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Quality Of Life For Schoolchildren Of 11-15 Years Old Depending On Their Level Of Physical Activity.

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ABSTRACT

The link between physical activity and children's health is known. Systematic studies of physical activity have shown that children who are engaged in physical exercise, have better physical and mental health. Low physical activity quickly leads to the development of a number of diseases, including obesity, coronary heart disease and metabolic syndrome. Sedentary behavior also contributes to the development of cognitive development and reduced child performance in school. According to the Russian statistics service in the country, there has been a deterioration in public health over the past 17 years, which is largely due to the computerization of schools and the introduction of new technologies in the educational process. The purpose of this study was a systematic review of the existing literature, which assessed the relationship between physical activity, sedentary behavior and their relationship to health and quality of life among schoolchildren 11–15 years old. The paper presents evidence that a higher level of physical activity and a decrease in the time of low activity lead to an increase in the quality of life and an improvement in the health of children and adolescents. In the future, it is necessary to revise Russian education in terms of increasing the physical activity of children and adolescents during extracurricular lessons. It becomes clear that besides this, active state propaganda of an active lifestyle among children and adolescents is necessary. All this in a complex can help to heal the younger generation in Russia.

Keywords: physical activity, sedentary behavior, quality of life, health, recreation, schoolchildren 11-15 years old.

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INTRODUCTION

The functional state of the body is closely related to the peculiarities of its internal [1,2,3] and the external environment [4,5,6]. It has been observed that environmental factors can have a strong modeling effect on the main vital signs [7-10], causing either a healing [11,12] or pathogenic effect [13,14]. These observations have already received great practical significance [15–17] and are actively used in practical biology [18, 19] and medicine [20]. The number of important environmental factors for the body includes physical activity. The relationship between physical activity, sedentary behavior, physical and mental health among children has long been observed [21]. Systematic reviews and primary studies of physical activity and health showed that children who exercise, had better physical and mental health, psychosocial well-being than those who were inactive [22,23]. The promotion of physical activity among school-age children has demonstrated that it benefits and prevents development of a number of diseases, including obesity, coronary heart disease and other health problems [24,25]. A sedentary lifestyle, watching TV, using computers, smartphones and video games are associated with various negative health effects [26,27]. The negative effects caused by sedentary behavior include an increased risk of obesity, cardiovascular disease and increased mortality among children, as well as mental health problems [28,29]. Sedentary behavior also contributes to such deviations as a delay in cognitive development and a decrease in the performance of children in school [30,31]. According to the Federal State Statistics Service, there has been a deterioration in public health over the past 17 years [32], which may be due to the computerization of schools and the introduction of new technologies in the educational process [33].

Health-related quality of life is increasingly being used as an indicator of health among children and adolescents to assess their physical and social functioning, mental health and well-being, and to develop intervention programs [34].

Quality of life is an integral characteristic of a person's physical, psychological, social, and emotional state, which gives a general picture of a person's state of health [35].

Quality of life assessments among children play an important role in identifying subgroups with poor health and in developing an intervention strategy to improve the health of young people. The relationship between physical activity and quality of life has been well researched regarding school-age children. But much less is known about the relationship between sedentary behavior and quality of life. What is important for schoolchildren who spend most of their time at the desk. We found many studies that examined the effect of physical activity and sedentary behavior on the quality of life among children and adolescents. But it is also important to investigate the influence of physical activity and sedentary behavior on aspects of physical, psychological and social functioning of quality of life among children aged 11–15 years, and whether there is a relationship between levels of physical activity, time spent on sedentary behavior, and quality of life. Such information will help provide a database for public health organizations aimed at promoting the health and quality of life of children and adolescents.

The objectives of this study are:

- 1) to analyze the existing scientific literature, in which studies were conducted of the relationship between FA, sedentary behavior and quality of life in children 11-15 years old;
- 2) to provide recommendations to school leaders on the improvement of school education programs and the introduction of sports recreation in order to improve the quality of life among children of school age.

MATERIALS AND METHODS

We conducted a computerized literature search in Russian and English from the MEDLINE, EMBASE, PSYCINFO, PSYCINFO, Federal State Statistics Service databases, studied publications in Russian scientific medical journals, the journal Physical Education and Health. Studies were selected that evaluated the relationship between physical activity and / or sedentary lifestyle and their relationship to the health of children aged 11 to 15 years.

We excluded studies that examined the relationship between physical activity, sedentary behavior and health among children with specific chronic diseases and adult population studies.

Headers and keywords were used: “physical activity”, “exercise”, “sedentary image”, “screen time”, “television”, “computers”, “video games”, “lifestyle”, “health-related quality of life”, “Quality of life”, “state of health”, “children”, “adolescents”, “middle school age”.

In this article, we sought to collect research that focused on finding the relationship between physical activity, sedentary behavior, and quality of life among a healthy population of children and adolescents.

The selection criteria were as follows:

- 1) Results of interest: studies of the mental and psychosocial status of schoolchildren, their level of health, IQ, physical fitness, the presence of excess weight;
- 2) Population of interest: schoolchildren aged 11 to 15 years;
- 3) Types of studies: transverse, longitudinal studies, cluster slice;
- 4) Definitions used in the study:

Physical activity is defined as any body movement produced by skeletal muscles that requires energy consumption, including activity during work, play, homework, travel and recreational activities [36];

Sitting behavior - any waking behavior, sitting, lying down, lying down or standing with low energy consumption (watching TV, playing video games, working at a computer, reading) [37];

The quality of life associated with health is an integral characteristic of a person’s physical, psychological, social, and emotional state, which gives a general picture of a person’s health [35].

Studies that investigated children with specific chronic diseases (for example, diabetes, asthma, obesity) were excluded. Studies were also excluded in which adults were assessed.

RESULTS AND DISCUSSION

A total of 9 studies were analyzed. Table 1 shows the characteristics of the included studies and their results. A total of 4,106 participants were included in the statistical analysis with a sample size from 152 to 839 people. The table includes the results of research from 6 countries of different continents.

Most of these studies were cross sectional studies. One study was longitudinal, where the long-term effect of the physical activity of schoolchildren (participation in competitions) on the quality of life for 5 years was analyzed [35]. Another evaluated the impact of school physical activity programs on the quality of life of schoolchildren using cluster controlled research [38].

Of the included studies, 5 studies evaluated the relationship of a sedentary lifestyle and quality of life among children aged 11–15 years. These studies examined the relationship between the use of electronic media (television, video games, computers, telephone) and the quality of life [39,40].

All included studies used a standalone physical activity report. Sitting behavior was measured in most studies by the number of hours or minutes spent daily watching TV, playing video games on a computer and a phone, as well as the time spent preparing homework [41].

Quality of life was measured using the WHOQOL-Bref program. WHOQOL-Bref score ranges from 1 to 100, the higher the score, the better the quality of life.

The results of studies in cross section

Seven cross-sectional studies that examined the relationship between physical activity and quality of life among children and adolescents found evidence that children and adolescents with higher levels of physical activity had a high level of quality of life compared to children with low levels of physical activity. All data is shown in table 1.

Studies have shown that children with longer TV viewing are more likely to have poor quality of life indicators. In Novosibirsk, it was noted that children who followed the recommendation for physical activity for 60 minutes / day had significantly better indicators of quality of life than those who did not follow the recommendations [42].

In two studies, no significant relationship was observed between sedentary behavior and quality of life.

The results of longitudinal and cluster studies.

In studies that examined the longitudinal relationship between physical activity and quality of life, there was a significant effect among children and adolescents. In Moscow, they found that the level of high physical activity is associated with high quality of life. With 5 years of observation among schoolchildren in all four dimensions of health: physical, mental, social and general health, it was observed that children who supported participation in sporting events for a five year period had a better quality of life than children who did not participate in sports and dropped out of sports. The difference between the participants of the competition and non-participants was approximately 12-15 points, which is more than the minimum clinically significant difference of 5 points [35].

In one cluster study, the effect of a school curriculum focused on the development of physical qualities for girls and boys of middle school age was evaluated. It was revealed that the program had a positive effect on the quality of life of schoolchildren [38,43].

Based on the data obtained, it can be concluded that the level of physical activity affects the quality of life. The largest impact was found in Moscow, by 13 points, and the lowest impact in Australia (3.7 points), which is below the clinically significant minimum of 5 points.

Based on the results obtained, it can be concluded that in most cases a sedentary and sedentary lifestyle significantly affects the quality of life. This is most noticeable in China, but in the USA and St. Petersburg the link between the time spent behind the screen and the quality of life has not been revealed.

All included studies and their results are shown in Table 1.

City, country	Type of study, number of participants	Evaluation of physical activity	Assessment of sedentary behavior	Life quality assessment	Communication physical activity and quality of life	Relationship sedentary behavior and quality of life
Spain [44]	Cross cut 456 people	Self report Physical activity questionnaire from 9 points, rated by five-point scale. The result was calculated on average of 9 points.	Self report A study of sedentary behavior like the average number of hours per day that children spent watching TV / DVD, smartphones, tablets or other devices.	Self report 27 items five components: 1) physical well-being, 2) psychological well-being, 3) independence and relationships with parents, 4) social peer support 5) attitude in the school environment grade point average 50. Higher ratings indicate a higher quality of life.	A higher level of physical activity was associated with higher grades of quality of life 71.6 vs 63.8	No data
Australia [38]	Cluster 12 months 198 people - experimental 209 people -control group	The analysis was conducted during 12-months in randomly selected schools (8 classes –experimental group, 8 classes - control group). The experimental group received increased physical education. The control group continued to study under the normal program.	No data	Ped 4.0 self-report on 3 points: 1) overall assessment 2) physical health 3) psychosocial health	the experimental group showed significantly higher scores in three sections: -physical training (average: 83.9), - psychosocial health (79.9) - total score (81.3) than the control group (80.9; 76.1; 77.8, respectively), which proves that the intervention had a positive effect on the quality of life.	No data
China [29]	Cross cut 839 people	Self report physical activity was assessed by frequency and duration of physical activity by 24 activities per day for 7 days. everyday transferred to a specific metabolic equivalent value based on the standards of the collection of physical exercises. Total physical activity was the sum of metabolic equivalent values all activities that were divided to high (75%), medium (50%) and lower (25%) levels	Self-sitting position was measured as the average number of hours spent on homework per day for the last 7 days.	Ped 4.0 self-report on 3 points: 1) overall assessment 2) physical health 3) psychosocial health	Schoolchildren with a high level of physical activity had a higher level of quality of life. on average (72.3 or 72.9). The worst results were shown by fans of computer games (<65)	Every extra hour spent behind homework influenced decline in quality of life an average of 5-7 points

USA [40]	Cross cut 371 people	Participants were asked: "How often do you do activities related to physical activity? Responses were classified as: physically active- "Daily" or "5-6 times a week" "Moderately active" (1-4 days in week) and "Low active (<1 day per week) Groups were merged (act, cf, bottom) for statistical analysis.	"How many hours do you spend watching TV, playing video games or using a computer?" > 2 hours / day classified as high sedentary behavior	Ped 4.0 self-report on 3 points: 1) overall assessment 2) physical health 3) psychosocial health	Active children had significantly better quality of life values (total rating: 84.3 against 80.8; physical Health: 91.5 vs. 85.6; psychosocial health 91.7 vs. 87.0) On average, 89.1 vs. 84.4	There were no significant differences between the short and longer time spent behind the screen and the quality of life.
Brazil [45]	Cross cut 608 people	Self Report Physical activity was measured using the International Physical Activity Questionnaire (IPAQ), version 8, for 7 days	No data	The quality of life measured using WHOQOL-Bref, which includes 26 questions. WHOQOL-Bref score ranges from 1 to 100, the higher the score, the better the quality of life. The study used data from the psychological field.	Less active students were more susceptible to negative influences and had psychological problems in areas of quality of life. Average 63.7 vs. 56.9	No data
Moscow [35]	Longitudinal section, 5-year following 742 people	Self Report Physical activity was measured using bracelets with monitoring of physical activity. Physical activity was divided by 2 groups: -20.0 kcal / kg / day, - <20.0 kcal / kg / day	Self Report Watching TV time: - <2 h -2-3 h, -> 3 hours per day. Video games: - <1 h, - 1-2 hours - 2-3 hours, -> 3 hours per day	Self Report Brief form of the study of medical results, 36 questions, including 8 sections: physical function -endurance, - general health, - vitality -social sphere, The role of emotional and mental health. Sections summed up with physical and mental results, final grades	In less active children compared with active, there was a low level of quality of life. on average by 12-15 points. 80.3 vs 66.7 Active students more often participated in sports and went to sports clubs.	Compared with children who spent behind TV <2 hours, children sitting at computer games and TV for more than 3 hours had a lower quality of life. 70.2 And also after the introduction of a dosing screen viewing, a positive effect was observed on average by 3-4 points.
St. Petersburg [39]	Cross cut 156 people	Self Report Physical activity was measured by the number of times a week, the number of hours and the quality of physical activity (determined by the frequency of respiration and pulse)	Self Report Sedentary behavior measured by time spent behind the screen, the number of hours per day	Self Report 10 questions covering the physical, emotional, mental, social and behavioral components of the quality of life on a five-point scale. The quality of life index was calculated in the range from 0 to 100	Students who reported a high level of physical activity, named high quality of life indicators. On average 80.6 vs. 75.3	Связь между временем, проведенным за экраном, и качеством жизни не была выявлена
Novosibirsk [42]	Cross cut 152 people	Self Report Physical activity was assessed by activity level and nutrition. The questionnaire consisted of 24	No data	Studies were conducted on 2 tests. 1) Ped 4.0 (3 points: general assessment, physical health, psychosocial	No statistically significant association found. between physical activity and quality of life, measured	No data

		<p>questions. The study was conducted during the week. FA level was divided into two categories: “yes” or “no” based on recommendations of the world health organization (60 minutes a day)</p>		<p>health) 2) EQ-5 (5-point descriptive system: walking; self control; performing ordinary activities; pain or the discomfort; and a feeling of anxiety, sadness, loneliness.) And visual analysis, where 0 (worst health) 100 (best health)</p>	<p>Ped 4.0 test. Children doing physical activity for more than 60 minutes a day showed better EQ-5 scores than those who didn't follow recommendations. 74.2 vs 70.1</p>	
Vladivostok [46]	Cross cut 375 people	<p>Self Report The frequency of physical activity was measured at four points: - Often, -often, -infrequently, -Almost never</p>	<p>Self Report TV viewing time was divided into four Categories: 0-2 hours 2-3 hours, 3-4 hours > 4 hours a day</p>	<p>The evaluation was carried out in nine sections: - physical training, - self-awareness, - daily activities - social activities - diseases - general health, - changes in health, - social sphere - standard of living</p>	<p>Children who had low physical activity had a poor quality of life compared to their active peers. The dose-response relationship between physical activity and low quality of life is observed: Quite often: quality of life = 72.0 Seldom: quality of life = 69.3, Almost never: quality of life = 65.8</p>	<p>Children with long-term TV viewing were more likely to have a poor quality of life. The relationship between quality of life and time spent watching TV 2-3 h: quality of life = 71.6; 3-4 h: quality of life = 70.1 > 4 h: quality of life = 65.6</p>

CONCLUSION

In this article, evidence has been found that a higher level of physical activity and a decrease in the time of sedentary behavior are associated with an increase in the quality of life associated with health among children and adolescents. Future research is needed to identify potential causal mechanisms. More detailed tests are needed to evaluate the effect of physical activity on children and adolescents. Therefore, it is worth conducting research to determine the appropriate amount of physical activity to improve the quality of life. And also to answer the question: "Is there a time threshold for sitting behavior to reduce the quality of life, and when sedentary behavior exceeds a certain amount?" Because physical activity and sedentary behavior can be measured and expressed in different quantities (for example, objective or subjective), including various aspects (for example, out-of-class physical activity, television / computer or time at a desk / homework) and different indicators (for example, intensity and duration), further research is needed to study which types or aspects of physical activity and sedentary behavior will be most relevant to quality of life. Further research is also needed on how changes in this behavior affect changes in the quality of life among children and adolescents. The findings in this article can be used as evidence of the link between physical activity and sedentary behavior with quality of life to inform health authorities about the need for prevention and the introduction of physical activity into school programs in order to preserve the health of children and young people. The results of this study indicate that the programs school health promoting an active lifestyle and recreation among children and adolescents can help improve the quality of life and health as a whole.

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