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CHANGES IN EXERCISE REGIME AFFECTED BY TEACHING THE MODULE HEALTHY LIFESTYLE

***E. Bendíková**, Elena.Bendikova@umb.sk, ORCID: 0000-0001-5952-056X,*
***N.Smoleňáková**, Natalia.smolenakova@umb.sk*
Matej Bel University, Banská Bystrica, Slovak Republic

Aim. The aim of the study was to extend the knowledge about the impact of applied selected components of "Healthy Lifestyle" teaching module, during the Physical and sport education lessons, to the changes in the exercise regime of high school pupils. **Materials and Methods.** Experimental selection (ES) consisted of pupils of comprehensive studies (eight-year grammar school) (n = 23 pupils), control selection (CS) of pupils of comprehensive studies (four years grammar school (n = 26 pupils). Participants were pupils (age = 15.5 ± 0.5 years old), multiplicity of each sex was following ES = 17 boys, 6 girls; CS = 16 boys, 33 girls. Pedagogical experiment was realized at High school in city Nováky and lasted from 28.4.2017 to 27.6.2017. To obtain the necessary data we used non-standardised anonymous questionnaire, which consisted of accompanying text, information about the intention, personal data (body height, body weight, sex, age, and health problems), questions about healthy life style and volume of physical activity in pupils regime. Questionnaire was distributed and filled out in the whole research group (ES, CS) before and after the experiment. Obtained data were assessed by Chi-Square test of good correlation at 1 % and 5 % level of statistical significance. **Results.** Application of an experimental agent in the form of a specific educational program, compiled of selected components showed that a short period of theoretical impetus has proven to be satisfactory, by increasing number of high school pupils with the dominating frequency of physical activity and changes in the amount of movement in their exercise regime. Both in boys and girls, we found statistically significant difference between knowledge about importance of physical activity and its realisation in daily regime (girls input/output; Chi = 20.96/16.96 $p \leq 0.01$; boys input/output Chi = 7.88 $p \leq 0.05$/12.71 $p \leq 0.01$). **Conclusion.** The study has presented findings from the field of applied selected components in content standard of teaching module "Healthy Lifestyle" during the Physical and Sports education lessons to the changes in exercise regime of high school pupils.

***Keywords:** Students, physical activity regime, teaching module Healthy Lifestyle.*

Health and health protection represents value that requires a life-long active approach. Social health and its improvement are based on an active participation of every individual. Individual health, as a form of highest potential of health and harmonious personality development can be positively affected by healthy lifestyle. Regular participation in physical activity is one of the basic conditions for a healthy lifestyle and active health in adulthood [6]. Experts from various fields of sport and medicine science emphasize decrease in physical activity of young people, followed by its negative effects on individual health and health of the entire population [4, 22, 23]. Current problems in physical inactivity of children and youth and related prevalence of disorders motivates researchers to review the results of unhealthy lifestyle in this age category. Physical and Sport Education is one of the intervening forms of stimulation and motivation for lifelong active participation in physical activity. Through regular continuous theoretical instruction in teaching module "Healthy Lifestyle" represents physical and sport education at school area, suitable to increase the volume of information and knowledge about individual components of a healthy lifestyle [2, 16, 18, 20, 21, 29, 32, 34–36].

Regular spontaneous physical activity as a part of daily routine, enables one to live genetically determined potential health [15]. Daily regime has its own well-defined components. Child should be physically active in its spare time, if possible in the most diverse ways. Exercise regime is a systematic arrangement of all physical activities for a period of time and the sum of all the physical activities that occurs in human

life of the workload to the nature of the interest. Subjective and objective factors such as sex, age, education, health, previous physical activity, level of motor skills, physical fitness, attitudes and social status affects the content, intensity, frequency and type of exercise regime. Physical activity should be realized in terms of satisfaction, based on human needs. Dobay [17] highlights not only the importance of recreation or education, but also the need of compensation, contemplation, communication, integration and participation.

The World Health Organization (WHO) recommends participation in physical activities 60 minutes cumulatively a day [28]. High school pupils have free time in the range of 2–4 hours a day, what represents a sufficient space for active participation in hobby activities. Differences are presented in amount of pupils participating in leisure physical activity, proved by 54.2 % of respondents with regular hobby activities, while only 43.2 % of them preferred physical and sports activities [28]. The frequency of physical activity in children and youth age period is mostly presented on a level twice a week [33]. Analysis of the daily sedentary activities made by Žukowska & Szark [37] showed a slight increase in the number of hours spent inactive. 39.6 % of high school students spend 3–4 hours with sedentary activities and an alarming 29.8 % spend 5–6 hours per day with sedentary activities. Authors considered as a reason for inactivity prevalent focus on computer activities. Physical activity is absolutely natural and has a significant antidepressant effect. Child is feeling more self-confident and socially attractive. Production of endorphins affects good mood, subsequently relaxation, increases stress resistance, rest and serenity. Physical activity in adolescence supports the physiological development of the organism, improves motor performance and creates positive attitude towards lifelong physical activity [1, 3, 5, 10, 11, 19, 23, 38].

Due to pubertal changes in body composition and internal environment of the organism, it is necessary to emphasis the individual development of a child to act intentionally by creating the need of physical exercise as a compensation to daily basis. It is important to understand the specificities of each age period to select the right form of physical activity and sport. According to Łubkowska & Troszczyński [25] is the acquisition of motor skills and the level of motor abilities corresponding to the age an important prerequisite for locomotor development. Each individual should have specific regime that consists of physical activities designed to fulfil the task. Authors further states, that proper development of motoric skills affects child's medical condition but also intellect, mental state and general development of the child.

Inactivity, on the other side effects negatively the cardiovascular system, demineralized bones, increases their fragility, and decreases the strength of the muscles, resulting in loss of muscle mass and muscle fatigue [13, 14, 26, 27, 31].

Weekly exercise regime complements, in case of children and youth, physical and sport education at school, which represents the ideal environment to create lasting relationship to regular lifelong physical activity. Physical and sport education has, due to Müller et al. [29] irreplaceable role in the education and training systems. Despite of this, the large amount of secondary and high schools pupils is not participating actively in the lessons of physical and sport education [24].

Physical and sport education has undergone the process of innovation and transformation, to improve the teaching and education of pupils at all school levels. The acquisition of theoretical knowledge as basis for individual exercise regime represents educational area “Health and movement”, which actively and systematically allows schools to support the primary health care. Physical Education and Sports is divided into four modules – Health and its disorders, Physical fitness and physical performance, Sporting exercises in the regime and Healthy lifestyle, which application we used to gain the results of our study. Content of the “Healthy Lifestyle” teaching module constitutes of an exercise regimen evidence, hygiene habits and basic concepts in nutrition, composition of foods and eating habits and knowledge about eating disorders. Furthermore, knowledge and skills about health oriented physical activity, importance of regeneration, relaxation, psychohygiene, Kalokagathia and Olympism [7].

The aim of the study was to extend the knowledge about the impact of applied selected components of “Healthy Lifestyle” teaching module, during the Physical and sport education lessons, to the changes in the exercise regime of high school pupils. We assumed, that application of the experimental agent in the form of health oriented theoretical program will positively affect exercise regime of high school pupils and that there will be an increase in the volume of hours spend by doing sport in the experimental selection.

Material and methods

Pedagogical experiment was realized at High school in city Nováky and lasted from 28.4.2017 to 27.6.2017. Experimental selection (ES) consisted of pupils of comprehensive studies (eight-year grammar school) (n = 23 pupils), control selection (CS) of pupils of comprehensive studies (four years grammar school (n = 26 pupils). Participants were pupils (age = 15.5 ± 0.5 years old), multiplicity of each sex was following ES = 17 boys, 6 girls; CS = 16 boys, 33 girls (Table 1).

Table 1

Characteristics of the group (n = 72)

Factors	Experimental selection (n = 23)		Control selection (n = 49)	
	Body height, cm	Body weight, kg	Body height, cm	Body weight, kg
	173.8 ± 10.5	62.2 ± 15.5	170.9± 20.5	62.5 ± 12.7
Age	15.5 ± 0.5 years old		15.5 ± 0.5 years old	
BMI	20.5 ± 6.1		21.1 ± 5.7	

Experimental agent was specific program based on selected components of teaching module "Healthy Lifestyle" with a concentration on theoretical and practical knowledge about healthy lifestyle, its characteristics, risks and exercise regime realization. Experimental program was implemented during the Physical & Sport Education (P.S.E.) lessons. Theoretical training, during the experiment last in total 80 minutes, what represents 11 % of the total minute's subsidy of P.S.E. lessons, in the second half of the school year.

Control selection realized during the experimental period ongoing thematic units. To obtain the research data and results we applied several methods during the research. Before starting the experiment we conducted an admission assessment (25.4.2017) of various indicators identifying the level of knowledge in the teaching module "Healthy Lifestyle" (ISCED 3), selected components and some other adequate support knowledge about the positive affect of physical activity. The same assessment was realised after the end of the experiment (27.6.2017). To obtain the necessary data we used non-standardised anonymous questionnaire, which consisted of accompanying text, information about the intention, personal data (body height, body weight, sex, age, and health problems), questions about healthy lifestyle and volume of physical activity in pupils regime. Questionnaire was distributed and filled out in the whole research group (ES, CS) before and after the experiment. Obtained data were processed within the individual areas using mathematical statistics methods. Incidence of results was expressed using percentage and graphically in the form of images, in which we compared both input and output data, in some indicators specifically for boys and girls. To obtain basic information about the lifestyle of experimental selection pupils, we used "weekly exercise regime record". At first pupils recorded their physical activity during the week before the application of the experimental agent in the period from 24.4.2017 – 28.4.2017 and then after the end of the experiment from 26.6.2017 – 30.6.2017. We managed to gather complete records from 20 pupils (8 female students and 12 pupils) from ES. Exercise regime records has been processed in terms of volume of physical activity in each day of workweek (hours per day). Obtained data were assessed by Chi- Square test of good correlation at 1 % and 5 % level of statistical significance.

Results and discussion

We assumed that the experimental agent will contribute changes in the volume of weekly and daily physical activity of experimental selection (ES). Already at the initial evaluation, we found that 17.7 % (n = 23) of ES pupils took part in sporting activities "3 times a week" and 41.1 % (n = 23) "4 or more times a week". After experiment, the number of "4 or more times a week" physically active pupils didn't changed but the number of students who began to do sports "3 times a week" increased from 17.7 % to 35.3 %, what confirms the benefits of our experimental agent. In control selection occurred during the experimental period the following changes (Table 2). The highest number of high school pupils took part in sporting activities "1–2 times a week". Activity increased in group doing sport "3 times a week" from 20.8 % to 29.2 % of pupils and in a group doing sport "4 or more times a week" from 27.2 % to 29.2 %. An increase in physical activity could be affected by many factors, including the warmer summer weather, which allows participation in popular outdoor activities.

Table 2

Changes in the volume of physical activity per week in experimental and control selection (n = 72)

Groups / factors	Experimental selection, % (n = 23)		Control selection, % (n = 49)	
Volume of PA	Input	Output	Input	Output
1–2 a week	35.3	33.3	43.7	33.3
3 times a week	17.7	35.3	20.8	29.2
4 or more times a week	41.4	41.4	27.2	29.2
Inactive	5.9	5.9	8.3	8.3
SUM (Σ)	100	100	100	100

Table3

Changes in the volume of physical activity, hours per day, in experimental and control selection (n = 72)

Groups/factors	Experimental selection, % (n = 23)		Control selection, % (n = 49)	
Volume of PA	Input	Output	Input	Output
Less than 1 hour	11.8	0	20.8	10.4
1 hour	70.5	70.5	37.5	45.8
2 hours	11.8	23.5	22.9	25.0
More than 2 hours	0	0	10.4	10.4
Inactive	5.9	5.9	8.4	8.4
SUM (Σ)	100	100	100	100

The initial evaluation demonstrated the movement in the range of "3 times a week" only in 17.7 % of ES students compared with the CS (27.8 % of students), at the end of the experiment, it was up 35.3 % ES compared to 29.2 % CS. Sporting "4 or more times a week" was noted in 41.1 % of ES students but only in 29.2 % of CS students. The data above confirmed our hypothesis that positive changes in volume of physical activity will occurin ES compared to CS. We noticed similar findings in the analysis of changes in physical activity per day. We observed highest increase in the volume of "two hours a day" (23.6 % ES pupils) compare to input number (11.8 %; n = 23). We can conclude that the experimental agent induced increase of the daily physical activity of ES pupils. Amount of CS students (45.8 %, n = 46) doing sport "one hour daily" was also increased, compared to input data (37.5 %). There was also an increase in the number of pupils in CS doing sport "two hours a day" (Table 3).

Comparison of the results after the experiment demonstrated that there were 94.1 % of ES pupils but only 70.8 % of CS students doing sport "one or more hours per day", what confirms our hypothesis that health oriented theoretical program can positively affect exercise regime of high school pupils. Positive is also the fact that after the experiment there weren´t ES pupils doing sport "1 hour a day", while in CS it were still 10.4 % (n = 49) of pupils. Evaluation of output results in each research group, based on gender perspective, confirmed the increase in doing sport "three times a week" in the ES girls by 16.7 % and in the CS girls by 12.5 %. Similarly there was larger increase in ES boys by 18.2 % compared to untouched 43.8 % in CS. We also observed increase in ES girls doing sport "hour per day" by 33.3 % compared to a CS where was the increase in the number of practicing sport "hour a day" presented by 12.5 %. We´ve also recorded increase in ES girls doing sport "2 hours per day" by 18.2 % compared to CS girls, where was the increase presented by 6.3 %.

Interesting finding brought us the analysis of the relationship between knowledge and volume of physical activity in a research file (ES, CS). Girls said that physical activity is health-enhancing in the case that we take part in it "three times a week" (input 31.6 %, output 23.7 %). Boys have consistently said that the health effects of physical activity manifest after "3 times a week" physical activity (input 51.9 %, output 33.3 %). We observed significant increase in the option "daily physical activity", in a group of girls from 21.1 % to 44.7 % and in the group of boys from 14.8 % to 33.3 %.

Despite the fact that 33.3% of boys and 44.7 % of girls had at the output rating knowledge, that daily physical activity is beneficial to health, "4 or more times a week" are physically active 54.2 % boys and only 22.2 % girls. In the group of girls we observed statistically significant difference between knowledge about the required amount of physical activity and the real volume of physical activity both in input and output ratings at the 1% level of statistical significance

(girls input: Chi = 20.96,p ≤ 0.01; girls output: Chi = 16.96, p ≤ 0.01). In the group of boys statistically significant difference wasn´t observed (Chi = 0.693). In order to make physical activity health-enhancing, we should, by the opinion of girls (ES,CS), actively participate in it "45 minutes" and "60 minutes" (both 36.8 %) and by the opinion of boys (ES,CS), "60 minutes" (66.7 %). Output results presented the correct answer of daily physical activity by 47.4 % of girls and 70.4 % of boys. Positive is, that knowledge about the need of active participation in physical activity "60 minutes a day" cumulatively applies in practice 65.7 % of girls and 44 % of boys of the research group (ES, CS).The frequency of proper under standing of the participation in physical activity "60 minutes a day" cumulatively increased in ES girls from 0 % to 50 % and in ES boys from 81.8 % to 90.9 %. We found that there is a statistically significant difference between knowledge about daily exercise regimen and real time of active participation in the group boys (ES, CS) in input (Chi = 7.879; p ≤ 0.05) and output ratings (Chi = 12.71; p ≤ 0.01). Statistically significant difference between knowledge about daily exercise regime and real time of active participation in the group boys (ES, CS) was detected only in output ratings (Chi = 9.489; p ≤ 0.05). The research indicated that there is a positive parallel between the knowledge and active participation in physical activity, what confirms our hypothesis.

Students of experimental selection recorded in two periods of time (before and after application of the experimental agent), duration of physical activity in each day of working week. Analysis of the results in terms of the volume of physical activity showed a larger amount of physical activity in a group of boys compared to girls. Physical activity in the group of boys also appears more regularly in terms of hours per day. Overall girls were in each day physically active from 8 to 21.5 hours (most on Thursday) and boys from 24.4 to 42.6 hours (most on Monday). Initial evaluation of ES had a range from 32.4 hours to 60 hours per day, what represented the average range from 1.7 hours/day to 3 hours/day for one student. However, the individual assessment highlighted the difference that boys were physically active from 1.9 hours per day to 3.5 hours and girls from 1 hour per day to 2.7 hours per day. From this perspective, we can state that all the members of the ES presented in the initial evaluation standard volume of physical activity required by WHO [28].

To assess the effectiveness of realized experiment in relation to changes in the exercise regime we compared input and output data. Analysis in terms of volume of physical activity in each day of the week also showed a greater amount of physical activity in the group of boys compared to girls. Comparison of hours spent by doing sports in the group of girls demonstrated increase on Monday, from 17.9 hours to 22 hours, on Tuesday from 14.3 hours to 1.3 hours and on Friday from 8 am to 8.2 pm, but at the same time didn´t occur total increase in the number of hours per day. While initial analysis registered average duration of physical activity 15.2 hours per week, output analysis showed only an average of 14.3 hours per day. The hypothesis that there would be an increase in the volume of hours spend by doing sport in the experimental selection can´t be confirmed in the case of girls of ES for research because there was a reduction in the volume of physical activity. We´ve recorded downgrade of total hours of physical activity per week from 28.2 hours to 28 hours as well in the group of boys (Table 4). In terms of changes in the volume of physical activity per week in the whole ES we´ve recorded an average time of 42.3 hours, what presented reduction to input data (43.3 hours) what negates our the hypothesis.

Table 4

Changes in the volume of physical activity in Experimental selection (n = 23)

Gender	Girls (n = 6)		Boys (n = 17)	
Day	Input, hours	Output, hours	Input, hours	Output, hours
Monday	17.9	22	42.6	40.3
Tuesday	14.3	15.3	25.5	27.2
Wednesday	14.2	12.8	22.9	22.1
Thursday	21.5	13.3	25.4	24.9
Friday	8	8.2	24.4	25.4
SUM	75.9	71.6	140.8	139.9
Hours / day	15.2	14.3	28.2	27.9

Same as our study also Novotná & Slovaková [30] presented, that pupils know the effect of intentional physical activity to health, and that the main motive for exercising is the need to be in the company of friends, what in our opinion, as well as other authors [9], reflects to lack of "real" social contact and its incidence to mental health of child. Mostchildrenfail to engage in physical activity for the recommended 60 minutes or more eachday, with as many as one-third reporting no physical activity in the preceding 5 days [12].

The results of HBSC Slovakia presented implementation of daily physical activity only in 31 % of male respondents (age 11 and 13) and only 13 % of female respondents (age 15). Moreover, according to survey 13 years old girls had the highest numbers of passive leisure time [8]. The most common reason why children discontinue exercising is that the activity is wearisome, especially presented by teachers who don´t motivate them to do sports. Physical & Sport education at school is nowadays oriented not only to optimize and ensure optimal physical development, but based on knowledge about importance of healthy lifestyle and individual lifelong active participation on physical activities and the teacher of P.E. should be not only object of educational process but also a motivator and example to pupils. Our results presented that experimental agent in form of theoretical teaching programme contributes changes in the volume of weekly and daily physical activity of pupils and there for it confirms the importance of P.E. in primary prevention.

Conclusion

The aim of the research was to extend the knowledge about the impact of selected components of a content standard of teaching module "Healthy lifestyle" during the teaching of the Physical Education on exercise regime of high school pupils. We observed changes in the indicator of pupil daily participation in the physical activity. Output rating showed in "3 times per week" physically active pupils the increase of 17.6 %, in ES (input 17.7 % output 35.3 %) compared to almost stabile 29.8 % pupils from control selection. The action of theoretical training as a form of experimental agent increased the number of high school pupils, who take part in physical activity. Similarly, we´ve noticed the increase in the volume of daily physical activity. Analysis of output records of exercise regime, in terms of volume of physical activity per day showed a larger volume expressed as increased frequency of physical activity each day in experimental selection. At the same time, we have come to a finding that there wasn´t overall increase in the number of hours per day within ES. Based on our findings we recommend enriching the content of physical education at school and emphasizing the need for application of new physical activities in the healthy mode of life "outside" of the school and educational process.

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ИЗМЕНЕНИЯ В РЕЖИМЕ ФИЗИЧЕСКОЙ АКТИВНОСТИ ПОД ВЛИЯНИЕМ КУРСА ЗДОРОВОГО ОБРАЗА ЖИЗНИ

Е. Бендикова, Н. Смоленьакова

Университет Матея Бела, г. Банска-Бистрица, Словакия

Цель. Расширение знаний относительно влияния отдельных элементов курса здорового образа жизни, использованных в рамках уроков физической культуры, на изменения в режиме выполнения физических упражнений учениками старшей школы. **Материалы и методы.** Экспериментальная выборка состояла из учеников общеобразовательной школы (школа с восьмилетним обучением) (n = 23), контрольная группа также включала в себя учеников общеобразовательной школы (школа с четырехлетним обучением) (n = 26). В исследовании приняли участие ученики, средний возраст которых 15,5 ± 0,5 года, из них в экспериментальной группе 17 мальчиков, 6 девочек, в контрольной группе – 16 мальчиков, 10 девочек. Педагогический эксперимент проводился в школе г. Новаки с 28.04.2017 по 27.06.2017. Для получения необходимых данных мы использовали нестандартный анонимный опросник, состоящий из сопроводительного текста, информации о целях исследования, раздела для сбора персональных данных (рост, вес, пол, возраст, проблемы со здоровьем), вопросов относительно здорового образа жизни и объема выполняемой физической нагрузки учениками. Опросники были разосланы и заполнены участниками групп до и после эксперимента. Полученные данные были оценены с использованием критерия хи-квадрат с выраженной корреляцией на уровне 1 и 5 % статистической значимости. **Результаты.** Применение экспериментальной образовательной программы, состоящей из избранных компонентов, продемонстрировало, что краткосрочный период теоретического обучения доказал свою эффективность, что проявилось в увеличении числа школьников с повышенной частотой физической активности и изменении в количестве движений в выполняемых упражнениях. Как мальчики, так и девочки продемонстрировали статистически значимую разницу между знаниями о важности физической активности и их применением в повседневной жизни (девочки, входные/выходные данные: критерий хи-квадрат = 20,96/16,96 $p \leq 0,01$; мальчики, входные/выходные данные: критерий хи-квадрат = 7,88 $p \leq 0,05$/12,71 $p \leq 0,01$). **Выводы.** Данное исследование продемонстрировало результаты использования избранных компонентов учебного курса здорового образа

жизни во время уроков физической культуры, направленных на изменение режима физической активности школьников.

Ключевые слова: *студенты, режим физической активности, учебный курс «Здоровый образ жизни».*

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Елена Бендикова, PhD, кафедра физической культуры и спорта, факультет искусств, Университет Матея Бела. Tajovského 40, 974 01, г. Банска-Бистрица, Словакия. E-mail: Elena.Bendikova@umb.sk, ORCID: 0000-0001-5952-056X.

Наталья Смоленьакова, PhD, кафедра физической культуры и спорта, факультет искусств, Университет Матея Бела. Tajovského 40, 974 01, г. Банска-Бистрица, Словакия. E-mail: Natalia.smolenakova@umb.sk.

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