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Research Article

Participation in Sports Competitions as a Rehabilitation Measure for Children Recovered from Cancer Diseases

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Abstract

Justification: Currently, in the rehabilitation of patients cured of cancer, physical exercise is considered as an additional way to the traditional forms of prevention of mental disorders, especially the anxiety spectrum, and to increase self-esteem. The "Winners Games" competition is extremely effective not only as a component of physical exercise, but also as a powerful psychological effect.

Aim of the Study: The aim of the study was to assess the results of rehabilitation of children cured of cancer within the framework of the program of physical training and participation in sports competitions "Games of the winners".

Materials and Methods: The study included children cured of cancer, planning to participate in the competition "Winners Games" - 20 children aged 8 to 12 years. The dynamics of changes in the psychological status was assessed by a number of indicators: the level of self-esteem (Rosenberg test), the level of anxiety (M. Luscher's test), psychodiagnostic examination (Cattell's method) for the period from the beginning of training and after three months.

Results: In the course of prospective observation, the dynamics of indicators of the psychophysiological status of children was assessed before the start of the training process and after 3 months. By the time of the competition, all children noted positive dynamics in the psychoemotional sphere. The number of children with a low level of self-esteem (from 9 to 2) and with a high level of anxiety (from 6 to 1) ($p < 0.05$) decreased. According to extreme estimates (low and high levels), significant differences were recorded, indicating an increase in emotional stability, motivation and a decrease in anxiety, as well as an increase in sociability, courage, a decrease in isolation and timidity. The number of children with a low level of emotional-volitional characteristics and communicative properties has significantly decreased (from 9 to 3), and with a high level - increased (from 3 to 8). No significant differences were found in the distribution of children according to the level of emotionality, although there is a tendency for a decrease in the number of children with low levels and an increase in the number of children with a high level of this indicator.

Conclusion: It was registered that preparation for competitions and participation in them reliably contributes to the increase of self-esteem, reduction of anxiety. A statistically significant improvement in emotional-volitional characteristics, communicative properties and characteristics of interpersonal interaction by the end of the observation is obviously associated with the implementation of the program of physical training and psychological support. The competitive process plays the role of an effective rehabilitation factor for children who have been cured of malignant neoplasms.

Keywords: *Psychological Status; Oncological Diseases; Children; Physical Culture; Sports Competitions*

Introduction

The list of late toxic effects along with changes in the somatic sphere leads to long-term deformation of the psychoemotional sphere [1]. Patients cured of cancer, for a long time experience a state of anxiety, self-doubt, low self-esteem. Psychological discomfort and existing physical abnormalities in health are reflected in all components of life [2]. The activity of the subject can be increased by the implementation of physical culture and sports programs, which in turn will lead to an improvement in physical health, and contribute to the formation of a healthy person in the patient.

The value of physical education and sports is determined not only by the fact that they develop and improve motor qualities, but also by the fact that they give an outlet to suppressed emotions, stimulate general activity, contribute to the development of self-control, foresight, give the subject responsibility, assigning him a certain role, increase self-esteem [3]. In 81% of cases, there is a link between physical activity and anxiety reduction [4].

In connection with the above, at present, in the rehabilitation of patients cured of cancer, physical exercise is considered as an additional to traditional forms (pharmacotherapy and psychotherapy), a way to prevent and treat mental disorders, especially anxiety spectrum, and increase self-esteem [5].

The World Winners 'Games for Children, better known as the Winners' Games, are international sports competitions for children and adolescents who have overcome cancer. The project was launched by the Grant Life 2010 Foundation. Since 2018, the regional stages of the Winners' Games have been held not only in Russia, but also abroad.

The main goal of the Games of the Winners is to help children who have suffered from cancer to return to normal life and rehabilitate after a long struggle with the disease. The project participants gain confidence in their abilities, they understand that they are no different from other children and can lead an active life, as before, because sport is the complete opposite of illness. From the standpoint of neurophysiology, competitions are a powerful stimulus that triggers the adaptive mechanisms of the body. For many seriously ill children, the dream of taking part in the Winners' Games became an incentive for recovery [6].

High motivation, which determines the desire to participate in competitions, is the driving force behind any success, including sports. In this regard, the importance of creating a so-called motivational climate by competition participants and their parents is obvious, which is aimed at not only an external type of result (receiving medals or approval from others), but also an internal type, the so-called causal one. This is especially important for children who have been cured of cancer. They prove to themselves and to those around them that they are free from the past illness, which ultimately leads to a pronounced mobilization of physical and psychological reserves.

It is known that the effectiveness of sports activity is determined not only by the level of development of motor qualities, but also by the psychophysiological characteristics of the individual [7,8].

The desire to participate in competitions is determined by motivation, which in turn is the driving force behind sports success. The motivational climate of children who have recovered from cancer, the desire to prove to themselves and those around them complete liberation from the past illness leads to the mobilization of not only physical, but also psychological reserves [9].

Self-esteem of an individual also depends on the level of development of physical qualities. It is well known that people with a high level of self-confidence respond to situations associated with ego-orientation, improved performance, while the results of people with medium and low levels of self-confidence decrease in such situations. Even when perceiving oneself as having lesser abilities (compared to other participants), especially in team interaction, focusing on a task and focusing on a specific criterion for completing this task allows an individual to consider himself competent and successful [10], in addition, the level of self-esteem is associated with stress resistance.

It is obvious that the improvement of the psychological status (increase in self-esteem, emotional and communicative components) is interconnected with sports achievements when participating in the «Winners' Games» competition. Preparation for them, which includes not only physical exercises, but also psychological support, will accordingly affect both sports performance and the improvement of psychological status.

All of the above determines the relevance of the selected research topic.

Purpose of the Study

The purpose of the study was to assess the results of rehabilitation of children cured of cancer within the framework of the program of physical training and participation in sports competitions «Games of the winners».

Materials and Methods

The study included children cured of cancer, planning to participate in the competition «Winners Games» - 20 children aged 8 to 12 years. The children and their parents were notified of the purpose of the study and gave their voluntary written consent to conduct it.

All children had previously received anticancer treatment. The remission period ranged from 5 to 10 years. Information about the initial state of each child and a description of the dynamics of the studied indicators (including the dynamics of the development of motor qualities) in the process of psychological correction was entered into an individual protocol.

The study was carried out at 2 sites: in the Regional Social and Psychological Center «Resource» (Orenburg) and in the Treatment and Rehabilitation Scientific Center «Russian Field» (Chekhov, Moscow Region).

The training process in the sports declared in the «Winners' Games» competition was carried out by professional physical education teachers. The frequency of training was 2 times a week for 3 months, a total of 20 sessions. The training, in addition to physical exercise, included a mental representation of the competitive conditions. Personalized psychological support was aimed at developing adequate motivation, working out the obstacles that the participants may face, ways to overcome them. In addition, they worked out the exercises necessary to maintain the state of optimal psychological readiness during the competition, monitor the success of the training process, teach self-regulation skills and optimize relationships with partners and the coach.

To determine the level of self-esteem (self-esteem and self-deprecation), the Rosenberg test was performed [11]. The test results were assessed on a scale: 10 - 18 points - low level, 18 - 22 points - balance between self-esteem and self-deprecation, 23 - 34 points - prevalence of self-esteem, adequate assessment of advantages and disadvantages, 35 - 40 points - high self-esteem [12,13].

To assess the level of anxiety, we used M. Luscher's eight-color test, which was performed on the «Psychotest-Neurosoft» diagnostic complex. The number of points for alarm intensity (primary colors) and compensation (additional colors) are summed up. The maximum intensity of anxiety corresponds to 12 points [14].

Psychodiagnostic examination was carried out according to the method of multivariate study of Cattell's personality. We used the children's version of the Cattell test of 8 - 12 years old, which is a modification of the adult version of the 16-factor personality questionnaire by R. Cattell, and was specially developed and adapted for children of primary school age (8 - 12 years old). http://www.psy-research.ru/study/1431001. The questionnaire contains 12 scales corresponding to the main personality traits of the child. Each of the traits can be either positive or negative. Emotional-volitional characteristics were assessed: factor C (emotional stability - emotional instability), factor Q4 (relaxation - tension) and factor O (self-confidence - anxiety), as well as communicative properties and features of interpersonal interaction - factor A (isolation - sociability), factor H (timidity - courage) and factor F (restraint - expressiveness). The

sum of points on each scale is translated into scores - walls. In the methodology, three levels of development of different personality traits are distinguished: low (1 - 3 walls), medium (4 - 7 walls) and high (8 - 10 walls). The maximum score is 10 points, the average value is 5.5 points. http://test-metod.ru/index.php/metodiki-i-testy/1/40-interpretatsiya-metodika-mnogofaktornogo-issledovaniya-lichnosti-r-kettella-187.

At this stage of the study, a comparison of the indicators of the psychological status at the beginning of the training process and at its end (after three months) was carried out.

On the basis of individual assessments of the survey results, group mean values (M), mean errors (m), and standard deviations (σ) were calculated. To compare the mean group values, we used t - Student's test, and distribution estimates (qualitative characteristics) - Fisher's F test. Differences between groups were considered statistically significant at $t > 1.96$ and at $F > 4.098$ (95% significance level).

Results

The results obtained are presented in tables. The distribution of children by the level of general self-esteem at the beginning of observation and 3 months after physical training and psychological support (Table 1) demonstrates a positive trend in this indicator - the number of children with a low level of self-esteem has decreased (the differences are significant). Moving to a higher level was as follows. The transition from a predominance of self-esteem to a high level of self-esteem (1 person), from a balance between self-esteem and self-abasement to a predominance of self-esteem (3 people), from a low level to a balance between self-esteem and self-deprecation (2 people) and to a predominance of self-esteem (5 people).

Self-assessment	Reference values, examination period, number of children, value of Fisher's criterion			
	Points	Number of children		
	min÷max	Baseline	In 3 months	F
Low level	10÷17	9	2	6,84
Balance between self-esteem and low self-esteem	18÷22	7	9	0,42
Predominance of self-esteem	23÷34	3	7	2,26
A high self-evaluation	35÷40	1	2	0,31

Table 1: *Distribution of children by the level of self-esteem in dynamics (Rosenberg test).*

According to the data presented in table 2, the level of anxiety in children cured of cancer after physical training and psychological support decreased significantly: before the start of training, only one child was not anxious, after the end of the observation - in 6 children. On the contrary, at the end of the observation there was only one child with a high level of anxiety, and at the beginning of the observation there were six of them.

The degree of anxiety	Reference values, examination period, number of children, value of Fisher's criterion			
	Scores	Number of children		
	min÷max	Baseline	In 3 months	F
Is absent	0	1	6	5,01
Low	1÷2	9	3	4,56
Average	3÷6	4	10	4,14
High	7÷11	6	1	5,01

Table 2: *Distribution of children by the level of anxiety in dynamics (Luscher test).*

Table 3-5 show the results of testing according to the Cattell method [15]. When comparing the average values of emotional-volitional characteristics and communicative properties and characteristics of interpersonal interaction at the beginning and at the end of the observation of children cured of cancer (i.e. after physical training and psychological support), a statistically significant improvement was recorded for all factors (Table 3). The exception was the figures reflecting «emotionality-restraint»: although after three months the average value of this indicator increased, this increase was not statistically significant.

Factor blocks	Period of examination, number of children, value of Student's criterion				
	baseline		In 3 months		
	M	+m	M	+m	t
Emotional and volitional features					
Factor C (emotional stability-emotional instability)	3,9	0,48	6,6	0,54	3,67
Factor Q4 (relaxation - tension) - motivation	4,7	0,42	6,0	0,48	1,99
Factor O (self-confidence - anxiety)	6,6	0,54	4,7	0,42	2,63
communicative properties and features of interpersonal interaction					
Factor A (isolation - sociability)	5,5	0,42	7,3	0,48	2,42
Factor H (shyness - courage)	5,9	0,36	7,5	0,54	2,15
Factor F (restraint - expressiveness).	6,0	0,48	7,2	0,36	1,66

Table 3: *Average values of the studied characteristics in dynamics (emotional-volitional characteristics, communicative properties and peculiarities of interpersonal interaction).*

It is known that informative indicators are not so much the average group assessments as the distribution of the observed assessments by the level of assessments (low, medium, high). The dynamics of the distribution of children by the level of emotionally volitional characteristics (factor C, factor Q4 and factor O) is presented in table 4. Note that the number of children with an average level did not change significantly. At the same time, according to extreme estimates (low and high levels), significant differences were registered, indicating an increase in emotional stability, motivation and a decrease in anxiety.

Factor blocks / level	Examination period, number of children, value of Student's test		
	Baseline	In 3 months	t
Factor C (emotional instability-emotional stability)			
Low	9	3	4,56
Middle	8	7	0,12
Tall	3	8	6,12
Factor Q4 (relaxation - tension) motivation			
Low	8	2	5,27
Middle	6	5	1,26
Tall	6	13	5,13
Factor O (self-confidence - anxiety)			
Low	4	12	7,14
Middle	6	8	0,44
Tall	10	3	6,01

Table 4: *Dynamics of the distribution of children by the level of emotionally volitional characteristics.*

A similar dynamics was noted in terms of the level of interpersonal interaction and communicative properties of children cured of cancer at the beginning and at the end of observation (i.e. after physical training and psychological support). The number of children with an average level remained the same, with a low level it decreased significantly, and with a high level it increased, which indicates an increase in sociability, courage and a decrease in isolation and timidity (Table 5). There were no significant differences in the distribution of children by the level of emotionality (factor F - restraint - expressiveness), although there is a tendency for a decrease in the number of children with low and an increase in the number of children with a high.

Factor blocks/level	Examination period, number of children, value of Student's test		
	Baseline	In 3 months	t
Factor A (isolation - sociability)			
Low	8	1	8,43
Middle	7	7	0
Tall	5	12	5,26
Factor H (shyness - courage)			
Low	8	2	5,27
Middle	8	7	0,10
Tall	4	11	5,53
Factor F (restraint - expressiveness)			
Low	5	2	1,63
Middle	8	8	0
Tall	7	10	0,93

Table 5: *Dynamics of the distribution of children according to the level of peculiarities of interpersonal interaction and communicative properties.*

Discussion

The analysis of the data obtained made it possible to assess the dynamics of the psychophysiological status of children cured of cancer and preparing to participate in competitions (at the beginning of the observation and after 3 months) as positive. A significant decrease in the number of children with a low level of self-esteem and a high level of anxiety, a statistically significant improvement in emotional-volitional characteristics, communicative properties and characteristics of interpersonal interaction by the end of the observation is obviously associated with the implementation of the program of physical training and psychological support [16].

The obtained facts coincide with the literature data [17,18], according to which a positive assessment of one's own achievements by others, high results in specific activities underlie self-esteem and psychological status [19,20]. Since the greatest sports efficiency can be achieved in those cases when the child feels as comfortable as possible, experiences more positive emotions and fewer negative ones, at the next stage of the work it is planned to present the results of assessing the sports efficiency (dynamics of motor tests performance) of children cured of cancer and preparing to the Games of Winners.

Conclusion

In the process of observing patients cured of malignant neoplasms, it was possible to assess the importance of participation in competitions as a powerful adaptive factor. In comparison with children receiving only physical rehabilitation and not participating in the

competitive process, a significantly greater positive dynamics was noted. The number of children with a low level of self-esteem and the number of children with a high level of anxiety decreased (the differences are significant).

When comparing the average values of emotional-volitional characteristics and communicative properties and characteristics of interpersonal interaction at the beginning and at the end of the observation of children, a statistically significant improvement was recorded for all factors. According to extreme estimates (low and high levels), significant differences were recorded, indicating an increase in emotional stability, motivation and a decrease in anxiety, as well as an increase in sociability, courage, a decrease in isolation and timidity. However, it should be noted that the number of children with an average level of the studied characteristics did not change significantly. At the same time, the number of children with a low level of emotional-volitional characteristics and communicative properties has significantly decreased, and with a high level - increased. No significant differences were found in the distribution of children by the level of emotionality, although there is a tendency for a decrease in the number of children with low levels and an increase in the number of children with a high level of this indicator.

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