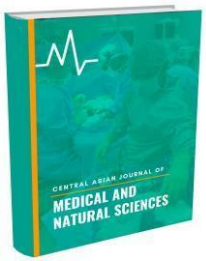

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Article

Assessment of The Daily Activity in Patients Recovering After Stroke

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Abstract: The article presents data on the evaluation of the daily activities of children who have experienced different types of strokes. The authors analyzed the skills of patients after discharge from the hospital using a modified scale for assessing daily activities, which were compared with data from comprehensive rehabilitation. The results showed good and average recovery rates after hemorrhagic and especially ischemic strokes. For mixed strokes with hemorrhagic transformation, daily activity levels were low

Keywords: Children, Stroke, Daily Activities, Barthel Scale, Rehabilitation

1. Introduction

The issue of morbidity and disability in children is a significant concern in pediatric neurology. More recently, there has been increased attention paid to the challenges of cerebral circulatory disorders in children, such as strokes. According to estimates, strokes in children occur at a frequency of between 2 and 13 per 100,000 per year. Neonatal strokes, occurring within the first 28 days of life, are more common than strokes in older children. In the general population, childhood stroke is estimated by experts from the World Health Organization to be the second leading cause of death after cardiovascular disease, with more than 6 million deaths worldwide in 2017.The main factors influencing the outcomes and consequences of stroke in children include the nature, localization, and volume of the lesion; the degree of brain structure maturity at the time of damage; the innate ability of the brain to recover; the sex of the child; and the type of therapy being administered.

According to Russian researchers, only 20-25% of children experience complete recovery after a stroke, while more than 70% have persistent neurological symptoms. The main outcomes include motor (in one-third of patients) and cognitive (more than 60%) disorders, as well as school difficulties (15-20%). These conditions lead to disability in approximately half of pediatric patients. The goal of social rehabilitation is to help children achieve maximum independence and adapt to their environment. This involves mobilizing their internal resources and helping them set goals and achieve them. In this regard, it is important to assess the condition of a sick child and his daily activities and quality of life during different stages of rehabilitation. This assessment of daily living activities provides answers to several questions: Can the patient live independently? Can the provision of any type of assistance make his life more manageable under normal circumstances (help him)? Or should he be admitted to a specialized facility with permanent care?

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In 2000, the World Health Organization (WHO) approved a new version of the International Classification of Functioning, Disability, and Health (ICF). This classification provides professionals with a unified language and well-defined framework to describe health and health-related indicators. Along with the International Classification of Diseases (ICD-10), the ICF forms a "family" of classifications developed under WHO guidance. In accordance with the ICF adopted by WHO in 2001, "disability" encompasses all disorders, activity restrictions, and limitations on participation in society. According to the ICF, health is defined from the perspective of the "organism", which refers to the structure and function of the human body. It also includes the "activity" of an individual and their "participation" in society, which refers to how they perform ordinary tasks and participate in social situations. If we are discussing conditions or abnormalities related to the structure or function of the body, we may use the terms "disorders of structure" or "disorders of function". For example, a child with motor disorders has impaired motor function. The term "restriction of life activity" refers to any limitations on an individual's ability to perform activities and participate in society.

This can include a reduced ability to serve oneself. Additionally, the classification system includes a list of factors that can affect human activity, such as environmental and personal factors. In order to obtain a comprehensive assessment, it is possible to use questionnaires that measure different areas of a patient's life. These questionnaires can be single-topic or multi-topic, depending on the specific needs of the patient. The multi-topic questionnaires combine different blocks of questions covering various aspects of a person's life, taking into account their specific limitations. Purpose The objective of this research was to evaluate the quality of life and level of daily functioning among individuals who have experienced a stroke.

2. Materials and Methods

There exist a multitude of tools designed to assess the well-being and daily activities of stroke survivors. To evaluate the daily functioning of children following a stroke, several standardized scales can be employed. For instance, the Children's Assessment of Participation and Enjoyment (CAPE) scale and the Pediatric Evaluation of Disability Inventory (PEDI) can be utilized to assess children's daily activities. In our study, we employed the adapted Barthel scale for daily functioning, which has been rationally adapted for use in pediatric populations. The Bartel scale serves as a valuable tool for evaluating the specific requirements of social services among adults who have experienced organic brain damage. Nonetheless, when it comes to children who have undergone cerebrovascular accidents, suffer from cerebral palsy, or exhibit other severe motor impairments, these scales fall short in adequately assessing the child's level of functioning both immediately following the illness and over time.

The Barthel scale for adults includes 10 parameters, including eating, dressing, bathing, using the toilet, getting out of bed, transferring from bed to chair, moving around, and climbing stairs. These parameters are evaluated using points, and the total score determines the level of dependence on outside assistance. However, some of these parameters may not be applicable to children, so we have adapted the scale for children by replacing some activities with more child-friendly ones. For example, the "bathing" parameter has been replaced with "self-care skills," and the activities of going to the bathroom, getting out of bed, and transferring from bed to chair have been modified to include walking, running, jumping, manipulating toys, and balancing the torso when falling.

3. Results

We examined 108 children, aged 2 to 10, who had experienced a stroke. They were divided into three groups based on the type of stroke they had: group 1 - hemorrhagic stroke (HS), group 2 - ischemic stroke (IS), and group 3 - mixed stroke (MS). The children's

ages ranged from 3 to 10. All patients were assessed using the Barthel scale to measure their daily activity. The children received a course of drug and rehabilitation treatment after the stroke, either in a hospital or in a polyclinic or rehabilitation center. We followed the dynamics of their recovery after 6 months to 1 year. Our findings are presented in the table 1 below.

Table 1: Assessment of patients' daily activities using the Barthel scale:

Criterias	Before treatment			After treatment		
	HS	IS	MS	HS	IS	MS
Eating	4,55±0,27	4,56±0,27	2,5±0,61	5,47±0,37 *ΔΔ	8,78±0,36 xΔ	2,78±0,6
Self-care	0,22±0,22 ***	1,44±0,52	0±0	3,02±0,71 *ΔΔ	8,22±0,58 xΔ	0±0
Personal hygiene	0,33±0,19 ***	1,22±0,32	0±0	1,63±0,36 *xxxΔ	4,44±0,29 xΔ	0±0
Dressing	0,44±0,21 **	2,11±0,4 xx x	1,39±0,54	3,02±0,41 *xxΔ	7±0,43 xΔ	1,39±0,54
Ability	0,33±0,19	0,78±0,27	0±0	1,16±0,37 *ΔΔΔ	4±0,3 xΔ	0±0
Pelvic control	1,33±0,68 *	7,11±0,99 xx	0±0	12,33±1,1 *Δ	18,89±0,57 xΔ	10±1,14 ΔΔ Δ
Walking, running, jumping	0,89±0,33 **	2,78±0,49 xxx	0±0	2,56±0,54 *Δ	8,22±0,45 xΔ	0,28±0,28
Movement	1,33±0,43 *	6,11±0,63 x	0±0	3,26±0,62 *Δ	11,89±0,64 xΔ	0,83±0,45
Ascending stairs	0,89±0,29 *	3,56±0,47 xx	0±0	2,56±0,48 *Δ	8,33±0,42 xΔ	1,11±0,5 Δ ΔΔ
Toy manipulation	0,91±0,29 *	4±0,41 x	0±0	2,33±0,48 *ΔΔ	8,56±0,38 xΔ	0,83±0,45
Body balance in the event of falling	0,57±0,24 **	2±0,37 xxx	0±0	1,63±0,36 *ΔΔ	5,11±0,19 xΔ	0±0
Overall score	1,06±0,31	3,24±0,47	0,34±0,07	3,6±0,52	8,49±0,42	1,65±0,53

Note: *- there was a significant difference compared to "IS" (*** - P<0,05; ** - P<0,01; * - P<0,001); x – Compared to MS (xxx - P<0,05; xx - P<0,01; x - P<0,001); Δ - Compared to «Before treatment» (ΔΔΔ - P<0,05; ΔΔ - P<0,01; Δ - P<0,001).

It should be noted that in the examined groups, children with SI had an early age, mainly up to 1-2 years old, so it was not possible to determine the scale for each parameter.

The analysis within and between groups was carried out using the Mann Whitney and Wilcoxon tests.

Table 2. Interpretation of Barthel scale indicators based on analysis within groups before and after treatment:

Abilities	Mann Whitney's criteria	Wilcoxon's criteria
Self-care	Significant changes are observed within the groups ($p < 0.05$)	In the HS and IS groups, there were significant improvements in skills after treatment ($p < 0.05$). However, the MS group showed less pronounced changes.
Personal hygiene	Significant differences between the groups before and after treatment ($p < 0.05$).	The HS group showed significant improvements ($p < 0.05$), while the changes in the IS and MI groups were less pronounced.
Dressing	Significant improvements in the HI group after treatment ($p < 0.05$).	Significant differences were observed between the HS and MS groups, with less pronounced changes in the IS group ($p < 0.05$).
Ability	HS has a significant improvement after treatment ($p < 0.05$).	Significant changes are noted in the HS and IS groups, and smaller improvements in the MS group.
Pelvic control	Improvements in the HS group after treatment ($p < 0.05$).	Significant improvements in the HS and MS groups, less pronounced changes in the IS group.

Walking, running, jumping	Significant improvements in the HS and IS groups ($p < 0.05$).	Significant changes in the HS groups and small ones in the MS.
Movement	Significant improvements in the HS group ($p < 0.05$)	The HS and IS groups have significant improvements after treatment.
Ascending stairs	Significant differences in the HS group ($p < 0.05$).	Significant improvements in the HS and IS groups.
Toy manipulation	Significant improvements in the IS group ($p < 0.05$).	Significant changes are observed in the HS and MS groups
Body balance in the event of falling	Significant improvements in the HS group ($p < 0.05$).	Significant improvements in the HS and IS groups.
Overall score	Significant changes in the HS group ($p < 0.05$).	Significant improvements in the HS and IS group after treatment.

4. Discussion

According to the data obtained, there has been a significant improvement in daily activity in almost all parameters ($p < 0.05$), especially among children with HS and IS. Positive dynamics were particularly observed in the group of patients with ischemic lesions. In group 1, consisting of patients with HS, a significant improvement was noted in skills such as self-care, personal hygiene, dressing, walking, and balancing the torso during movement. In the second group, consisting of patients with IS, positive changes were observed in pelvic control functions, self-care, and movement, along with improvements in toy manipulation.

In the group of children with stroke, the Barthel scale score was low, which correlated with indicators of neurological status. These children had severe neurological symptoms, such as persistent motor, cognitive, and speech impairments, which were difficult to treat and did not respond well to rehabilitation measures. This led to severe complications, including spasticity, contractures, joint deformity, impaired speech comprehension and production, coordination problems, visual and sensory impairments, and other difficulties.

5. Conclusion

The assessment of daily activities allows not only to determine the current state of a child, but also to create an individual rehabilitation plan aimed at recovering lost functions and improving quality of life. These assessments can also assist in selecting appropriate

methods of education and social integration for the child, as well as adapting the environment to maximize comfort and safety.

It can be concluded that a systematic assessment of daily activities for children who have experienced a stroke is crucial for their recovery and successful transition to life after the injury.

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