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Effect of an 8-Week High Intensity Interval Training Programme on Cardiorespiratory Parameters of Male Athletes of Tai Solarin Federal University of Education Ijagun Ogun State

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Abstract

The main objective of the study was to determine the effects of an 8-week high-intensity interval training program on the cardiorespiratory parameters of male athletes at Tai Solarin University of Education in Ijagun, Ogun State. The study's target population consisted of all male undergraduate athletes at Tai Solarin Federal University in Ijagun, Ogun State. Fourteen volunteers were chosen at random from the population to make up the study's sample. This study adopted the one group Pre-test/Post-test research design. It is one of the pre-experimental designs where a single group is observed after a treatment, often without a control group. The participants were exposed to pre-test measurements. After the pre-test measurement, participants were exposed to 8-week interval training. Data was collected for pre-test and post-test using the following standardized instruments: 400-metre running track (for Cooper's 12-minute run test for Vo2 max), the PCV micro-haematocrit centrifugation, and the sphygmomanometer for measuring Heart rate and blood pressure were all standardised instruments. The acquired data was evaluated using the descriptive statistics of mean and standard deviation, and the hypotheses were analysed at the 0.05 level of significance using the inferential statistics of the Student t-test. Five hypotheses in all were developed, tested, and all of them were found to be false. According to the study, male athletes' resting heart rate, resting systolic and diastolic blood pressure, packed cell volume, and maximum oxygen absorption were all affected by 8-week interval training. Given the results, it was recommended that male athletes should Coaches should include high-intensity interval training to improve cardiorespiratory variables, while proper enlightenment campaign should be organized for male athletes on the effectiveness of interval training at high intensities programme in reducing/improving the resting heart rate which is an evidence of improved cardiovascular health and endurance.

Keywords: Interval Training, Blood Pressure, Heart Rate, Haematocrit, Maximum Oxygen consumption

INTRODUCTION

Students in postsecondary educational institutions continue to have the lowest rates of participation in regular physical exercise or training, and one of the main causes of this trend is time constraints brought on by rigorous study schedules. Student athletes have to strike a balance between their regular physical training and academic obligations, which may jeopardise their level of fitness and health. Regular physical exercise is one of the finest and least expensive ways to promote cardiorespiratory health and optimal performance. A healthy cardiorespiratory and cardiovascular systems is important for the efficiency of the body in delivering oxygen and nutrients to the body tissues, maintaining blood pressure, supporting physical performance and general health, as well as reducing the risk of cardiovascular diseases (Hall, 2021; Kenny et al., 2020).

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The heart, lungs, blood, and blood vessels make up the cardiorespiratory system. It is in charge of maintaining homeostasis, eliminating waste products from metabolism, such as carbon dioxide, and giving the cells and tissues nourishment and oxygen. Physical activity, growth, and general health are all supported by an effective cardiorespiratory system. Measures that show how well the cardiorespiratory parameters measure how well the cardiovascular and respiratory systems are functioning. Heart rate (HR), blood pressure (BP), respiration rate (RR), oxygen saturation (SpO2), maximum oxygen consumption (Vo2 max), cardiac output, stroke volume, vital capacity, and haematological variables are a few important cardiorespiratory markers. It has been demonstrated that exercise increases heart rate and stroke volume, both of which are factors that calculate the heart's output (Hawkins, 2007).

According to McArdle et al. (2015) and Kenny et al. (2020), this causes an increase in the amount of blood that circulates throughout the body during activity, an increase in the amount of nutrients, oxygen, and other materials delivered to the working muscles, and an increase in the rate at which waste is eliminated. To prevent long-term conditions like diabetes, cancer, obesity, high blood pressure, coronary heart disease, and cardiovascular disorders, and depression, exercise is essential (Booth et al., 2012). "Walking is Man's best Medicine" and "if there is a deficiency in food and exercise, the body will fall sick" are attributed to Hippocrates, the father of Western medicine (Murphy, et al., 2020). Physicians have prescribed exercise as medicine for their patients for centuries (Sylow & Richer, 2019). Despite the well-established benefits of exercise, Physical inactivity is a global issue, with about 1.4 billion individuals not meeting public health guidelines for recommended levels of exercise (Azadpour et al., 2017).. To attain significant health advantages, the World Health Organization's 2020 guidelines on physical activity and sedentary behaviour suggested engaging in at least 150 to 300 minutes of moderate-intensity physical activity or 75 to 150 minutes of vigorous-intensity aerobic exercise each week. However, the most frequent obstacle to maintaining regular exercise has been found to be a lack of time (Cassidy et al., 2015). Thus, interval training—which is marked by very brief bursts of intense activity alternating with rest or low-intensity exercise for recovery—has been the subject of recent research.

According to Buchheit and Laursen (2013), it consists of short bursts of high-intensity exercise carried out with a "near or maximal all out" effort that corresponds to less than 90% of maximum oxygen uptake (V02max). High Intensity Interval Training (HIIT) with submaximal efforts that elicit > 90% of V02 max (Bishop et al., 2019) or > 75% of peak power (Weston et al., 2014) is one of the most popular interval training paradigms. Athletes of higher institutions of learning face challenges balancing academic schedules and physical training, potentially impacting cardiorespiratory fitness and health. Despite its importance, many struggle to engage in regular exercise due to time constraints. As a result, coaches, human kinetics instructors, and other sports and health experts have persisted in looking for shorter-duration structured exercise programs that can accomplish the same goals of fitness and physiological adaptations as longer-duration ones.

Although High Intensity Interval Training (HIIT) provides a quick fix, it's unknown how exactly it affects this population. Therefore, the goal of this study was to determine how an 8-week high-intensity interval training program affected the cardiorespiratory parameters of male athletes at Tai Solarin Federal University of Education, Ijagun, Ogun State, including resting heart rate, resting systolic and diastolic blood pressure, packed cell volume, and maximum oxygen consumption.

Hypotheses

The following theories were developed and examined at the significance level of 0.05.

1. 8-week high intensity interval training will not have substantial impact on the heart rate at rest of male athletes.
2. There is no significant male athletes impact of eight weeks of high-intensity interval training on the systolic blood pressure at rest of male athletes
3. Male athletes' resting diastolic blood pressure will not be significantly affected by an 8-week high-intensity interval training program.
4. There is no significant 8-week high-intensity interval training's impact on

the packed cell volume of male athletes.
5. 8-week high intensity interval training will not have significant effect on the maximum oxygen uptake of male athletes..

RELATED WORKS

Oworu (2023) pointed out that while a resting heart rate ranges from 60-80 bpm in sedentary adults, an elite/trained heart rate might be as low as 40 b.pm which shows evidence of better cardiovascular endurance. Whyte et al., (2010) who shown a notable drop in the systolic blood pressure at rest in sedentary overweight adult following a sprint interval training programme lasting 2 weeks.

Soltani et al. (2019) reported a decrease in the resting systolic blood pressure of hypertensive patients after eight weeks of two high intensity interval training protocols, including a very short HIIT (30s/30s) at 80% of Vo2 peak, 30s recovery, and 40 minutes total session; thus, HIIT normalises blood pressure and may have protective effects against the development of hypertension (Pescatello et al., 2015) and can reverse the clinical diagnosis of hypertension in a relevant proportion of patients (Alvarez et al., 2018). McArdle et al., (2006) posited that exercise training lowers and normalizes blood pressure of both trained and sedentary individuals by reducing blood vessel stiffness, so blood can flow easily, thereby improving cardiovascular health and performance

Burns and Tran (2012) which showed significant reduction in the resting diastolic blood pressure in normal weight adolescents following a structured high intensity interval training intervention lasting few weeks. After eight weeks of two high intensity interval training protocols, which included a very brief (30s/30s) at 80% of VO2 Peak, 30s recovery, and a 40-minute total session, Soltani et al. (2019) observed a decrease in the resting diastolic in hypertension individuals.

In a similar vein, Olea et al. (2017) found that a 24-cycle section of an 8-week HIIT routine significantly reduced the resting diastolic blood pressure of 22 hypertensive people, changing their diagnostic clinical baseline from hypertensive to nomotensive. As a result, HIIT lowers blood pressure and may prevent the onset of hypertension. (Pescatello et al., 2015) and can lead to reversal of clinical diagnosis of hypertension in a relevant proportion of patients (Alvarez et al, 2018). In a study on comparative physiological adaptation of athletes Oliyide (1989) found a significantly low resting systolic diastolic blood pressure values in trained soccer, basketball and handball players, showing chronic effect of training.

Odedeyi and Igbanugo (1992) which reported a reduction in the value of hematological parameters, normally called sport anemia following a 12-week rigorous aerobic and anaerobic training, adding that exercise will lead to increased red blood cells and hemoglobin degradation due to hemolysis and erythroglytes fragility, but does not result into pathological bilirubin accumulation as in jaundice. Except the liver is diseased, it has ability to metabolize increased bilirubin in the blood as soon as much of it is formed due to haemolysis under normal condition. (Odedeyi & Igbanugo, 1992).

Ceclan, et al (2014) have also reported significant decrease in the hemoglobin in aerobic dance group, they reported that this reduction may be associated with malnutrition rather than exercise. A lowered hematocrit among skilled athletes, especially in endurance sports, is sometimes referred to as "sports anemia." Exercise can reduce red blood cells despite increased erythropoiesis by compression of red blood cells and intravascular haemolysis, which is brought on by mechanical rupture when red blood cells pass through capillaries in contracting muscles (Telford et al., 2015).

Trilk et al. (2011) that overweight sedentary women after completing a four-week sprints interval training programme. Also, in agreement with the result obtained in the study is the submission of Dausin et al., (2007) who reported significant increase in maximum oxygen uptake of athletes in response to a high-intensity interval training program lasting eight weeks. In a similar vein, Warbuetom et al. (2004) found that 12 weeks of high-intensity interval training increased untrained men's maximal oxygen uptake. According to Olea et al. (2017), a rise in VO2 max of hypertensive and normotensive subject following 24 cycling sessions of 8 weeks high intensity interval training programme. A high Vo2 max indicates that the person's circulatory system can effectively supply more blood and oxygen to the working muscles and that the heart can pump a significant amount of blood with each beat.

METHODOLOGY

This study adopted the one group Pre-test/Post-test research design. It is one of the pre-experimental designs where a single group is observed after a treatment, often without a control group (Shrutika, 2023). This design establishes a cause-effect relationship between the variables in the two groups. All male undergraduate athletes at Tai Solarin Federal University of Education in Ijagun, Ogun State, made up the target population. The sample for this study consisted of 14 male athletes, who were chosen using a simple sampling technique. The experimental design is a blueprint of the process that allows the researcher to test his hypotheses by reaching valid conclusions about relationships between independent and dependent variables (Key 1997). The participants were drawn from Soccer (5), Hand-ball (3), Basketball (2), Tennis (2) and Track (2). This is to give equal opportunity to every member in the population to be part of the sample. The participants signed the informed Consent Form and were certified fit by the University Medical Doctor. The participants were briefed on the protocol involved, and were also instructed to desist from smoking, drinking and eating few hours before each training session.

The following instruments were used for data collection:

1. **Digital sphygmomanometer (Omron Model):** This was used to measure the individuals' heart rates and blood pressure. It is calibrated from 0mmHg - 300mmHg.
2. **Stethoscope (Litman Model):** This was used to monitor the cardiac condition of the participants during training for safety reasons.
3. **Packed cell Volume Measurement instruments (PCV reader, clay sealer, capillary tube, centrifuge, EDTA-anticoagulant bottle):** These instruments were used to measure the packed cell volume (PCV) of the subjects using microhematocrit centrifugation technique by qualified laboratory technician at the Tai Solarin Federal University of education Medical Center.
4. **Digital Weighing Scale (Omron Model):** Used for measuring the weights of the participants, in kilogram (kg).
5. **Calibrated wall:** This was used to measure of participants height in metre.
6. **Stop Watch (Hever brand)** calibrated from 0-30 minutes seconds with minute hands reading from 0-15 minutes was used for the study.
7. **400 meters running track:** An athletic track where the training programme was carried out. It was also used to estimate the maximum oxygen intake (vo2 max) of the participants using cooper's 12 minutes run test (Cooper, 1968). The idea was to cover as much distance as possible in 12 minutes.
8. **Recording sheet:** Used for recording the pre-training and post-training data of the participants. After being certified fit by the University Medical Doctor, the participants were required to sign an informed consent form.

The pre-test measurements were conducted for all the participants. After the pre-test, all the participants were exposed to eight weeks of interval training at a high intensity. The subjects were asked to sit in an upright position and rest for at least 10 minutes before taking their basal measurement. The cuff of the sphygmomanometer was worn around the participant's upper arm, while the air tube of the cuff was passed through the top in line with the palm. The cuff was positioned at a distance of two centimetres to three centimetres above the elbow. The cuff was held at the same level with the participant's heart. The start button was then pressed. Air is released and the values on the display count downward when the goal value is attained. The heart symbol illuminates and a buzzer sounds as soon as the gadget detects a pulse. The subject's heart rate and systolic and diastolic blood pressure are displayed simultaneously on the monitor of the sphygmomanometer. The displayed values were then recorded. The Packed Cell Volume test was carried out at the Tai Solarin University of Education Medical Center by qualified Medical Laboratory Scientists. The blood sample of each participant was collected and subjected to Hawkley's the microhematocrit centrifugation technique, and all the results of the tests were recorded.

To estimate the maximum oxygen consumption of the subjects, the Cooper's 12-minutes run test designed by Kenneth Cooper in 1968 was adopted. In this method, the subjects run or spend a total of 12 minutes walking 400 meters on a running track. The goal was to travel as far as possible in 12 minutes. Each athlete's total distance (measured in meters) in 12 minutes was determined by multiplying the number of full laps by 400 plus the final full lap's distance (measured in meters). After converting the distance in meters to kilometres, the Vo2max was estimated using the following formula: (Vo2 Max (ml/kg/min) = (22.35 x distance covered in km - 11.288). There were three training days each week, interspaced by a free day in which no training was done. Training days were on Mondays, Wednesdays and Fridays. An interval training programme using the progressive over load principle was adopted. A warm up lasting five minutes was done by all participants before the beginning of every high intensity interval training session. Each training session lasted for maximum of 30 minutes. The first and second weeks of training comprised 100m walk, 100m jog, 100m walk and 100m jog, round the track for five rounds at 50% Max HR in each training session.

From the third week to fourth week, the workload was increased to 100 meters of jogging, running, and jogging set up to 75% Max HR. From the fifth to eight weeks, the training programme graduated to 100m run, 100m sprint, 100m run and 100m sprint, set up to 95% of Max HR. This was as hard as the participants could go and it elicited high fatigue levels by the end of the sessions. At the end of each training session, a cool down lasting at least five minutes was observed by the participants. After completing the 8-week training programme, both experimental and control groups were exposed to post-test measurements. Inferential statistics of the paired student t-test were employed to assess the null hypotheses at the 0.05 level of significance, while descriptive statistics of the mean and standard deviation for the subject physical attributes were utilised to evaluate the data.

RESULTS AND DISCUSSION

Results

The results were presented in tables below:

Hypothesis One (Ho1): 8-week interval training will not have substantial impact on the heart rate at rest of male athletes.

Table 1. T-test statistical analysis on 8-week interval training on resting heart rate.

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One-Sample t-test						
	Test Value = 0					
	T	**Df**	**Sig. (2-tailed)**	**Mean Difference**	**95% Confidence Interval of the Difference**	
					Lower	**Upper**
Heart Rate (Pre-Test)	41.917	13	.000	73.000	69.24	76.76
Heart Rate (Post-Test)	51.198	13	.000	67.857	64.99	70.72

The t-test analysis results, as displayed in Table 1 above, indicate that the significance value of 0.05 at degree of freedom 13 is more than the p value of 0.000 for both the pre-test and post-test (heart rate). The null hypothesis, which claims that there will be no significant change in the resting heart rate of male athletes before and after an 8-week high intensity interval training program, is rejected since the p-value is less than the significance value (p.v. = 0.000< 0.05). This implies that high intensity interval training programme has significant effect on the heart rate of participants and this enhances cardiovascular health and motor performance due to lowered resting heart rate.

The second hypothesis (Ho2): There is no discernible impact of 8-week interval training on resting systolic blood pressure of male athletes.

Table 2. T-test analysis on 8-week high intensity interval training on resting systolic blood pressure of male athletes.

One-Sample t-test						
	Test Value = 0					
	T	Df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
resting systolic blood pressure (pre test)	48.576	13	.000	118.929	113.64	124.22
resting systolic blood pressure (post test)	60.524	13	.000	112.357	108.35	116.37

For both the pre-test and post-test (resting systolic blood pressure), the t-test analysis result in Table 2 above demonstrates that the p value of 0.000 is below the significance threshold of 0.05, i.e., p-value=0.000<0.05 (level of significance) at the degree of freedom of 13. The null hypothesis, which claims that there will be no significant difference in the resting systolic blood pressure of male athletes before and after an 8-week high intensity interval training program, is rejected because the p. value is less than the significance level. This indicates a significant difference in the participants' resting systolic blood pressure.

Hypothesis three (Ho3): Male athletes' resting diastolic blood pressure will not be significantly affected by an 8-week high-intensity interval training programme

Table 3. T-test analysis on 8-week high intensity interval training on resting diastolic blood pressure on male athletes.

One-Sample t- test						
	Test Value = 0					
	T	Df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
resting diastolic blood pressure (pre test)	28.077	13	.000	69.786	64.42	75.16
resting diastolic blood pressure (post test)	35.095	13	.000	65.357	61.33	69.38

For both the pre-test and post-test (resting diastolic blood pressure), the t-test analysis result in Table 3 demonstrates that the p value of 0.000 is below the significant level of 0.05, i.e. (p-value=0.000<0.05 level of significance at the degree of freedom of 13). The null hypothesis, which claims that there won't be a significant impact on male athletes' resting diastolic blood pressure before and after an 8-week high intensity interval training programme, is rejected since the p-value is smaller than the significant value. This suggests that the participants' resting diastolic blood pressure was significantly impacted by the high-intensity interval training program. It is implied that the training improves both motor function and cardiovascular health by maintaining a healthy blood pressure.

Hypothesis four (Ho4): Eight weeks of high intensity training had no discernible impact on the packed cell volume of male athletes.

Table 4. T-test analysis on 8-week high intensity interval training on packed cell volume (pcv) of male athletes.

One-Sample t-test						
	Test Value = 0					
	T	Df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Packed Cell Volume(Pcv)(Pre-est)	52.488	13	.000	42.071	40.34	43.80
Packed Cell Volume(Pcv) (Post-Test)	35.582	13	.000	40.000	37.57	42.43

The null hypothesis, which asserts that there will be no significant effect on the packed cell volume of male athletes prior to and following an 8-week high intensity training program, is rejected because the p value of 0.000 for both the pre-test and post-test (packed cell volume (PCV)) is below the significance level of 0.05, i.e. (p-value=0.000<0.05 level of significant at degree of freedom 13).

Hypothesis five (Ho4): Eight weeks of intense interval training will not have significant effect on the maximum oxygen uptake of male athletes

Table 5. T-test analysis on Male athletes' maximal oxygen uptake after eight weeks of high-intensity interval training.

One-Sample T-Test						
	Test = 0					
	T	Df	Sig. (2-Tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Maximum Oxygen Uptake (V02 Max) (Pre-Test)	37.685	13	.000	56.007	52.80	59.22
Maximum Oxygen Uptake (V02 Max) (Post-Test)	33.597	13	.000	61.624	57.66	65.59

Table 5 displays the Vo2 max t-test analysis findings. For both the pre-test and post-test maximum oxygen uptake (V02 max), the p-value of 0.000 is less than the significance threshold of 0.05, meaning that at degree of freedom 13, the p-value is less than the 0.05 level of significance. The null hypothesis, which claims that there won't be any significant impact on male athletes' maximum oxygen consumption before and after an 8-week high-intensity internal training program, is rejected since the p-value is lower than the significance value. This implies that Interval training at a high intensity has significant effect on the Vo2max of participants positively as the rate of oxygen consumption increases, leading to improvement in cardio respiratory fitness.

DISCUSSION

Hypothesis one which states that 8-week interval training will not have substantial impact on the heart rate at rest of male athletes was rejected, indicating that 8-week interval training had substantial impact on the heart rate at rest of male athletes. This finding is in line with Grace et al. (2018) also revealed a notable decrease in the resting heart rate of sedentary ageing men following a 6-week sprint interval training. Oworu (2023) pointed out that while a resting heart rate ranges from 60-80 bpm in sedentary adults, an elite/trained heart rate might be as low as 40 b.pm which shows evidence of better cardiovascular endurance.

The second hypothesis asserts that there is no discernible impact of 8-week interval training on resting systolic blood pressure of male athletes was rejected. This implies that 8-week high intensity interval training had effect on resting systolic blood pressure of male athletes. This finding is in support of Whyte et al., (2010) who shown a notable drop in the systolic blood pressure at rest. in sedentary overweight adult following a sprint interval training programme lasting 2 weeks. Soltani et al. (2019) reported a decrease in the resting systolic blood pressure of hypertensive patients after eight weeks of two high intensity interval training protocols, including a very short HIIT (30s/30s) at 80% of Vo2 peak, 30s recovery, and 40 minutes total session; thus, HIIT normalises blood pressure and may have protective effects against the development of hypertension (Pescatello et al., 2015) and can reverse the clinical diagnosis of hypertension in a relevant proportion of patients (Alvarez et al., 2018). McArdle et al., (2006) posited that exercise training lowers and normalizes blood pressure of both trained and sedentary individuals by reducing blood vessel stiffness, so blood can flow easily, thereby improving cardiovascular health and performance

The third hypothesis, which claimed that an 8-week high-intensity interval training programme would not significantly affect male athletes' resting diastolic blood pressure, was disproved. had effect on resting diastolic blood pressure of male athletes. This finding corroborates that of Burns and Tran (2012) which showed significant reduction in the resting diastolic blood pressure in normal weight adolescents following a structured high intensity interval training intervention lasting few weeks. After eight weeks of two high intensity interval training protocols, which included a very brief (30s/30s) at 80% of VO2 Peak, 30s recovery, and a 40-minute total session, Soltani et al. (2019) observed a decrease in the resting diastolic in hypertension individuals. In a similar vein, Olea et al. (2017) found that a 24-cycle section of an 8-week HIIT routine significantly reduced the resting diastolic blood pressure of 22 hypertensive people, changing their diagnostic clinical baseline from hypertensive to normotensive. As a result, HIIT lowers blood pressure and may prevent the onset of hypertension. (Pescatello et al., 2015) and can lead to reversal of clinical diagnosis of hypertension in a relevant proportion of patients (Alvarez et al, 2018). In a study on comparative physiological adaptation of athletes Oliyide (1989) found a significantly low resting systolic diastolic blood pressure values in trained soccer, basketball and handball players, showing chronic effect of training.

The fourth hypothesis asserts that there is no discernible impact of 8-week high interval training on the packed cell volume of male athletes was rejected. This implies that 8-week high interval training had effect on the packed cell volume of male athletes. This finding agreed with Odedeyi and Igbanugo (1992) which reported a reduction in the value of haematological parameters, normally called sport anaemia following a 12-week rigorous aerobic and anaerobic training, adding that exercise will lead to increased red blood cells and haemoglobin degradation due to haemolysis and erythroglytes fragility, but does not result into pathological bilirubin accumulation as in jaundice. Except the liver is diseased, it has ability to metabolise increased bilirubin in the blood as soon as much of it is formed due to haemolysis under normal condition. (Odedeyi & Igbanugo, 1992). Ceclan, et al (2014) have also reported significant decrease in the haemoglobin in aerobic dance group, they reported that this reduction may be associated with malnutrition rather than exercise. A lowered haematocrit among skilled athletes, especially in endurance sports, is sometimes referred to as "sports anaemia." Exercise can reduce red blood cells despite increased erythropoiesis by compression of red blood cells and intravascular haemolysis, which is brought on by mechanical rupture when red blood cells pass through capillaries in contracting muscles (Telford et al., 2015).

Hypothesis five which states that 8-week high intensity interval training will not have significant effect on the maximum oxygen uptake of male athletes was rejected, indicating that Male athletes' maximal oxygen uptake was impacted by eight weeks of high-intensity interval training. This result is consistent with the improvement in Vo2 Max (pre: 21.6 ml/kg/min and post: 24.5 ml/kg/min) reported by Trilk et al. (2011). Male athletes' maximal oxygen uptake was impacted by eight weeks of high-intensity interval training. This result is consistent with the improvement in Vo2 Max (pre: 21.6 ml/kg/min and post: 24.5 ml/kg/min) reported by Trilk et al. (2011) that overweight sedentary women after completing a four-week sprints interval training programme. Also, in agreement with the result obtained in the study is the submission of Dausin et al., (2007) who reported significant increase in maximum oxygen uptake of athletes in response to a high-intensity interval training program lasting eight weeks. In a similar vein, Warbuetom et al. (2004) found that 12 weeks of high-intensity interval training increased untrained men's maximal oxygen uptake. According to Olea et al. (2017), a rise in VO2 max of hypertensive and normotensive subject following 24 cycling sessions of 8 weeks high intensity interval training programme. A high Vo2 max indicates that the person's circulatory system can effectively supply more blood and oxygen to the working muscles and that the heart can pump a significant amount of blood with each beat.

CONCLUSION

1. The following conclusions were drawn from the study's findings:
2. That athletes' resting heart rates were lowered by a high-intensity interval training programme
3. That athletes' resting systolic and diastolic blood pressure decreased as a result of a high-intensity interval training programme;
4. That athletes' packed cell volume decreased as a result of a high intensity interval training program;
5. That high intensity interval training programme elicited an increment/improvement in the maximum oxygen uptake of the athletes.
6. High intensity interval training increased maximum oxygen uptake (V02).

RECOMMENDATIONS

The following suggestions are given in light of the study's findings: -

1. Coaches should incorporate high intensity interval training into male athletes to enhance their cardiovascular parameters
2. There should be proper enlightenment campaign of male athletes on the effectiveness of interval training at high intensities programme in reducing/improving the resting heart rate which is evidence of improved cardiovascular health and endurance.
3. The high intensity interval training programme should be adopted for all team sports that require long duration since it improves the physiological indices that are pertinent in such sports.
4. Male athletes should be enlightened and encouraged to participate in high intensity interval training programme as it has been found to elicit reductions in the individuals' systolic and diastolic blood pressure, thereby improving health and fitness and preventing cardiovascular diseases.
5. Male athletes should be made aware of how well high intensity interval training (HIIT) stimulates erythropoiesis, ensuring that the body's tissues and organs receive an adequate supply of oxygen and nutrients.

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