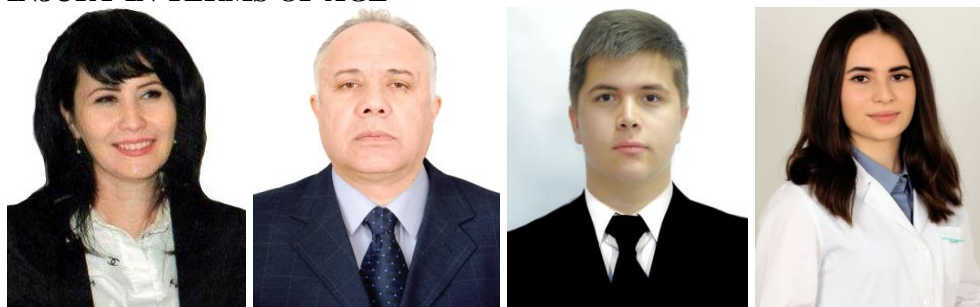


EFFICIENCY OF THERAPEUTIC MEASURES IN CHILDREN WITH CERVICAL NATAL SPINAL INJURY IN TERMS OF AGE



Mavlyanova Zilola Farkhadovna, Sharipov Rustam Khaitovich, Ashurov Rustamjon Furkatovich, Shamsiddinova Madinabonu Shukhrat kizi
Samarkand State Medical University, Republic of Uzbekistan, Samarkand

БЎЙИН ТУҒМА СПИНАЛ ТРАВМАСИ БЎЛГАН БОЛАЛАРДА ДАВОЛАШ ТАДБИРЛАРИНИНГ ЁШ ЖИҲАТИДАН САМАРАДОРЛИГИ

Мавлянова Зилола Фархадовна, Шарипов Рустам Хайитович, Ашуров Рустамжон Фуркатович, Шамсиддинова Мадинабону Шухрат кизи
Самарқанд давлат тиббиёт университети, Ўзбекистон Республикаси, Самарқанд ш.

ЭФФЕКТИВНОСТЬ ЛЕЧЕБНЫХ МЕРОПРИЯТИЙ У ДЕТЕЙ С ШЕЙНОЙ НАТАЛЬНОЙ СПИНАЛЬНОЙ ТРАВМОЙ В ВОЗРАСТНОМ АСПЕКТЕ

Мавлянова Зилола Фархадовна, Шарипов Рустам Хайитович, Ашуров Рустамжон Фуркатович, Шамсиддинова Мадинабону Шухрат кизи
Самарқандский государственный медицинский университет, Республика Узбекистан, г. Самарқанд

e-mail: info@sammu.uz

Резюме. Орқа мия ва умуртқа бўйин қисмининг тузғуқ травмаларининг (ОМваУБҚТТ) асоратлари бўлган мактабгача ва мактаб ёшидаги болаларнинг ҳаёт сифати бўйича турли хил терапевтик тадбирларнинг самарадорлигини қиёсий баҳолаш ўтказилди. ОМваУБҚТТ билан касалланган 98 нафар бола ҳар томонлама текширилди: 46 нафар мактабгача ёшидаги болалар ва 52 нафар мактаб ёшидаги болалар, улар даволаш усулларига қараб икки гуруҳга бўлинган: асосий гуруҳ ОМваУБҚТТ билан оғриган беморлар, бу стандарт терапия билан биргаликда кенг қамровли реабилитация усулларидан фойдаланган ҳолда мушак-скелет тизимини моделлаштириши билан биргаликда амалга оширилди; таққослаш гуруҳи асосий стандарт терапияни олган ОМваУБҚТТ билан оғриган беморлар. Назорат гуруҳи 42 нафар соғлом боладан иборат эди. Маълум бўлишича, эрта ёшда реабилитация тадбирларидан комплекс фойдаланиш ҳаётини функцияларни тезда тиклашга ёрдам беради, шунинг учун ушбу патологияга эга болаларнинг ҳаёт сифати ўз вақтида бошланган муолажаларга боғлиқ.

Калим сўзлар: ҳаёт сифати, болалар, орқа мия ва умуртқа бўйин қисмининг тузғуқ травмалари, PODCI шкаласи, перинатал шикастланиш

Abstract. A comparative assessment of the effectiveness of various therapeutic measures on the quality of life of preschool and school-aged children with complications of birth injuries of the cervical spinal cord and spine was carried out. 98 children with this disease were comprehensively examined: 46 preschool children and 52 school-age children, who, depending on the treatment methods, were divided into two groups: the main group was patients with birth injuries of the cervical spinal cord and spine, who received standard therapy in combination with modeling of the musculoskeletal system using complex rehabilitation methods; comparison group - patients with RTSOMiP who received basic standard therapy. The control group consisted of 42 practically healthy children. Thus, the comprehensive use of rehabilitation measures at an earlier age contributes to the rapid restoration of vital functions; therefore, the quality of life of children with this pathology depends on timely procedures.

Key words: quality of life, children, birth injury of the cervical spinal cord and spine, PODCI scale, perinatal damage.

Relevance. Perinatally caused pathology of the central nervous system plays a leading role in the formation of various disorders of the child's neuropsychic development, such as: motor deficits, speech disorders and higher cortical functions, head-

aches, epilepsy, school maladjustment [3,6,7,10,18]. According to WHO experts, the prevalence of vertebral deformities in children is 5.0%-9.0%, and in the adult population reaches 40.0%-80.0%, which is associated with an underestimation of "minimal" neuro-

logical manifestations in children [1,8,12,13]. Despite the imperfection of statistics, it is obvious that perinatal damage to the nervous system has recently taken first place in the structure of infant mortality [2,4,7,11,16]. Most often, this is a functional pathology of organs and systems, caused by neurogenic disorders and the consequences of perinatal injuries [4,7,9,19]. That is why the main task facing a practicing doctor is to choose the most effective set of treatment and rehabilitation measures for the purpose of improving the health of children and adolescents.

The study of quality of life (LQ) in medicine is a unique approach that allows you to fundamentally change the traditional view of the problem of health status and comprehensively study indicators of a person's quality of life, assessing all components of health - physical, psychological and social functioning [5,17]. From the analysis of literature data, it follows that insufficient attention is paid to the study of health-related quality of life, and especially in children and adolescents, which contradicts modern world trends and the opinion of scientists. This is due to objective difficulties, the main one of which is the lack of tools that meet the internal needs of the country and comply with international requirements and approaches.

In the world, special attention is paid to a wide range of scientific research aimed at studying the modern approach to early rehabilitation of children and improving the quality of life with complications of birth injury of the cervical spinal cord and spine. All this indicates great prospects for research into the quality of life of children and adolescents, including the consequences of injuries to the central nervous system. The results of the study of the quality of life may be the necessary justification for the development and adoption of long-term government programs to improve and create new conditions for the formation of the health of the younger generation. Knowledge about the attitude of parents to the health of children will help to build a comprehensive concept for strengthening their health, to carry out effective prevention of diseases and their complications.

The purpose of the study was to conduct a comparative assessment of the effectiveness of various approaches to therapeutic measures on the function of the upper extremities in children of preschool and school age with complications of birth injuries of the cervical spinal cord and spine, depending on age.

Research methods: The study utilized clinical-neurological examination and the results of the PODCI scale, neurofunctional assessments (electroneuromyography, ENMG), neuroimaging studies (ultrasound examination, cervical spinal cord ultrasound). The Pediatric Outcomes Data Collection Instrument (PODCI) was developed to assess the

functional status, therapeutic needs assessment, and changes after treatment in children and adolescents aged 2 to 18 years with orthopedic issues. PODCI has three forms: a parental form for children, parental and self-report forms for adolescents. The instrument includes 86 items evaluating "upper extremity physical function", "transfer and basic mobility", "sports and physical function", "pain/comfort", "happiness", "overall functioning", and "expectations of treatment areas".

The research group consisted of 98 children diagnosed with birth injuries of the cervical spinal cord and spine; 42 neurologically healthy children formed the control group. Among patients with complications from perinatal spinal cord trauma in preschool children, there were 46 cases. Depending on the treatment methods, patients were divided into two groups: the study group (n=24; 52.2%) - patients with birth injuries of the cervical spinal cord and spine who underwent standard therapy combined with musculoskeletal system modeling using complex rehabilitation methods, specifically electromyostimulation and kinesiotaping; comparison group (n=22; 47.8%) - patients with birth injuries of the cervical spinal cord and spine who received basic standard therapy. The control group consisted of nearly healthy children of similar age (n=20; 47.6%), who underwent medical examination at the family polyclinic.

There were 52 school-age children with health issues: 28 children with birth injuries of the cervical spinal cord and spine (53.8%) were included in the study group, who underwent the developed comprehensive rehabilitation program. The comparison group consisted of 24 children with birth injuries of the cervical spinal cord and spine (46.2%) receiving basic standard therapy. The control group comprised 22 (52.4%) nearly healthy school-age children (Figure 1).

Results. Impairment of upper limb function is an area that significantly impacts the quality of life in children with cerebral palsy and motor impairment (CPMI). This outcome underscores the difficulty of manipulating objects with the upper limbs during certain activities, such as lifting heavy books, pouring milk, opening previously opened cans, using cutlery, combing hair, buttoning clothes, putting on a coat, and writing with a pencil. All of these tasks may be associated with limited range of motion in these children, which is affected by muscle weakness, simultaneous activation of antagonists, difference in length of the affected limb, and contractures. Subsequently, children with CPMI demonstrate limitations in performing functional tasks necessary for independence in daily activities and quality of life, as well as tasks requiring fine motor skills (e.g., handwriting).

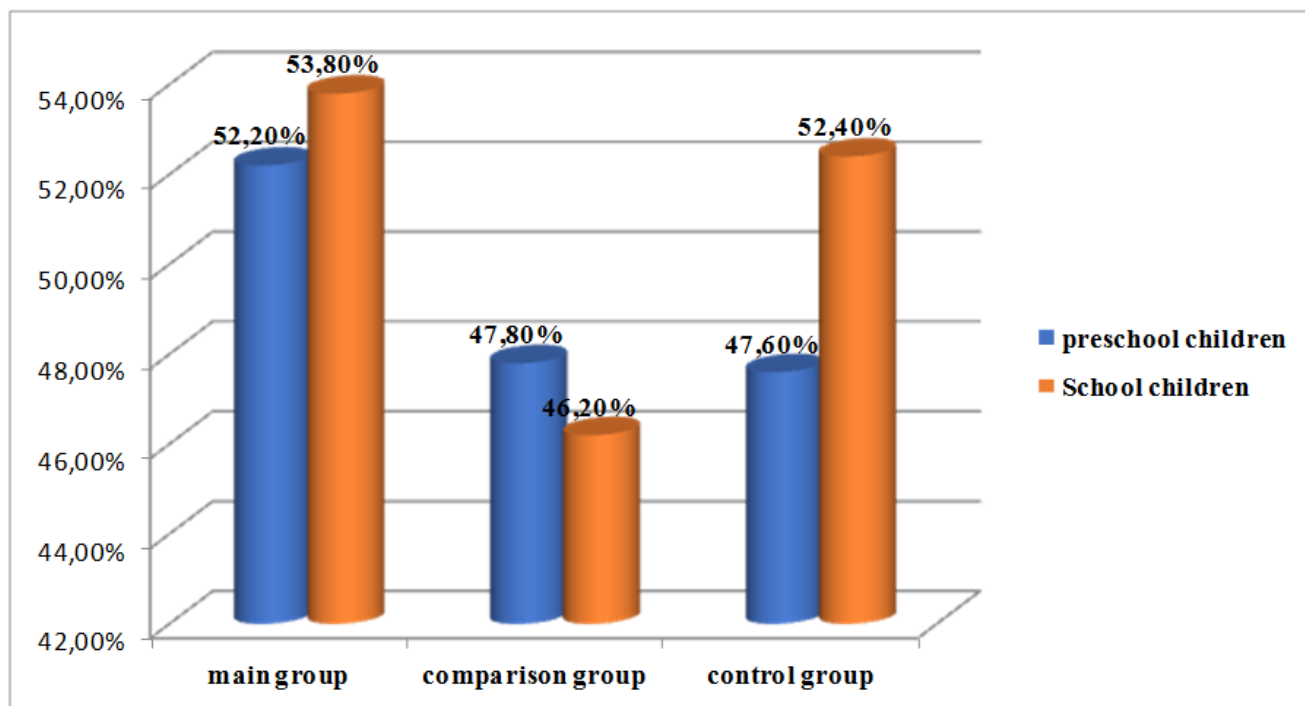


Fig. 1. Distribution of children into observation groups in terms of age

Table 1. Quality of life results based on the PODCI questionnaire in preschool-aged children

Domains	Before rehabilitation		After rehabilitation	
	Main group (M±m)	Comparison group (M±m)	Main group (M±m)	Comparison group (M±m)
Upper limb function	56,98±3,25	51,18±3,7	91,95±2,19*	69,92±3,13 [^] °
Basic mobility and transmission	56,95±1,54	53,77±3,35	92,87±0,66*	77,55±2,63 [^] °
Sport	68,96±2,25	70,7±2,25	91,53±1,77*	77,92±2,11 [^] °
Comfort/pain	52,09±2,21	55,53±2,35	93,76±1,20*	73,86±2,58 [^] °
Happiness function	68,9±1,27	68,12±3,55	96,71±0,71*	72,5±3,09 [^] °
Global function	58,75±1,56	59,94±2,05	92,64±1,0*	67,5±1,82 [^] °

Note: * reliability of data before and after treatment in the main group (* - P < 0.05)

[^] - reliability of data before and after treatment in the comparative group ([^] - P < 0.05)

[°] - significance of the difference after rehabilitation between the main and comparative groups ([°] - P < 0.01).

Table 2. Results of quality of life assessment using the PODCI questionnaire in school-age children

Domains	Before rehabilitation		After rehabilitation	
	Main group (M±m)	Comparison group (M±m)	Main group (M±m)	Comparison group (M±m)
Upper limb function	74,74±2,70	74,18±1,52	96,35±1,62*	82,12±1,28 [^] °
Basic mobility and transmission	51,39±1,05	50,94±2,69	94,43±0,96*	69,1±2,42 [^] °
Sport	85,15±0,91	82,44±1,08	97,37±0,81*	87,5±0,81 [^] °
Comfort/pain	45,15±1,9	48,48±2,69	88,2±2,39*	65,85±2,44 [^] °
Happiness function	60,09±2,57	61,32±2,61	92,5±1,02*	72,2±2,42 [^] °
Global function	64,0±0,81	63,98±1,58	94,16±1,07*	71,12±1,31 [^] °

Note: * reliability of data before and after treatment in the main group (* - P < 0.05)

[^] - reliability of data before and after treatment in the comparative group ([^] - P < 0.05)

[°] - significance of the difference after rehabilitation between the main and comparative groups ([°] - P < 0.01).

Table 1 presents the data results on the quality of life in preschool-aged children based on the PODCI questionnaire. Children with birth injuries of the cervical spinal cord and spine showed a decrease

in upper limb function. It was found that the two compared groups of children had no statistically significant difference before rehabilitation, indicating the equivalence of the groups. It is worth noting that

the rehabilitative measures implemented resulted in significant positive changes in the studied parameters. Specifically, the upper limb function in the main group of children improved significantly: from 56.98 ± 3.25 points to 91.95 ± 2.19 points, respectively. This function also improved significantly in the comparison group children - from 51.18 ± 3.7 points to 69.92 ± 3.13 points, but it was substantially lower ($P < 0.01$) than that of the main group.

The domain "Basic mobility and transfer" in the compared groups of children also had its own characteristics. The treatment led to a significant improvement in the parameters. For example, while this parameter was 56.95 ± 1.54 points in the main group of children before treatment, it increased to 92.87 ± 0.66 points after treatment ($P < 0.05$). Despite the improvement in this parameter in the comparison group children, the parameters were significantly lower than those of the main group - 77.55 ± 2.63 points and 92.87 ± 0.66 points, respectively.

It is known that children with birth injuries of the cervical spinal cord and spine participate less in sports activities. The domain "Sports and physical function" includes tasks such as walking, running, climbing stairs, riding a bicycle, and participation in non-competitive sports and games compared to competitive sports with other children of the same age. Therefore, the dynamics of the "Sports" domain were of particular importance in the study. As seen from the presented table, this parameter significantly increased after the rehabilitative measures were carried out. If prior to rehabilitation, this domain in the main group of patients was 68.96 ± 2.25 points, then after treatment, it significantly increased and reached 91.53 ± 1.77 points. In contrast to the comparison group parameters: 70.7 ± 2.25 points and 77.92 ± 2.11 points before and after treatment, respectively.

The indicators of the "Comfort/Pain" domain were even more vivid than the previous parameters. Thus, in the main group of children before the implementation of rehabilitative measures, the domain score was 52.09 ± 2.21 points, and increased to 93.76 ± 1.20 points during treatment. Treatment led to a significant increase in the comparison group children as well - 55.53 ± 2.35 points and 73.86 ± 2.58 points, respectively, but still significantly lower than in the main group.

Children with cerebral palsy and motor impairment may be less happy than children with typical development. This is why children with cerebral palsy and motor impairment showed lower scores in the happiness domain of the PODCI, which addressed questions about children's satisfaction with their appearance, body, clothing and shoes, ability to do the same things as their peers, and overall health status. It turned out that the lowest scores in this area could be related to feelings of irritation and distress, which are often encountered by children due to differences in

the level of performance of the same tasks as their typical peers. Assessment of the "Happiness Function" domain revealed a significant increase in the values of this parameter at the stages of rehabilitation. If before treatment, this parameter was 68.9 ± 1.27 points in the main group of children, then after treatment it was 96.71 ± 0.71 points.

The rehabilitative measures led to a more pronounced increase in the "Global Function" domain in the main group. So before treatment, this parameter in the main group of children was 58.75 ± 1.56 points and did not significantly differ from the comparison group data - 59.94 ± 2.05 points. After treatment, this domain increased in both the main and comparison groups - 92.64 ± 1.0 points and 67.5 ± 1.82 points, respectively, proving to be 1.37 times more effective in the context of a comprehensive rehabilitation program.

Thus, the conducted research showed that rehabilitative measures significantly improved the quality of life in preschool-age children in the main group across all parameters of the PODCI questionnaire.

A similar assessment of the effectiveness of various treatment methods on quality of life has been conducted for school-age children with complications of birth traumas to the cervical spine and spinal cord, the data of which are presented in Table 2.

It should be noted that the children in the compared groups at the time of their inclusion in the study before rehabilitation did not have a statistically significant difference, indicating the equivalence of the groups. The conducted rehabilitation measures showed a significant positive trend in the parameters studied. It was found that the function of the upper limbs in the main group of children significantly improved. For instance, before rehabilitation, this parameter was 74.74 ± 2.70 points, and after treatment, it significantly increased to 96.35 ± 1.62 points. It is worth noting that this function also significantly improved in the comparison group children - 74.18 ± 1.52 points and 82.12 ± 1.28 points, but it was significantly lower ($P < 0.01$) than in the main group of children.

The results of the conducted research showed specific features in the domain "Basic mobility and transfer" in children of the compared groups as well. The treatment contributed to a significant improvement in the parameters. For example, if in the main group of children this parameter was 51.39 ± 1.05 points, it increased to 94.43 ± 0.96 points after treatment. The rehabilitation measures led to an improvement in this parameter in the comparison group children: 50.94 ± 2.69 points and 69.1 ± 2.42 points, respectively. However, the effectiveness was still significantly lower than in the main group of children - 69.1 ± 2.42 points and 94.43 ± 0.96 points, respectively.

A nearly identical situation was observed in the main group of children in the "Sports" domain. As seen from the table, after the rehabilitation measures, this parameter substantially increased. For example, if before rehabilitation this domain was 85.15 ± 0.91 points, after treatment it significantly increased to 97.37 ± 0.81 points. After the treatment, the parameters of the comparison group children also improved, but not to the same extent as in the main group of children. Therefore, it can be noted that the rehabilitation measures conducted for the children in the main group proved to be more effective.

The results in the "Comfort/Pain" domain were even more pronounced than the previous indicators. Thus, in the children of the main group before the rehabilitation measures, the domain parameters were 45.15 ± 1.9 points and increased to 88.2 ± 2.39 points following treatment. Treatment led to a significant increase in children in the comparison group as well – from 48.48 ± 2.69 points to 65.85 ± 2.44 points, but still significantly lower than in the main group.

Interesting data was obtained for the "Happiness Function" domain. Treatment significantly increased the value of this parameter: before treatment, children in the main group scored 60.09 ± 2.57 points, and after treatment, it was 92.5 ± 1.02 points. Despite an increase in this indicator in the comparison group, it was still significantly lower than in the main group ($p < 0.01$).

Rehabilitation measures resulted in a more significant increase in the "Global Function" domain in the main group. Prior to treatment, this indicator in the children of the main group was 64.0 ± 0.81 points and did not significantly differ from the comparison group's 63.98 ± 1.58 points. After treatment, this domain increased in both the main and comparison groups – to 94.16 ± 1.07 points and 71.12 ± 1.31 points, respectively.

Thus, the conducted research indicated that rehabilitation measures significantly improved the quality of life for school-age children. A more significant improvement in all parameters of the PODCI questionnaire was observed in children in the main group. It was found that rehabilitation interventions contribute to a faster restoration of life functions in pre-school-aged children, emphasizing the importance of timely procedures for the quality of life of children with this pathology.

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ЭФФЕКТИВНОСТЬ ЛЕЧЕБНЫХ МЕРОПРИЯТИЙ У ДЕТЕЙ С ШЕЙНОЙ НАТАЛЬНОЙ СПИНАЛЬНОЙ ТРАВМОЙ В ВОЗРАСТНОМ АСПЕКТЕ

*Малянова З.Ф., Шарипов Р.Х., Ашууров Р.Ф.,
Шамсиддинова М.Ш.*

Резюме. Проведена сравнительная оценка эффективности различных лечебных мероприятий на качество жизни детей дошкольного и школьного возрастов с осложнениями родовых травм шейного отдела спинного мозга и позвоночника (РТШОСМиП). Комплексно обследованы 98 детей с РТШОСМиП: 46 детей дошкольного возраста и 52 ребенка школьного возраста, которые в зависимости от методов лечения были разделены на две группы: основная группа пациенты с РТШОСМиП, которым проводилась стандартная терапия в сочетании с моделированием опорно-двигательного аппарата с использованием комплексных методов реабилитации; группа сравнения - пациенты с РТШОСМиП, которые получали базовую стандартную терапию. Контрольную группу составили 42 практически здоровых ребенка. Оказалось, что комплексное применение реабилитационных мероприятий в более раннем возрасте способствует быстрому восстановлению жизненных функций, следовательно, от своевременно начатых процедур зависит качество жизни детей с данной патологией.

Ключевые слова: качество жизни, дети, родовая травма шейного отдела спинного мозга и позвоночника, шкала PODCI, перинатальное поражение.