho-pedagogical, and social components) will lead to a significant improvement in both quality of life and overall health status in children with neuropsychic disorders.
- It is assumed that the early and systematic application of physical therapy programs contributes to increased motor autonomy and the prevention of physical complications, directly influencing the child's perception of their own health status.
- The implementation of cognitive optimization strategies and occupational therapies is expected to enhance attention levels and emotional regulation, while reducing episodes of anxiety and aggressive behavior.

Objective of the Study

The objective of this paper is to identify and implement personalized psycho-educational intervention strategies that facilitate social inclusion and emotional regulation in children with neurodiversity, with the aim of increasing autonomy and overall life satisfaction.

Assessment of Participants

In order to develop an individualized intervention plan, both objective and subjective assessment parameters will be employed, as outlined below:

Biomechanical and Mobility Parameters

- **Gait assessment** using the Tinetti Performance-Oriented Mobility Assessment (POMA) to evaluate balance and gait.
- **Monitoring of gait characteristics**, including step length, double support time, walking speed, and gait asymmetry, באמצעות the mobile health application available on the participant's smartphone.
- **Range of motion (ROM)** assessment by measuring the ankle joint angle using a goniometer.

Physiological Indicators

- **Cardiovascular parameters:** monitoring heart rate, pulse, and blood oxygen saturation using a mobile health application.

- **Postural alignment assessment:** conducted through visual postural evaluation, complemented by the calculation of the **Body Mass Index (BMI)** to classify children into appropriate weight categories.

Standardized Functional Assessments (Clinical Scales and Specific Tests)

- **Postural Assessment Scale (PASS):** utilized to evaluate postural control across three fundamental positions (supine, sitting, and standing). The scale includes 12 items (5 assessing the ability to maintain posture and 7 assessing postural transitions), with a maximum total score of 36 points.
- **Berg Balance Scale (BBS):** used to objectively assess static and dynamic balance. It consists of 14 items, each scored on a 5-point ordinal scale (0–4), where 0 indicates the lowest level and 4 the highest level of function. The administration time is approximately 20 minutes.
- **Ozeretski–Guillmain Test:** applied to evaluate dynamic hand coordination and overall dynamic coordination.
- **Barthel Index and Activities of Daily Living (ADL) Scale:** employed to objectively measure autonomy, independence in daily activities, and overall quality of life.

Target Group

The personalized intervention plan is designed for children of early school age, as well as preschool children, diagnosed with neuropsychic disorders, particularly those with autism spectrum disorder (ASD), attention-deficit/hyperactivity disorder (ADHD), and attention-related difficulties.

Personalized Rehabilitation Program

The individualized rehabilitation program includes the following categories of exercises:

- **For the stimulation and development of an optimal gait pattern:**

The program aims to promote a gait pattern as close to normal as possible, with full plantar support, while preventing or reducing compensatory or maladaptive postures associated with forefoot walking in children with autism. Interventions include basic exercises such as

passive and active-assisted stretching, ankle mobility exercises, muscle strengthening exercises, and structured gait training.

- **For improving coordination and balance indicators:**

Interventions involve proprioceptive neuromuscular facilitation (PNF) techniques, exercises targeting shifts in the center of gravity, balance and rebalancing activities, general motor coordination exercises, gait training, and obstacle navigation tasks.

- **For achieving correct posture through improved motor control:**

The program incorporates PNF techniques based on the activation of proprioceptors through a combination of stretching and both passive and active muscle contractions, facilitating muscle relaxation and elongation. Additional components include strengthening exercises for postural muscles, stretching and relaxation exercises, and sensory feedback strategies designed to enhance body awareness and postural control.

- **For enhancing quality of life:**

The intervention includes the practice of functional activities aimed at developing independent living skills. These are complemented by the integration of animal-assisted therapy and play-based (ludic) activities within the physiotherapy program.

Methods and Techniques Employed

1. **Proprioceptive Neuromuscular Facilitation (PNF) Techniques:**
   - **Contract–Relax:** The target muscle is stretched, followed by an isometric contraction for several seconds, then relaxation and a subsequent stretch.
   - **Hold–Relax:** The muscle is stretched, followed by an isometric contraction, then relaxation without subsequent active movement.
   - **Agonist Contraction:** Activation of the antagonist muscle group to facilitate relaxation of the target muscle.
2. **Exercises for Sensory Integration Stimulation:**
   - **Tactile stimulation:** walking on textured tactile discs with varying surfaces.
   - **Proprioceptive stimulation:** holding weights while standing on unstable surfaces; walking while carrying weighted objects to enhance body position awareness.
   - **Bobath ball exercises:** in prone position, performing passive-active movements (left/right, forward/backward), rolling activities.
   - **Deep pressure exercises:** pressing into a ball or stepper, rolling a ball under the foot forward and backward.

3. **Jumping Exercises:**
   - Vertical jumps with take-off from both feet.
   - Forward jumps with bilateral take-off.
   - Squat jumps starting from a crouched position (knees flexed, feet on the ground), followed by extension of both upper and lower limbs.

2. Classical Physiotherapy Method with Adapted Exercises

- **Gait and locomotion variations:**

Walking on toes, heels, the inner and outer edges of the foot; backward walking; lateral walking with a stick positioned under the forefoot while maintaining heel support; heel-to-toe walking; imitation of animal locomotion patterns from quadruped positions.

- **Throwing and catching exercises:**

Catching a ball rolled along the ground; throwing and catching a ball from chest level; overhead throwing and catching with both hands; throwing and catching a ball from between the legs.

- **Segmental coordination exercises:**

Activities aimed at coordinating upper and lower limbs, including asymmetrical movement patterns (e.g., crawling with opposite arm and leg forward). Mirror exercises are also employed, in which the therapist demonstrates a movement and the child is required to imitate it.

- **Balance development exercises:**

Static exercises involving reduction of the base of support and elevation of the center of gravity; maintaining therapist-imposed postures; walking along a marked line; walking on a гимнастics bench; walking on the narrow surface of the bench; lateral movement on wall bars; and obstacle negotiation tasks.

- **Mirror-based postural awareness exercises:**

Exercises designed to improve global body posture awareness through visual feedback.

- **Stretching exercises for reducing muscle tightness:**

Neck stretching (lateral, flexion, and extension); trunk flexion with hands reaching toward the ground; *Cat–Cow* exercise; shoulder elevation and depression movements.

- **Muscle strengthening exercises for postural support:**

Targeting the back, abdominal, pelvic, gluteal, and hip adductor muscles. Recommended exercises include:

  - **Boat Pose:** from a supine position, lifting both lower limbs and trunk to form a “boat” shape.

- **Superman exercise:** from a prone position, simultaneously lifting extended upper and lower limbs.

Conclusions

1. **The Importance of Early Intervention**

The success of any strategy aimed at optimizing health is critically dependent on early detection. The earlier neuro-motor and psycho-pedagogical rehabilitation programs are initiated, the more effectively the child's brain plasticity can be harnessed to compensate for existing deficits.

2. **Multidisciplinary Approach**

Quality of life cannot be improved solely through medical treatment. A multidisciplinary team—comprising physicians, physiotherapists, psychologists, speech therapists, and educators—is essential to address the child holistically, rather than focusing exclusively on specific symptoms.

3. **The Central Role of the Family**

Optimization strategies are unlikely to succeed without the active involvement of parents. The family functions not only as a support system but also as a therapeutic partner. Parental training and psychological support reduce family stress levels, which directly influences the child's well-being.

4. **Social Inclusion as a Quality of Life Indicator**

A major conclusion is that health extends beyond the absence of disease to include the degree of social participation. Adapting the school environment and combating stigmatization are as important as physiotherapy interventions in fostering a sense of belonging and dignity.

5. **Individualization of Strategies**

There is no universal "one-size-fits-all" approach. Optimizing quality of life requires personalized intervention plans tailored to each child's developmental pace, residual potential, and socio-economic context.

6. **Technology and Alternative Methods**

The use of assistive technologies and complementary therapies (such as art therapy and play-based interventions) represents a modern direction that significantly enhances children's motivation and makes the rehabilitation process more engaging and less stressful.

REFERENCES:

Buhas, S., (2020), *The importance of physical activity in determiningthe quality of life of peoplewith mental deficiency*, Buletin of Transilvania university of Brasov, series IX: Sciences of Human Kinetics.

Constantinescu, D., (2021), *Personalized Kinetotherapy in Neurorehabilitation*. Rehabilitation Science Quarterly, 9(4).

Georgescu, H., (2020), *Holistic Approaches in Pediatric Rehabilitation*. Rehabilitation and Health, 13(2).

Ionescu, J., (2020), *Comprehensive Evaluation in Pediatric Neurorehabilitation*. Journal of Pediatric Medicine, 16(3).

Ionescu, O. et All. (2020), *The Importance of Kinetic Treatment for Integrating Children with SEN into Education.* BRAIN. Broad Research in Artificial Intelligence and Neuroscience, 11(4Sup1)

Manea, O., (2020), *Interdisciplinary Approaches to Special Needs*. Special Education Review, 10(4).

Manfredi Fr. et al (2022), *The Management of Toe Walking in Children with Autism Spectrum Disorder: 'Cast and Go,* Jurnalul Children, Vol. 9, nr 10.

Neagu, S., (2022), *Real-Time Monitoring in Pediatric Kinetotherapy*. Journal of Medical Technology, 14(2).