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THE EFFECT OF A PHYSICAL FITNESS PROGRAM ON THE RESPIRATORY CARDIO FITNESS OF BLIND MALE STUDENTS BETWEEN 15 AND 18 YEARS OLD

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Abstract:
Background: The present research aims to know how much impact the physical fitness program may have on the VO_2 max of blind male students (15-18 years old). The experimental method was used on a sample of 9 blind male students at the Visually Impaired Center, in the town of Tlemcen. These students were chosen randomly. **Methods:** We applied the one-mile running test to measure the level of respiratory cardio fitness. **Results:** The results obtained indicated that there are statistically significant differences between the pretests and posttests, in favor of the posttests. **Conclusion**: It was found that it is highly recommended to pay great attention to level of respiratory cardio fitness of the blind and also to provide specialized professors in the field of motor activity in special centers for the visually impaired.

Keywords: respiratory cardio fitness, blind, motor activity

1. Introduction

The number of people with visual impairment in the world is estimated at 285 million; 39 million of them suffer from total blindness (Pascolini and Mariotti, 2012). It is very likely that this number reaches 76 million by the year 2020 (U.S. Census Bureau, 1998). 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 (Chen and Lin, 2011) 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

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has been reported that the physical activity level of visually impaired people is low compared to that of sighted people (Longmuir and Bar-Or, 2000). 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 (Lieberman and McHugh, 2001). This certainly affects the health of visually impaired individuals. In this regard, another study reported that low physical fitness would adversely affect cardiovascular health (Dogra and Stathokostas, 2012). This means that a visually impaired person must have an acceptable level of health-related fitness. By doing so, the vision impaired individual certainly helps to protect his health in the first place. The present study intends to suggest an integrated physical program for blind people in order to improve their VO_2 max level. This program is highly important because it helps to protect the individual by improving his VO_2 max level now and making him physically more active in the old age. In fact, one study has shown that physically active young adults still remain active in the old age (Buckworth et al, 2013). A study was conducted on a sample of 7794 males and females. Its main objective was to find out the relationship between participation in various sports in childhood and physical activity in adulthood. After the respondents answered the questions, the researchers concluded that there is a direct relationship (positive correlation) between participation in sports in childhood and physical activity in adulthood (Tammelin, 2003).

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 cardiorespiratory fitness of blind male students?"*

2. Materials and Methods

Before we started the research, we obtained the approval from Directorate of Social Activity and Solidarity, and from the samples, because we are a certified research team, we belong to Laboratory of Physical and Sports Programs Evaluation, University of Abdelhamid Ibn Badis, Mostaganem, Algeria.

2.1 Research sample

The research sample consisted of 9 blind students aged between 15 and 18; the arithmetic average of their ages was 16.74 (0.62) (table 01); these students were randomly selected, and three students participated in the exploratory study.

Table 1: Demographics of the study participants

Sample	N	Age	Height	Weight
		Mean±SD	Mean±SD	Mean±SD
Blind	9	16.74±0.62	174.22±4.76	81.88±5.83

2.2 Tests used

We applied the one-mile running test (Winnick and Short, 1998; Sharon and Marilu, 2013). The visually impaired student was assisted by a member of the research team, with a 50 cm rope between them.

2.3 The scientific foundations of the tests

The results obtained are summarized in Table 2; they indicate that the test of the one-mile running show high stability and reliability. The coefficients of stability of VO_2 max is 0.81and are considered as high. The same applies for the reliability coefficient which are 0.90.

Table 2: Coefficient of stability and accuracy of the test

Test	Stability coefficient	Accuracy coefficient
VO_2 max	0.81	0.9

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.

From the results given in Table 3, one can note that the Arithmetic mean±standard deviation of VO_2max in the pretest was 35.82±2.59. However, in the posttest, it was 40.58 ±1.96. The value of t was found equal to 9.11 and the probability value (P-value) was equal to 0.000, which is smaller than 0.01. Therefore, the null hypothesis is rejected and the alternative hypothesis is accepted, which 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 maximum oxygen consumption.

Table 3: Statistical results of the cardiorespiratory fitness

Tests		N	df	Mean±SD	t	Sig
VO_2 max	pre-test	9	8	35.82±2.59	9.11	0.000
	post-test	9	8	40.58±1.96		

α=0.01.

4. Discussion

The results obtained in this study show that blind people have improved their post-test fitness cardiorespiratory level. This improvement is attributed to their increased physical activity because these people have been suffering from the lack of sufficient daily physical exercise due to their handicap, which imposed a certain lifestyle on them.

Furthermore, the study found that visually impaired people have a low daily physical activity level (Kosub and Oh, 2004; Aslan et al, 2012).

There is no doubt that physical activity deficiency has a direct impact on the physical fitness components which are related to health in general and to the fitness cardiorespiratory system, in particular. Indeed, the results of several research studies suggested that the lack of physical activity in people with disabilities has an impact on their cardiorespiratory fitness, body composition and muscle strength and endurance (Vliet et al, 2006; Frey et al, 2008; Carmeli et al, 2008).

It is widely known that the visually impaired falls within the category of handicapped people. Several previously reported studies on blind people have indicated that the lack of physical activity reduces the cardio-respiratory fitness as well as the muscle and bone strength (Hinkson and Curtis, 2013; Capella and McDonnal, 2007; Sit et al, 2007; Frey and Chow, 2006).

For this reason, it was decided to increase the amount of their physical activity which is supposed to affect positively their maximum oxygen consumption. If the effect of physical inactivity on VO_2max is negative, then logically the increased physical activity must have a positive impact on the person. This has been confirmed by various studies, which concluded that visually impaired people, who practice physical activities, see noticeable improvement in their physical fitness level (AAHPERD, 1999; Gleser et al, 1992; Ponchillia at al, 2002). Obviously, cardiorespiratory fitness is one of the components of physical fitness.

The above-mentioned improvement can certainly be attributed to the opportunity given to this category of people to participate in physical activities because they usually do not have the chance to practice sport for several reasons, i.e. parents fearing for their children's security or even psychological barriers. In fact, 58.9% of visually impaired people said that they generally are not given the opportunity to participate in physical education classes. (Ponchillia at al, 2008) However, when they were allowed to participate in sport activities, their VO_2max was improved. Various studies found out that if visually impaired people are given the chance to participate in normal physical activity, then they will surely improve their physical fitness, which may become comparable to that of a sighted person (Ponchillia at al, 1992; Blessing et al, 1993; Williams et al, 1996). One study indicated that visually impaired people should be offered more opportunities to participate in physical activities because they can improve their health and fitness effectively through physical activity (Lieberman et al, 2010).

Furthermore, the results obtained showed that the applied physical fitness program had a fundamental role in this improvement; this program involved various physical exercises and the students were given great flexibility in their actions. This has, undoubtedly, contributed to improve their VO_2max, as a great deal of research indicated that sports programs develop and enhance fitness components (Miszko et al, 2004; Larsson and Frandin, 2006; Surakka and Kivela, 2008). Moreover, many other works showed that the cardiovascular fitness level of individuals in the study sample to

which the program was applied had remarkably improved (Chao-Chien and Shih-Yen, 2011; Caroline and Elizabeth, 2016; Cristiana et al, 2015).

4.1 Recommendations

- Pay attention to the level of fitness components associated with the health of blind people;
- Recruit competent teachers specialized in adapted motor activity in Centers for the Visually Impaired;
- Inform blind students about the importance to increase their level of physical activity.

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