The effect of a proposed training programme to enhance health related components of physical fitness of the secondary school male students (17-18 years old)

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Abstract

This study aims at identifying the effect of a proposed training program on improving the components of the physical fitness related to the health of the secondary school students. Therefore, a program that contains physical fitness tests, mainly the speed and strength, had been used with a sample of 20 students who were divided into an experimental and control group. After collecting the results and statistically treating them, we found out that the program has a positive effect on developing these elements. Consequently, the study recommends promoting such programs that rely on scientific methods sport training amid the educational institutions to increase the health levels of the students.
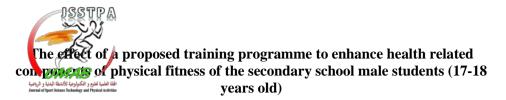
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1. Introduction

Sport is necessary for the human development. Most of the developed countries gave much importance to this side in order to shape positive citizens. They gave the sport activity new branches including the educational physical activity inside the educational institutions in order to build the human health since childhood. In Algeria, we find that a considerable number of the students suffer various health problems. Gary (2006) says that a big share of the children move to and from the schools in buses and spend much time watching TV and using computers.

Moreover, they have a low level, size, and quality of activity due to what the physical education suffers. This is what the study of Bin Saber et al. (2017) and Dahnon et al. (2018) pointed to the fitness programs are an essential part of an individual's life, helping them to carry out their daily duties efficiently and effectively without feeling tired. Al Zoabi (2009) adds, fitness has become one of the main foundations and requirements in societies for the advancement of the rising generation in terms of its physical, mental and health suitability in order to efficiently carry out the requirements of daily life. It goes beyond affecting the state of health of the rising generation and increasing the efficiency of the body's organs. This importance is due to the compatibility of health-related fitness elements such as muscle strength, and speed. Almbaiden & Sakran (2012) assert that fitness plays an important role in sports activities, resembling the physical fitness of sports activities as the basis of the house on which it is based. If the basis of the house is solid before all external conditions, it will remain coherent and solid. Despite the evolution and modernity of science and technology and the expansion of the circle of discovery and creativity, science is still inadequatein answering many questions. This necessitates the correlation of continuing scientific research with individual's lives.Accordingly, the researchers proposed a training program to resolve the problem of the lack of physical fitness among students in educational institutions in order to improve the health status of the age group under study (secondary stage).Since this program is a scientific addition to scientific research, it is based on practical scientific rules and foundations by identifying a range of activities and methods that look for the feasibility of a positive impact on the health situation, by raising the level of fitness associated with health. This fitness is represented in many physical indicators such as speed, and strength, which represent cardio-respiratory fitness, bodily structure, and musculoskeletal fitness. This study is also a

scientific and practical attempt to develop initial solutions and a real start to improve the health-related fitness of students. Thus, we find ourselves obliged to discuss following questions:

Does the proposed training programme have a positive effect on enhancing health related components of physical fitness of the secondary school male students (17-18 years old)?

This question fragmented into the following sub-questions:

Are there statistically significant differences between the pre and post-tests of the control group in enhancing the health related components of physical fitness (strength and speed) of the secondary school male students (17-18 years old) ?

Are there statistically significant differences between the post-tests of the control and experimental groups in enhancing health related components of physical fitness (strength and speed) of the secondary school male students (17-18 years old) ?

Are there statistically significant differences between pre and post-tests of the experimental group in enhancing health related components of physical fitness (strength and speed) of the secondary school male students (17-18 years old) ?

In order to answer these questions, the author proposed the following hypotheses:

The proposed training program has a positive effect on enhancing health related components of physical fitness of the secondary school male students (17-18 years old).

This hypothesis fragmented into the following sub-hypotheses:

There are statistically significant differences between the pre and post-tests of the control group in enhancing health related components of physical fitness (strength and speed) of the secondary school male students (17-18 years old).

There are statistically significant differences between the post-tests of the control and experimental groups in enhancing health related components of physical fitness (strength and speed) of the secondary school male students (17-18 years old).

There are statistically significant differences between the pre and post-tests of the experimental group in health related components of physical fitness (strength and speed) of the secondary school male students (17-18 years old).

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2. Method and Materials

We chosed the experimental method, we used the pre and post-tests measurements and divided the sample of the study into an experimental group and a control group to prove the validity of the study hypotheses.

2.1. Participants

The study population consisted male students (17-18 years old) who practiced physical education session in the Setif North secondary schools. The total of their number is 793 students. As for the sample of the study, it included 20 students from the secondary school of Al Ikhwa Ziani -Setif- who had been chosen at random. 10 students represented the experimental group while the other 10 students represented the control group. In addition, we measured anthropometric measurements variables of student   and determined their ages that it can negatively affect the results of the   main experiment.

Table 1. The characteristic homogeneity between the control and experimental groups

Variables	Size of the sample	Probabilistic value	Significance level	Significance of the differences
Height	20	0.30	0.05	Insignificant
Weight	20	0.26	0.05	Insignificant
Age	20	0.55	0.05	Insignificant

It turns out from table 01 that the probabilistic value is more than the significance level. Thus, the differences are statistically insignificant between the two groups concerning the height, weight, and age. This confirms the equivalence of the two characteristic groups before the main experiment.

2.2 Design and Procedure

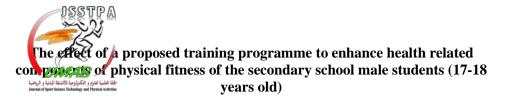### 2.2.1 Determination of study 's fieled

▪ **Human fieled :**

The study included the Setif North secondary schools male students (17-18 years old) . The members of the sample were 793 students.

▪ **Temporal fieled :**

The study was divided into two phases. The first phase was the exploratory study from 02 January 2022 till 13 January 2022. It was suspended for two weeks due to Covid-19. Then the second phase, was the main study to apply the proposed training program from 06 February 2022 till 21 April 2022.

▪ **Spatial fieled :**

The study done in sport hall of AL Ikhwa Ziani secondary school.

2.2.2 Determination of study 's variables

- **Independent variable:** The training program.
- **Dependent variable:** The indexes of fitness related to the health.
  ### 2.2.3 Tools of the study
- **Devices and tools used in the research:**
  Previous studies, internet, physical fitness tests, computer, stopwatch, decameter, whistle, and cones.
- **The physical fitness tests used in the research:**
  -The 30 m Sprint Test:
  This test aims at measuring the transitional speed. It needs a paper, pen, flat ground of no more than 50 m, stopwatch, and cones. After the warm up with a focus on the lower extremity, we make some fast run repetitions for short distances. Then, the student stands in the start line and starts running as fast as he can for 30 m when he hears the whistle. Two trials are allowed, and the best time is recorded .

  - The Squat Test:
  It aims measuring muscle strength of the legs. It needs a paper, pen, and a flat ground. The student stands with extended hands in parallel with the ground. He gets down vertically to the ground where the knee forms a 90° angle. Then, he goes back to the standing position. This is one trial. The position is repeated until the athlete loses his balance and, thus, the count stops and the trial is refused.

- The scientific criteria of physical fitness tests:
- Consistency:

Table 2. The consistency of the physical tests used in the study:

Test	Application	Arithmetic mean	Standard deviation	Consistency coefficient	Statistical significance of the consistency coefficient	
The 30 m Sprint Test	Application	4.15	0.06	0.82	Calculated T	2.86
	reapplication	4.06	0.07		Table T	2.77
The Squat Test	Application	86.83	5.07	0.99	Calculated T	14.03
	reapplication	88	4.85		Table T	2.77

We notice from table 02 that through the use of Pearson correlation coefficient, we find that calculated T is more than table T for all the physical tests. This indicates the existence of an acceptable consistency for the physical tests under study. Thus, we can rely on it in the main study.
- Validity test:

Table 3. The validity coefficients of the physical tests applied in the study:

Variables	Consistency coefficient	Validity
The 30 m sprint test	0.82	0.90
The squat test	0.99	0.99

Table 03 shows that the validity degrees are high and are achieved through the application of the square root of the consistency coefficient. This indicates that the tests have a high level of validity.

- The main experiment:

After making sure of the validity of the tests through the coefficients of the validity and consistency, we started applying the pre-tests from 06 February 2022 till 08 February 2022 to the study sample. Then, we integrated the suggested training program that contained 16 training sessions with a rate of 02 training sessions per week. The experiment was suspended for a week due to the spring holidays.
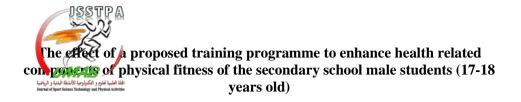
2.3 Statistical Analysis

We processed the results of the study using the arithmetic mean, the standard deviation, and the tests of consistency, validity, and objectivity. Moreover, we made T test for the related and independent samples. In addition, we used the law of the effect size and Pearson correlation coefficient through SPSS.

3. Results

3.1 Presentation of the 1st hypothesis results:

It states that there are statistically significant differences between the pre and post-tests of the control group in enhancing health related components of physical fitness (strength and speed) of the secondary school male students (17-18 years old).

Table 4. The results of the physical tests applied on the control group

The tests applied in the study		Number of the sample	The highest value	The lowest value	Arithmetic mean	Standard deviation	probabilistic value	statistical significance at 0.05
The 30 m sprint test	Pre-test	10	4.77	4.39	4.56	4.56	0.19	Statistically significant
	Post-test	10	4.97	4.30	4.65	4.65		
The squat test	Pre-test	10	103	32	56.90	56.90	0.00	Statistically significant
	Post-test	10	103	34	57.60	57.60		

From table 04, we see from the results of the 30 m sprint test of the control group in the pre-test that the arithmetic mean is 4.56 while the standard deviation is 0.12. As for the post-test, the highest value was 4.97 while the lowest was 4.30. Moreover, the arithmetic mean was 4.65 while the standard deviation was 0.25. This means that there is homogeneity because the tests are not dispersed. The probabilistic value of T student is 0.19 which is more than the significance level 0.05. Thus, the differences are statistically significant between the pre and post-tests for this group. In such test, the lowest result is the best. As for the squat test, we see that the control group got in the pre-test an arithmetic mean of 56.90 and a standard deviation of 23.14. Moreover, the highest value in the post-test was 103 while the lowest was 34. The arithmetic mean is 57.60 while the standard deviation is 22.89. This means that there is homogeneity because the tests are not dispersed. The probabilistic value of T student is 0.00 which is less than the significance level 0.05. Thus, the differences are statistically

significant between the pre and post-tests for this group.

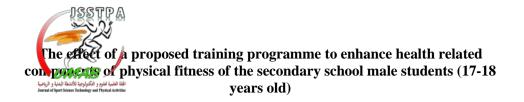**3.2 Presentation of the 2nd hypothesis results:**

It states that there are statistically significant differences between the post-tests of the control and experimental groups in enhancing health related components of physical fitness (strength and speed) of the secondary school male students (17-18 years old).

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Table 5. The results of the physical tests applied on the control group

The results of the tests in the post-measurement		Number of the ample	The highest value	The lowest value	Arithmetic mean	Standard deviation	Practical scientific significance	probabilistic value	statistical significance at 0.05
The 30 m sprint test	Control group	10	4.97	4.30	4.65	0.25	0.72	0.00	Statistically significant
	Experimental group	10	4.20	3.99	4.06	0.06			
The squat test	Control group	10	103	34	57.60	22.89	0.24	0.01	Statistically significant
	Experimental group	10	122	43	90.90	26.11			

From table 05, we see from the results of the the 30 m sprint test of the control group that the arithmetic mean is 4.65 while the standard deviation is 0.25. The highest value was 4.97 while the lowest was 4.30. Moreover, the arithmetic mean of the experimental group was 4.06 while the standard deviation was 0.06. The highest value was 4.20 while the lowest was 3.99. These results show that the experimental group outperformed the control group in this test. The arithmetic mean of the experimental group is less than that of the control group in a remarkable manner. From the probabilistic value 0.00, we see significant differences between the results of the two groups on behalf of the experimental. The value of the practical scientific significance was 0.72 which is more than 0.14. Thus, the effect size is big. From the same table, regarding the squat test, we see that the control group had an arithmetic mean of 57.60 with a standard deviation of 22.89. The highest value was 103 while the lowest was 34. The experimental group had an arithmetic mean of 90.90 and a standard deviation of 26.11. The highest value was 122 while the lowest was 43. These results show that the experimental group outperformed the control one in this test and that its arithmetic mean remarkably exceeds that of the control group. From the probabilistic value 0.01, we see significant differences between the results of the two groups on behalf of the experimental. The value of the practical scientific significance was 0.24 which is more than 0.14. Thus, the effect size is big.

3.3 Presentation of the 3rd hypothesis results:

It states that there are statistically significant differences between the pre and post-tests of the experimental group in health related components of physical fitness (strength and speed) of the secondary school male students (17-18 years old) .

Table 6. The results of the endurance test of the experimental group

The results of the tests in the post-measurement		Number of the sample	The highest value	The lowest value	Arithmetic mean	Standard deviation	Practical scientific significance	probabilistic value	statistical significance at 0.05
The 30 m sprint test	**Control group**	10	4.98	4.32	4.67	0.25	0.81	0.0	**Statistically significant**
	Experimental group	10	4.20	3.99	4.06	0.06			
The squat test	**Control group**	10	109	34	79.90	25.70	0.46	0.00	**Statistically significant**
	Experimental group	10	122	43	90.90	26.11			

From table 06, we see from the results of the transitional the 30 m sprint test of the experimental group in the pre-test that the arithmetic mean is 4.67 while the standard deviation is 0.25. The highest value was 4.20 while the lowest was 3.99. Moreover, the arithmetic mean in the post-test was 4.06 while the standard deviation was 0.06. The highest value was 2.35 while the lowest was 1.49. The probabilistic value of student T test was 0.005 which is less than the significance level 0.05. Thus, the differences between the pre and post-tests of this group are significant regarding the pre and post arithmetic means. In the squats test, the lowest result is the best. Thus, there are statistically significant results at significance level 0.05. From the same table, concerning the results of the squat test, we see that the experimental group in the pre-test got an arithmetic mean of 79.90 and a standard deviation of 25.70. The highest value is 109 while the lowest is 34. As for the post-test, the arithmetic mean was 79.90 while the standard deviation was 25.70. The highest value was 122 while the lowest was 43. The probabilistic value was 0.00 which is less than the significance level 0.05. Thus, the differences are significant between the two tests of this group on behalf of the post-test regarding the pre and post arithmetic means. Hence,
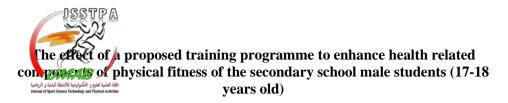
we say that there are statistically significant differences at significance level 0.05. Moreover, the practical scientific value is 0.46 which is more than the value 0.14. Therefore, the effect size of the independent variable on the dependent one in the squat test is big.

4. Discussion

There are statistically significant differences between the pre and post-tests of the control group in enhancing health related components of physical fitness (strength and speed) of the secondary school male students (17-18 years old) .From the study, the pre and post- tests measurements of the control group, we notice statistically significant differences between them in the pre and post-squat test, except the pre and post- 30 m sprint test and this is shown in table (04).The researchers explain that these results are expected as they didn't have a significant big difference between the pre and post- 30 m sprint test , cause they are considered resulting from the practice of the traditional sport training program by the control group in the physical education session and this program training caused to relatively few progress at the level of target physical fitness elements in this study cause the program also doesn't contain structured training sports exercises using scientific methods as much as it is simple pedagogical sports activities for just the development of healthy lifestyle of students . In addition, the researchers asserted that there is no improvement in the level of component of speed due to the lack of speed training involves various exercises based on acceleration by the teachers during the physical education session. These results agree with those of Al-Dairy (2009) and Al-Sharqawi (2009).

There are statistically significant differences between the post-tests of the control and experimental groups in enhancing health related components of physical fitness (strength and speed) of the secondary school male students (17-18 years old).Results appear that there are statistically significant differences between the post-tests of the control and experimental groups in enhancing the fitness elements related to the heath (strength and speed) of the secondary school male students (17-18 years old).Upon the statistical procession of the results of the post-test of the two groups, we noticed statistically significant differences on behalf of the experimental group in the 30 m sprint test and squat test,this is shown in table (05). We attribute the improvement in the results of the experimental group in comparison to the control group to the efficiency of the suggested training program which relies on special training sport sessions that directly

target the under study elements. These training sport sessions respect the scientific methodology of sports training including the endurance, density, load, repetition, and rest time. On the other hand, the traditional program used with the control group did not lead to any development due to the lack of the scientific bases of sport training and of the special sports exercises that target the physical elements in particular. Mufti (2004) notes that for athletes and people who don't practice fitness programs and want to practice it , they should use the right sport training with scientific bases. These results agree with those Mamdouh (2006) that found that the regularized training sport program had a positive effect on enhancing the level of the students of the experimental groups compared to the control ones. Moreover, the results are in accordance with those of Jovanovic et al. (2011) who found that the suggested sports training program had a positive effect on the development of the speed using the test of the 30 m sprint of transitional speed which is the test that we used in this research. From the discussion of this hypothesis and its results, we confirm that the suggested training program has an efficiency and positive contribution to the development of some components of the physical fitness related to the health (speed and strength).

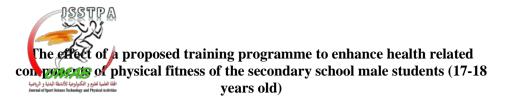There are statistically significant differences between the pre and post-tests of the experimental group in health related components of physical fitness (strength and speed) of the secondary school male students (17-18 years old).The researchers attribute the evolution in physical variables to the different content of the proposed training program, which is based in particular on the development and upgrading of the target physical capabilities (speed-strength), based on measured scientific tests and exercises. These exercises are subject to appropriate scientific and practical training methods. Through the previous theoretical study, we find that training based on the increase in muscle contractions and the gradation in increasing speed contributes to reaching the maximum speed and hence the development of the transitional speed. Furthermore, repetition using external resistance raises the strength index level, all of which are commensurate with the training program proposed in our study. The researchers also attribute this improvement to the attendance at training for 8 weeks with two training sessions per week, since sports training is characterized by the continuity that works on the cumulative positive impact on the level of the muscle system in particular and the rest of the functional organs in general, and thus continues to improve on the physical side of the

students. Ismail (1996) affirms the experts's views, however different the sources of their scientific and practical culture, that any training program inevitably leads to the development of achievement if it is built on a scientific basis in organizing the training process, programming it using appropriate and gradual intensity, and observing individual differences development, as well as the use of optimal repetitions, influential rest periods, and the supervision of specialized trainers under good training conditions in terms of space, time and tools.The results of this study coincided with the study of of Salama (2013), Raed (2011), Al-Sharqawi (2009), al Al-Dairy (2009), and Al-Bayati & Fares (2004) in terms of the change in all physical variables and the results of the study of Sharbahi (2013) in terms of the change in the index of (transitional speed). Our results also coincided with the results of the Asli et al. (2021) which emphasized the effectiveness of the proposed training program in raising the level of physical indicators (speed-strength). Moreover, Kharbit & Abdel Fattah (2018) attributes the development of motor traits to the effectiveness of the proposed physical exercises and the proposed training approach, stating that special exercises are not an alternative means of training but a very important and indispensable means. By discussing this hypothesis in light of the results, we confirm that the proposed training program has clear effectiveness and a positive contribution to improving some health-related fitness indicators.

5. Conclusion

One of the objectives of physical activity within educational institutions is to preserve and develop the health aspect in order to avoid various diseases and create a reasonably and physically sound individual.Thus, the purpose of our study was to reveal and demonstrate the effectiveness of the proposed training program's impact by testing its effectiveness in the development of various health-related physical characteristics, including (speed, strength), which were the focus of our study.The results of our study showed that there was a clear improvement in the proposed training program. This improvement is also achieved as a result of regular training and the application of frequent and varied exercises and special programs, as well as the flexibility of training that has created ease in dealing with the pupils'category, especially the age category under study (adolescence).Through this study, it can be said that teachers in educational institutions must familiarize them selves with the training
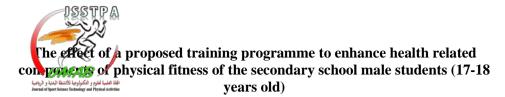
aspects, including selection, methods, and means to reach the construction of training programs, as well as knowing the training methods of the different physical attributes. All this is in anticipation of future programs that may be developed by the bodies responsible for the education sector. At the end of form this study, the researchers recommend:

- Activating such programs based on practical scientific methods, linking education and training within educational institutions to raise student's levels of health.
- The need to give great importance to the physical aspect of the student, considering that he/she is the future society, a healthy adolescence stage means a healthy adulthood stage and a healthy society.
- Update the concept of a physical education class by activating clear changes, so that it is closer to achieving health awareness through physical and sporting practice by raising the level of health-related fitness.
- Encourage researchers to conduct similar studies that are different in terms of sample, gender, age group, and health-related fitness indicators.

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