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Influence of programmed exercise on fitness components

Ljubo Milićević¹, Vladan Savić¹, Rosario D'Onofrio^{2,3}

³Faculty of Physical Education and Sport, University of East Sarajevo

²Faculty of Medicine and Surgery, Sapienza University of Rome

³Member of the Multidisciplinary Medical - Scientific Commission, - L.A.M.I.CA - Italy



Abstract. *Health condition in much for changing of lifestyles and ways behaviors. Research indicates that in modern times in civilization society level the usual physical activity reduces activity not only in adults, but also in school dece. The aim of this paper is to collect as many papers as possible that dealt with the impact of a particular exercise program on the fitness component of high school students. A well-designed organization, with the right approach, can be very successful due to the increased motivation of high school students for better personal appearance and body shaping, thus providing the opportunity for them to be included in effective physical exercise programs.*

Keywords: *Endurance, strenght, flexibility, fitness, influence*



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INTRODUCTION

From the point of view of evolution, physical ability has, over the past millennia, been a condition for the survival and survival of the individual, the family and society as a whole. Hippocrates' book "Regimen" states: "Food alone will not keep a person in good health; he must engage in physical exercise, because food and exercise, although possessing opposite qualities, work together to maintain good health. And it seems necessary to determine the power of various exercises and to know which of them strengthen and which weaken the body ... "More than 1500 years ago, the famous Roman doctor Galen prescribed physical activity in order to preserve health. In modern living conditions, the regressive tendency is more and more present, which is reflected in the growing passivity of modern man. Inactivity in childhood is transmitted to older age¹⁴. Although in the past few decades there is growing evidence of a significant positive impact of physical activity on maintaining and improving health status, the sudden change in the environment over the past few centuries has led to insufficient human adaptation to changing environmental conditions. Also, with the advancement of technology, in terms of motorized transport, but also watching television and expanding the Internet, it is increasingly difficult to find time and motivation to engage in physical activity and maintain the level of fitness needed for a healthy life. Recent research indicates that about 60-70% of the population of developed countries do not achieve a minimum level of physical activity²³. Significant psychological changes occur in people as a result of physical exercise. Emotional stability increases, aggression decreases, motivation for adaptive changes increases. Physically trained people feel better, and they have more life energy and desire to work. Physical activity affects the stated personality traits differently, and even more so the mental states, which, of course, depends on individual differences, primarily gender, age, health status, etc¹⁴.

In addition to psychological changes, physical exercise has a beneficial effect on the development of fitness components, ie, on improving cardiovascular endurance, which is the ability to bring oxygen and nutrients to tissues, as well as to remove waste products during certain periods of time. is characterized as the ability of muscles to withstand force for a short period of time. It also affects



muscle endurance, which is defined as the ability of a muscle or group of muscles to maintain repeated contractions or continue to apply force against a fixed object, flexibility, ie the ability of muscles and ligaments to achieve full range of motion and body composition. and ligaments to achieve a complete degree of movement¹³.

RESEARCH METHOD

Literature search

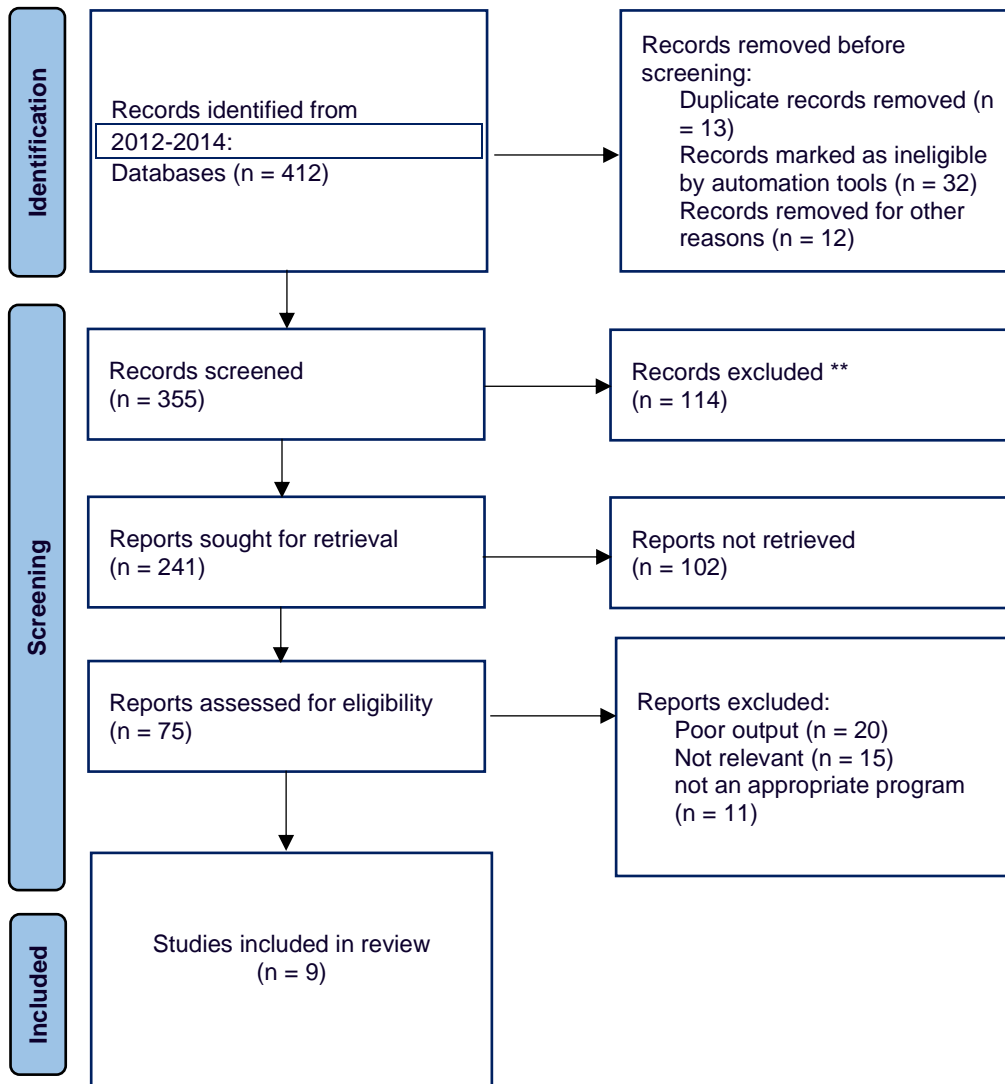
Descriptive method and theoretical analysis were used to collect, classify and analyze targeted research. The research was collected by searching electronic databases of scientist databases. Also, the works were collected from the references of the found works on this and similar topics, which are fully available. The keywords used in the search are: Endurance, Strength, Flexibility, Fitness, Influence. The greatest attention is focused on the works published in the period from 2012 to 2014. The first condition for taking the papers into consideration was that they examine the effect of a certain physical exercise program on fitness components, and the second that the sample of respondents consists of high school students.

Theoretical consideration of the problem

The study includes 9 closely related studies. At the beginning of the search, 412 references were identified that responded to some of the criteria, but a large number of papers based on other criteria were immediately eliminated based on the title (Figure 1). Each paper is presented according to the following parameters: Sample of respondents (number of respondents, age and gender of respondents) and experimental program (duration and exercise program, monitored parameters, results).



Figure 1. Identification of studies via databases and registers





RESULTS WITH DISCUSSION

Table1. Chronological tabular presentation of collected and analyzed research

First author and year	Sample of respondents			Experimental treatment			Results
	N	Age	Gender	Groups	Exercise program	Parameters	
¹⁹ Song et al. 2012	22	HS	M	1E1K	12 weeks of aerobic exercise: 3 times a week for 50 minutes.	Cardiovascular endurance, body composition	The results indicate that this type of exercise program can affect the improvement of cardiovascular fitness, as well as reduce body fat.
²¹ Stanimirov et al. 2012	250 m 136 y	16-17 years	M / F	1E 1K	Using anthropometry, BMI and body mass index (BMI) were measured, while the level of physical activity was measured using a questionnaire	BMI	Respondents who practiced some type of physical activity continuously had lower BMI and BMI
¹⁵ Meucci et al. 2013	22	HS	M / F	1E 1K	4 weeks of aerobic exercise during the summer holidays	Cardiovascular endurance, Body composition	Significant improvement of monitored parameters in favor of the experimental group
¹² Haugen et al. 2013	889 ж950 M	15 years	M / F	1E	Fitness program	Muscle strength, flexibility	The fitness program resulted in the development of strength and flexibility in the respondents
⁴ Bohr et al. 2013	9546	HS	M / F	1E	Fitness program through regular physical education classes	Functional abilities	The experimental program had a more significant impact on girls than on boys



⁶ Calceterra et al. 2013	22	15god.	M / F	1E	12 weeks of circular method of work (aerobics, strength training and a combination of football, rugby, volleyball and basketball)	Cardiovascular endurance, body composition	Significant differences in BMI reduction were observed. Also, the program had an impact on improving cardiorespiratory fitness
¹⁸ Resnoco w et al. 2013	19m 9ž	HS	M / F	1E	8 weeks of special physical exercise program with reduced diet on the principle of -500kcl / day	Body composition, aerobic fitness	Body weight in boys decreased by 11.4%, in girls 11.0%; the amount of fat decreased by 23.8% in boys, 21.5% in girls
²⁰ Singh et al. 2014	80	14-16	M	1E 1K	Pilates training (45 minutes a day, 3 days a week). Total duration of the experimental program: 12 weeks	Body composition (amount of fat, fat without weight)	Statistically significant results in favor of the experimental group after repeated measurements
⁷ Cruz et al. 2014	50	HS	M	1E 1K	Pilates training program: 2x a week for 7 exercises, 2-3 sets, 15-20 repetitions with 45sec. rest. Total program duration: 6 weeks	Body composition; percentage of fat; flexibility, muscle strength	The conducted experimental treatment did not result in statistically significant changes in the monitored parameters between the initial and final measurements.

This paper tries to suggest how, first of all, schools, ie physical education teachers, can promote fitness content and which are the exercise programs that most adequately affect the development of cardiovascular endurance, muscle strength, muscular endurance, flexibility, but also on body composition, which is, especially in the sensitive, adolescent age, one of the most important components.

The research included in this paper dealt with the impact of different exercise programs on certain fitness components in high school students. In relation to the goal of the study, the experimental



treatments ranged from at least six days²² up to a maximum of one school year⁹. However, considering that in most of the works, the treatment lasted 6 or 12 weeks, it can be concluded that this is the optimal period in which there can be statistically significant differences between the initial and final measurement, under the influence of certain physical activity. Authors who dealt with the influence of programmed exercise on the development of cardiovascular endurance^{3,6,8,9,10,11,15,19}. in addition to this component, they mainly studied the effects of exercise on body composition^{6,9,10,15,19}. In each of these studies, the effect of changing the intensity of exercise on the monitored parameters was examined. The obtained results showed significant progress in the development of cardiovascular endurance, but did not always give positive progress in terms of body composition, especially when it comes to the percentage of body fat, which means that the increase in exercise intensity is not correlated with body composition. In addition to body composition, as a secondary monitored parameter, the effect of programmed exercise on muscle strength was examined^{8,25}. In these studies, experimental treatment was a circular method of work, ie aerobic exercise and strength training⁸. and twelve-week fitness training²⁵. The results of both studies indicated positive changes in the monitored parameters, but statistically significant results were achieved with the circular method of work. A large number of authors have studied papers in which the development of strength under the influence of physical exercise has been studied. Avery and his colleagues² proved that load training combined with plyometric training gives statistically significant results in terms of strength development. Too, In his work, Carvalhno⁷ uses a combination of three types of stretching - passive, active and dynamic, and concludes that the greatest impact on strength development has a dynamic type of stretching. statistically significantly increase muscle strength. Three researchers have failed to prove the impact of a particular exercise program on the development of this fitness component. Namely, Ardoy¹ examined whether increasing exercise intensity had an impact on strength development, but did not come up with statistically significant differences between initial and final measurements. Tunar and his colleagues²⁴ as well as Cruz⁷ used the Pilates exercise program, but neither of these two studies confirmed a significant result in terms of muscle strength development. In none of the collected and analyzed papers was the subject of research the development of muscular endurance, which indicates insufficient research of this area and leaves scientists room to think about how they could deal with this issue in their future research. Flexibility, as one of the important fitness components,



was the subject of research in six analyzed papers^{1,2,5,16,26,24}. In all studies, the exercise program gave significant results in terms of the development of this motor ability, as well as fitness components. The reason for this, among other things, lies in the fact that flexibility is genetically determined in the smallest percentage of all motor abilities, so it can be influenced to the greatest extent under the influence of programmed training. However, up to the statistically largest differences between the initial and final measurements, of all the analyzed works, Zakas came with his associates²⁶ who applied daily stretching exercises for 10 minutes in his experimental treatment. Body composition, however, was an issue that most authors dealt with. The reason should be sought in the fact that obesity is becoming more common among adolescents and that they are less and less involved in organized physical activities, which results in increasing body composition parameters, and so the interest of experts in our field, directs most attention to solving this problem. All researchers who aimed to influence the physical composition of the target group with programmed exercise, which in this case consisted of high school students, came to statistically significant results. This encouraging fact suggests that any well-designed physical exercise organization within or outside school sections, with the right approach, can be very successful. Also, the motivation of high school students for better personal appearance and body shaping, provides an opportunity for them to be more involved in physical exercise programs which will be conducted at least two to three times a week, under the expert supervision of a physical education teacher¹⁷.

CONCLUSION

In today's time, when technological development has resulted in hypokinesia, the so-called disease of the modern age, the child's environment, especially parents and school, must be aware of the importance of physical exercise for the whole organism. Adolescence is a very sensitive period of a child's development in which it is possible to influence the fitness components in a very simple way with a simple organization of physical exercise. Analyzing the available work that has dealt with this issue, it can be concluded that all experimental treatments to some extent help to develop certain abilities to a greater or lesser extent, and it is also clear that absolutely no properly performed and dosed physical activity can have negative consequences. growth and development of children at this age, as well as their health. The aim of this study was to examine the effects of



different exercise programs on fitness components. Addressing this problem, we can conclude that the greatest impact can be achieved on the fitness component of flexibility because this ability is the least genetically determined, and, accordingly, it is possible to influence it to the greatest extent. In addition, the development of muscle strength can be influenced by different types of training, such as resistance training, fitness program of different duration and combined methods of two or more trainings. When it comes to the duration of the experimental treatment itself, it varied from research to research, but it can be concluded that the optimal time for the development of a certain fitness component is between three and six weeks.



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