



The Effect of a Physical Fitness Program on the Level of Musculoskeletal Fitness of Male Students with Visual Impairment or Blindness

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Abstract: The present research aims to know how much impact the physical fitness program may have on the level of musculoskeletal fitness of blind male students (15-18 years old). The experimental method was used on a sample of 18 students with visual impairment or blindness at the Visually Impaired Center. These students were chosen randomly, we used various tests, namely the push-ups, sit ups tests and sit and reach test, and the results obtained indicated that there are statistically significant differences between the pretests and posttests, in favor of the posttests, for the level of musculoskeletal fitness of students with visual impairment or blindness.

Key Words: Musculoskeletal fitness - push-ups - sit ups – flexibility – person with visual impairment or blindness.



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Introduction

Person with visual impairment or blindness are considered as ordinary people like the rest of the society members have been affected by the boom that has cast a shadow over the daily life of citizens. It

has also increased the loss of their eyesight, which in itself is a reason to discourage the constant movement. This makes them vulnerable to diseases resulting from the lack of daily physical activity and elements of fitness.

The number of persons with visual impairment or blindness in the world is estimated at 285 million; 39 million of them suffer from total blindness [4], it is very likely that this number reaches 76 million by the year 2020 [18], this means that a great number of people around the world suffer from visual impairment. This visual disability has a profound impact on the individual's life because the sight is considered as one of the most important channels of communication with the outside world. Weak vision leads to difficulty in movement [3], and causes physical inactivity, which in turn makes it difficult for a person to be active, to find a specific direction and to go from one place to another. It has been reported that the physical activity level of visually impaired people is low compared to that of sighted people [13], undoubtedly, the decline in physical activity has serious consequences on health. One study found that the lack of opportunities for physical activity for visually impaired individuals certainly causes impaired physical fitness, which results in decreased capacity to perform daily tasks [8], this is exactly what has been reported in one study which indicated that the level of physical fitness of the person with visual impairment or blindness is low compared to that of people who can see [9-2], this certainly affects the health of visually impaired individuals. In this regard, another study reported that low physical fitness would adversely affect of muscle strength [12-10], this means that a person with visual impairment or blindness must have an acceptable level of health-related fitness.

Considering what has been described above, one may ask the following question: Are there any statistically significant differences between the pretests and posttests, in favor of the posttests, in the musculoskeletal fitness of person with visual impairment or blindness?

2- Methods:

Before we started the research, we obtained the approval of Mr. Hamza Makoudi, who is responsible for the traineeship of the Directorate of Social Activity and Solidarity, on 26/10/2016, Resolution No. S78, as well as the approval of Mr.

Zine El Abidine Jamal Khaladi, general secretary of the Directorate of Education, on 05/12/2016, Resolution No. 1616, because we are a certified research team, we belong to Laboratory of Physical and Sports Programs Evaluation, University of Abdelhamid Ibn Badis, Mostaganem, Algeria. Before we get approval from the samples (persons with visual impairment or blindness and sighted ones), we were keen to give them a comprehensive explanation of the tests used and the expected objective, they were given absolute freedom to take the decision to participate in the research, we did not differentiate between them on the basis of religion or sectarian affiliation, we respected their views and intellectual orientations.

We also emphasize that the research does not pose any danger to the physical and psychological health of the samples, and we bear all our responsibilities, this research also has great social value where improving the fitness of the persons with visual impairment or blindness helps to integrate them into society, and in the scientific sense, we believe that it will help us to propose an adapted programs to the persons with visual impairment or blindness to improve their fitness and thus avoid the damage caused by physical inactivity.

Finally, we confirm the complete confidentiality of the names of the samples, and undertake to use the results obtained only in scientific research, and within the limits allowed by human rights law.

2.1 Research sample:

The research sample consisted of 18 students with visual impairment or blindness aged between 15 and 18;

Table 1: Demographics of the study participants.

sample	N	Age	Height	Weight
		Mean±SD	Mean±SD	Mean±SD
Blind	18	17.74±0.83	172.29±3.76	84.88±4.72

The arithmetic average of their ages was 17.74 ±0.83 (table 01) these students were randomly selected, and three students participated in the exploratory study.

2.2 Tests used:

We applied various tests were, namely the forward sit ups, push-ups test and the sit and reach test [7-1].

2.3 The scientific foundations of the tests:

The results obtained are summarized in Table 2; they indicate that the tests show high stability and reliability. The coefficients of stability range from 0.77 to 0.91 and are considered as high. The same applies for the reliability coefficients which are in the interval from 0.87 to 0.95; they are considered as very high.

Table 2: Coefficient of stability and accuracy of the tests.

Tests	Stability coefficient	Accuracy coefficient
Push-ups	0.82	0.90
Sit ups	0.91	0.95
Sit and reach	0.77	0.87

3- Results:

The Statistical Package for Social Sciences (SPSS) version 22 was used to carry out a statistical analysis of the results obtained. Prior to applying the paired sample t-test, the Kolmogorov-Smirnov test had been used to calculate the normal distribution of the data. It was found that the results showed a normal distribution.

3.1 Research results:

Table 3: Statistical results of musculoskeletal fitness.

Tests		N	df	Mean±SD	t	Sig
Push-ups	pre-test	18	17	11.82±1.01	5.14	0.001
	post-test	18	17	18.66±0.58		
Sit ups	pre-test	18	17	15.43±1.27	9.79	0.000
	post-test	18	17	24.33±1.17		
Sit and reach	pre-test	18	17	12.91±3	4.83	0.000
	post-test	18	17	19.13±1.47		

$\alpha=0.01$.

Concerning the push-ups test, the arithmetic mean \pm standard deviation was found equal to 11.82 ± 1.01 . In the post-test, it was equal to 18.66 ± 0.58 and the t value was 5.14 with a probability value equal to 0.001, which is smaller than 0.01. Therefore, the null hypothesis is rejected but the alternative hypothesis is accepted. This means that there are statistically significant differences between the pretest scores and post-test scores, with a tendency towards the post-test scores of the arms power.

The arithmetic mean \pm standard deviation of the pre-test in the sit ups test was 15.43 ± 1.27 . In the post-test, it was 24.33 ± 1.17 and the value of t was 9.79 with a probability value of 0.000, which is smaller than 0.01. Therefore, the null hypothesis is rejected and the alternative hypothesis is accepted; this indicates that there are statistically significant differences between the pretest scores and post-test scores, with a tendency towards the post-test scores of the trunk forward bending from supine position.

Table 3 indicates that the arithmetic mean \pm standard deviation in the pretest was 12.91 ± 3 and 19.13 ± 1.47 for the post-test score of the Sit and reach test. Also, the t value was 4.83 with a probability value (p-value) equal to 0.000, which is less than 0.01. Therefore, the null hypothesis is rejected while the alternative hypothesis is accepted. This suggests that there are statistically significant differences between the pre-test scores and the post-test scores, with a tendency towards the post-test scores of the trunk flexibility.

4- Discussion:

The Table 3 indicates that the post-test scores related to upper limb strength, muscular endurance and body flexibility of individuals have improved. The increase in sport activity has positively affected their physical endurance. One study showed that person with visual impairment or blindness who engage in physical activities may develop capacities similar to those of sighted people in their fitness components [15], It was also noticed that students with visual impairment or blindness expressed stronger desire to practice physical activities after they attended the physical education classes which had a positive impact on their musculoskeletal fitness. Moreover, it was reported in one study that visually impaired or blindness people who participate in physical education classes are more likely to have a greater desire to practice sport; their participation rate increases [14], desire plays a key role in helping this type of people to improve their musculoskeletal fitness.

It is also widely believed that a small number of physical education sessions per week leads to poor physical capacities. When that number was increased, the students could achieve better performance. In this regard, young people with hearing and visual impairment pointed out that among the reasons that prevent them from participating in physical activities are inadequate programming, non-qualified teachers and low parental expectations [8-16-5-17-11].

It is therefore logical that increasing the number of physical activity sessions leads to a higher desire to practice sports. This has a positive impact on their musculoskeletal structure. It is worth noting that the applied program has a significant impact on this improvement. One study recommended developing programs that allow improving the musculoskeletal structure of person with visual impairment or blindness [6], several studies also concluded that the level of musculoskeletal fitness of the experimental sample members improved considerably after the physical program was applied [15-9].

5- Conclusion and Future Actions:

Attention must be paid to the blind, and given them the opportunity to participate in physical activities, and we recommend applying a program to improve the health-related physical fitness be applied to them, as well as to apply this study to girls who are blind.

Conflicts of interest:

The authors certify that there is no conflict of interest with any financial organization regarding the material discussed in the manuscript; we were not funded from any institution.

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