The Impact of the Continuous Training on the Cardio Respiratory Endurance of the Students of Basic Stage in the Directorate of Education of Sahab`s District -Jordan

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Abstract

 This study aimed to identify the impact of the continuous run training of the moderate intensity on the efficiency of the cardio respiratory of the students of basic stage in Sahab`s directorate of education and to identify the relation between the distance which is covered in the Cooper 12 minute and between the maximal oxygen consumption of the basic level students . The sample of the study which is consisted of (20) students, was selected randomly and distributed into two homogenous groups; the experimental group(10 students) and the control group(10 students). The training program lasted for 6 weeks with three times per week, with 60 minutes for each training unit in order to develop the cardio respiratory endurance of the experimental group. The results of the study showed that there were statistically significant differences between the pre and post measures regarding the variables ;Resting heart rate, the distance which is covered in the Cooper 12 minute and the maximal oxygen consumption(mm/kg/min) in favor of the pre-measure of the experimental group and the results also revealed that there was an inverse correlation between the maximal oxygen consumption and between the distance which is covered in the Cooper 12 minute. The results also showed that the proposed training program has a great effective contribution in developing the cardio respiratory endurance of the sample of the study.

Keyword: Continuous Training, Basic Stage, Cardio Respiratory, Directorate of Education.

Introduction :

The scientists of physiology of the athletic training assure that the efficiency of the cardio respiratory system is one of the major component of life and fitness(Astrand&Rodahl,1997,Mcardle et al,1986).

 The best indicator of the fitness of the cardio respiratory which is known in the sport physiology by the maximal oxygen consumption (VO2MAX) which is defined as the individual capability to consume oxygen during exerting physical effort and it is measured by litre/min while the relevant maximal of oxygen consumption is defined by the number of mm/min/kg of the body weight (Abo Alla& Ahmad,1994).

  Because of the importance of the maximal oxygen consumption (VO2MAX) in revealing the extent of the efficiency and the fitness of the Cardio Respiratory Endurance , many scientific studies started to look for the ideal training methods for development and the proportions of the improvement in it as compared to the period and the length of training programs , whereas other studies discussed the physiological comparatives of the impact of the training programs on different samples as male and females(a comparison between athletes of different sports). For example , the studies of Ronal et al,1988,Douglas,E,1988, Howard et al ,1984,and Emma et al,1983), while the continuous training method is considered one of the followed methods to improve the aerobic capabilities and the efficiency of the lungs` function( Abo Ala`&Ahmad,1994, Shebli et al, 1987,Ahadabi,2001, and Al-kilani, 2000).

The problem and the significance of the study:

 While revising many of the physiologists' studies which were conducted on the effectiveness of the long run distances, the researcher found that there was a great concentration on identifying the impact of the different training methods on the improvement and the increase of the maximal oxygen consumption. And one of those methods was the continuous training methods of the moderate load intensity. But the researcher found some contrast in the results of these studies and he also found that there was no concentration on young ages who did wrong behaviors as smoking, using computers for a long time which expose them to lack of movement diseases especially obesity therefore this study is a try to identify the impact of the continuous training of the moderate intensity on improving the efficiency of the functions of the lungs and to identify the relation between   the maximal oxygen consumption and between the distance which is covered in the Cooper 12 minute of the basic level students so as to provide some information for the teachers and the coaches for the possibility of relying on the distance which is covered in the Cooper 12 minutes run as an indicator of the maximal oxygen capability.

Objective of the study :

This study aimed to identify the following :

1- The impact of the continuous run training of the moderate intensity on the efficiency of the cardio respiratory system of the basic level students.
2- The relation between the distance which is covered in the Cooper 12 minute run and between the maximal oxygen consumption of the students of the basic level.

Hypotheses of the study :
1- The continuous run training of the moderate intensity improves the efficiency of the cardio respiratory system of the sample of the study.
2- There is an inverse correlation between the distance which is covered in the Cooper 12 minute run and between the maximal oxygen consumption.

Training methods of the endurance of the cardio respiratory:
The training methods are those ways which are needed to implement the training program to improve the training status of the player`s behavior so as to achieve the desired aim. And the training methods are defined as follows : they are the planned system of the positive interaction between the coach and the player in order to achieve the aim of the sport training process(Al-Rahahla et al,2004).
And Al-Refai (2005)points out that the endurance is the player`s capability in continuing the implementation of the physical , tactical duties for a long possible time in the match and it means the late-appearance of fatigue

The factors that influence the capability of the maximal oxygen consumption:
The amount of the maximal oxygen consumption of the individual is affected by many factors as :
1- The quality of the test used : it is known that the test in which the a big number of muscles is used during the physical effort gives a higher amount of the maximal oxygen consumption compared with the test which used smaller muscles.
2- The sex: the normal rates of the individuals showed that men   have an average of maximal oxygen consumption more that women have where the difference ranges from 15% to 20% when it is calculated by mm/kg of the weight of the body per a minute .
3- The physical component of the individual : when the maximal oxygen consumption is calculated (litre/min), the individuals who have huge bodies and big muscles will achieve mainly high level of oxygen consumption so the researcher believes that in the sports which require the individual to hold his body as in running , the idea is not only the consumption by itself but also it   should be calculated regarding to each kilogram of the body weight because this seems to be considered as a better indicator to identify the maximal oxygen capacity.
4- Age : the highest percentage of the maximal oxygen consumption of the individual reaches between (18-25 years old),but this percentage starts decreasing gradually with age(Al-Hadabi,2001).

Heart Rate:
Heart rate is considered as one of the indicators that shows the extent of the physical effort intensity on the body, where heart rate increases rapidly when the physical effort increases till it reaches the highest rate at the maximal intensity. But when the physical effort is closer to the maximal intensity , we notice an increase in the heart rate after a period of stability . The physical training decreases resting heart rate when it is compared with the situation before the training , and it is noted that many athletes are distinguished in having low resting heart rates that ranged mainly between(50-70) beat in a minute .But there are many cases of athletes whose heart rate decreases to less than 40 beat in a minute, even there are athletes whose heart rates get to less than 30 beat in a minute while the maximal heart rate reaches 200 beat in a minute of a young healthy man in the twenties of his age.

The previous studies:
- Sohair`s study (1990) aimed to identify the impact of the a proposed training program to develop the cardio respiratory endurance and the dynamic muscular endurance on the digital levels of 400 m competitions of the juniors of Cairo clubs . The sample of the study consisted of 20 female athletes of the 400m competition . And the study concluded that the proposed program had a positive impact on developing the cardio respiratory endurance and the dynamic muscular endurance and it improved the time of the performance of 400 m.
- Al-Kilani`s study (1993) aimed at identifying the impact of a proposed training program with a high intensity(80%) and a low intensity with (50%) on some physiological variables (maximal oxygen consumption, *anaerobic threshold and the heart rate) and the digital level of the swimmers . The sample of the study consisted of (18) swimmers who were divided into two groups; the group of high intensity program , and the group of low intensity program . The researcher concluded that both programs improve the digital level of the swimmers , Therefore the study recommended using either of the two programs for improving the digital level.*

- *The study of Shebli et al(1987) aimed to use the heart rate as a basis in determining the intensity of the training load to the sports of the cardio respiratory endurance and it aimed also to design three programs with different intensity regarding the following percentages(30-50-70%) of heart rate. And also it aimed identify the best fitness programs , which were mentioned previously, that have an effect on the functions of the lungs , on the fitness of the cardio respiratory system and on the digital progress rate of the 1500 run race . The sample of the study consisted of 27 students of the department of physical education of Education Institute at Kuwait. The sample of the study was divided into three equal groups . And the study concluded that the performance of the exercises of load intensity(30%) of the individual own substitute heart rate had no effectiveness in improving the functions of the lungs.*

- And the study of Dudka(1974)aimed to investigate the hypothesis: " the endurance run with a percentage (80%)of the maximal oxygen consumption increases the mass measure which are the *Hydrostatic weight , percentage of fat, and the total of calcium. The sample of the study, which consisted of 15 young volunteers in a program includes 12 weeks for four times a week, was divided into two groups; the experimental that consisted of 8 volunteers and the control group that consisted of 7 volunteers. one of the study`s results that there were no statistically significant differences between the pre and post test in all the variables regarding the experimental group.*

Comment on the previous studies:

It is obvious from the presentation of the studies, which were conducted in the field of the cardio respiratory endurance physiology and the maximal oxygen consumption that most of the studies agreed that the continuous training of the moderate intensity has contributed effectively in improving the cardio respiratory endurance and the maximal oxygen consumption, but there was some variation in the results of those studies which may refer to the period of the different training program from a study to another, while it was proved that there was an inverse relation between the maximal oxygen consumption and the distance which is covered in the Cooper 12 minute run which asserted the test`s ability in predicting the maximal oxygen consumption and the possibility in using it as a substitute of the lab tests which are expensive and cannot be available all the time.

The terms of the study

- Resting Heart Rate : is the heart which is measured after waking up from sleep and before doing any physical effort ,and the least figure should be registered(Al-Ghamedi&Al-Haza`,2002).
- The maximal oxygen consumption : is the highest amount of oxygen that the individual can consume regarding every kilogram of the weight of the body and measured according to the number of the consumed litres of oxygen to each kilo gram of the weight of the body in a minute (mm/kg/min)
  (Al-Ghamedi& Al-Haza`,2002 and Abo Al- Ala`&Ahmad,1003).
- The distance which is covered in the Cooper 12 minute run: is the distance which the student run s for 12 minutes.
- Heart Rate after finishing directly Cooper`s test, and it is the number of heart beats of the students which are registered   after finishing running for 12 minutes .

Variables of the study:

The study consisted of the following variables :

First : the independent variable :

The independent variable is represented by the proposed training program which its goal is to improve the efficiency of the cardio respiratory system.

Second : the dependent variables :

1- Resting heart Rate
3- The distance which is covered in the Cooper 12 minute run:
4- The maximal oxygen consumption
5- Heart rate after finishing Cooper test

Methodology of the study:

The researcher used the experimental approach which consisted of two groups; experimental and control. The researcher used the proposed experimental program and a number of variables related to the efficiency of the cardio respiratory system.

The population of the study:

The population of the study ,which consisted of all the students of the basic stage of the directorate of education of Sahab`s district , is about 3000 students distributed into 12 schools .

The sample of the study

The sample of the study, which consisted of (20) male students who are not athletes, was selected randomly to take part in the training program. The sample of the study was divided randomly into two groups(experimental and control),ten students for each group , and the table (1) shows the results of (t) test for the independent groups between the experimental and control groups regarding the variables; age, weight and tall.

Table (1) Results of (t) test for the independent groups between the experimental and control groups regarding the variables; age, weight and tall.

Variables	)T(	Difference	control		Experimental		Significance
			Std	Mean	Std	Mean	
Age(year)	1.342	0.3	0.48	16.7	0.51	16.4	0.196
Weight (kg)	1.316	1.1	2.18	68.1	1.46	67	0.205
Tall (cm)	1.295	1.6	3.37	168.5	1.9	170.1	0.212

- Significance at the level (α=0.05), tabulated (T) is (2.32) with a degree of freedom (18).

   Table (1) illustrated that there were no significant differences at the level of the significance (α=0.05) between the between the experimental and control groups regarding the variables; age, weight and tall which indicates the equivalence of the two groups regarding these variables.

The proposed training program :

1- The proposed training program lasted for a month and a half, with three times a week , and the time of each training unit was (60m) with a total of (18) training units with (1080m). the pre-measure of the experimental group in the distance which is covered in the Cooper 12 minute run was used as a criteria to increase the intensity and the load of training as considering it represents 100% of the student capability for running, and the table (2) shows the distances in each training unit.

Table (2) : the distances in each training unit

The week	time (min)	(%)pre-measure	Rest heart rate	Distance	Training unit	total
1st	20 د	%60	None	1160	1st	3480m
	20 د	%60	None	1660	2nd	
	20 د	%60	None	1660	3rd	
2nd	20 د	%60	None	1660	1st	3480m
	20 د	%60	None	1660	2nd	
	20 د	%60	None	1660	3rd	
3rd	20 د	%70	none	1450	1st	4350m
	20 د	%70	None	1450	2nd	
	20 د	%70	None	1450	3rd	
4th	20 د	%70	None	1450	1st	4350
	20 د	%70	None	1450	2nd	
	20 د	%70	None	1450	3rd	
5th	20 د	%80	None	1547	1st	4640
	20 د	%80	None	1547	2nd	
	20 د	%80	None	1547	3rd	
6th	20 د	%80	None	1547	1st	4640
	20 د	%80	None	1547	2nd	
	20 د	%80	None	1547	3rd	
	360 د			Total		24940

It is totally clear from table (2) that the distances which the students covered as a training load was about (24940m) distributed on 6 weeks.

The pre-measure was at (9 am) on the football fields of Sahab`s Secondary schools on Saturday 30/6/2012. The measurement regarding the weight and the tall were taken. The researcher asked the students to come to school without doing any physical exercises or effort that may affect the reading of the resting heart rate . the researcher followed the method of putting the hand fingers(index finger& middle finger)on the carotid artery , then calculate the heart rate in the time of (10s) and multiply the conclusion with 4 to obtain the resting heart rate where the researcher was aware of the recording the least possible reading . And for the purpose of applying the 12min run test , the researcher got help from the teachers of physical education in Shabs' school , then he took the heart rate of the students directly after finishing Cooper test . Then the researcher extracted the maximal oxygen consumption with the help of the heart rate after the test and by applying the Astrand-Ryhming nomogram.

 Applying the training program :

 The application of the training program lasted from Sunday(30/6/2012) till Wednesday (15/8/2012) in Sahab`s secondary schools.

The pre-measure :

The pre-measure for the two groups was conducted on Friday in 16/8/2012 at 9:00 am with the attendance of the same teachers and assistants.

The statistical analysis:

The researcher used the following to analyze the data :

1.   The mean and the standard deviation
2.   Skew ness
3.   The upper and the lower limits.
4.   Pearson's correlation coefficient
5.   Paired Samples *T– Test to compare between the pre and post measures.*
6.   T- test for independent groups to compare between the experimental and control groups.

The equivalence between the groups in the pre-measure was used so as to be sure that there was no statistically significant differences between the experimental and control in the pre-measure that could affect the results so as not to have a variable that may affect unexpectedly the results except the independent variable which is the proposed training program. The researcher used *Independent*-Samples *T-test* between the experimental and control groups in the pretest .

   Table (2) showed the results of the *Independent*-Samples *T-test between the experimental and control groups regarding the variables;* Resting Heart Rate, the distance which is covered in the Cooper 12 minute run, maximal oxygen consumption (mm/kg/min), and the quantum through the heart rate after the test using the *Astrand*-Ryhming *nomogram* (Astrand , Ryhming1977) heart rate after finishing Cooper test in the pre-measure .

Table (3) The (T) test results of the independent groups between the experimental and control groups regarding the following variables: Resting Heart Rate, the distance which is covered in the Cooper 12 minute run, maximal oxygen consumption (mm/kg/min), and the heart rate after the Cooper test in the pr-measure.

Sig	)T(	Diff	Control		Experimental		Variables
			Std	mean	Std	Mean	
0.535	0.632	0.8	2.69	69.2	2.95	68.4	Resting heart rate
0.953	0.095	2	74.3	1931	76.16	1933	Distance
0.626	0.496	0.644	2.52	38.15	3.24	38.79	maximal oxygen consumption
0.999	0.003	0.01	7.26	170.6	7.61	170.5	heart rate after the Cooper test

*sig at the level(α=0.05),T(t) with FD(18).

It is clear from table (3) that there were no statistically significant differences at the significance level of ((α=0.05) between the experimental and the control group regarding the following variables ; Resting heart rate, the distance covered in the Cooper 12 minute run, maximal oxygen consumption (mm/kg/min) and the heart rate after the Cooper test in the pre-measure which indicates pointed to the groups equivalence concerning these variables . Because of these results , the researcher was certain that there were no statistically significant differences between the two groups in the pre- measure which indicates that the differences between the pre and post measures of the experimental group attributed to the impact of the researcher`s proposed training program(independent variable).

The presentation and the discussion of the results :

To achieve the first objective of the study, which is to identify the effect of the continuous run training of the moderate intensity on the efficiency of the cardio respiratory system of the students whose age ranged from (16-17) years old . And to achieve this goal , the researcher used (t) test for the correlated groups between the pre-measure and the post one of the control group regarding *the variables;* Resting Heart Rate, the distance which is covered in the Cooper 12 minute run, maximal oxygen consumption (mm/kg/min), and the heart rate after the Cooper test was done. The table (4) showed the results of the (t) test between the pre and post measures regarding the variables of the study of the control group.

Table (4) The results of the (t) test between the pre and post measures regarding the variables of the study of the control group.

Sig	T	diff	Control		control		variables
			Std	mean	std	mean	
0.024	2.714	2.4	2.1	66	2.95	68.4	Resting heart rate
0.00	6.653	79	76.99	2012	76.16	1933	distance
0.00	10.48	1.7	2.87	40.49	3.24	38.79	Maximal oxygen consumption
0.001	4.571	6.2	6.58	164.3	7.61	170.5	Heart rate after the test

*sig at the level(α=0.05),T(t) 2.32 with FD(9).

It is clear from table (4) that there were statically significant differences at the significance of level(α=0.05) between the pre and post measures in favor of the post measure of the control group regarding the following variables ; Resting Heart Rate with a mean and standard deviation (+_68.4)(2.95)to the pre measure and (+_66) (2.1)to the post measure with a difference about (2.4 , the distance which is covered in the Cooper 12 minute run with a mean (19.33) and standard deviation (67.16) of the pre measure , and with a mean and standard deviation of the post measure (20.12) (67.99) with a difference about (79), and maximal oxygen consumption (mm, kg, min) variable with a mean and standard deviation of the pre measure (170.5)(7061) and to the post measure (164.3)(6.58) with a difference about (6.2). These results indicate the effectiveness of the proposed training program on improving the cardio respiratory endurance of the experimental group where the endurance trainings increases the glycogen which enables the player to continue his physical activity for a long time , in addition to its positive effects on increasing the player`s capability to endure the accumulation of the Lactic acid and on improving the economy of energy(Al-Kilani,2000),( Al-Haza`, 1994), (Astrand&Rodahl,1977),(Mcardle et al,1986),(Abo-Alola&Ahmad,1994),(Al-Haza`, 1994),(Adams,1980) and (Fox,1971). The results of this study agree with the results of the study of Suhair(1990) that there was positive effect concerning the improvement of the cardio respiratory endurance and of the dynamic muscular endurance and the improvement of the time of 400m run.

Table (5) (T) test for the correlated groups between the pre-measure and the post one of the control group regarding all *the variables of the study.*

Sig	(t)	Dif	Control		experimental		Variables
			Std	Mean	std	mean	
0.168	1.500	0.8	2.27	68.4	2.69	69.2	Resting heart rate
0.319	1.055	5.4	70.64	1925.6	74.3	1931	Distance
0.091	1.889	0.18	2.52	37.97	2.52	38.15	Maximal oxygen consumption
0.363	0.958	0.4	6.66	171	7.26	170.6	Heart rate after the test

 *sig at the level(α=0.05),T(t) 2.25 with FD(9).

It is clear from table (5) that there were no significant difference between the pre and post measures of the control group regarding the variables; Resting Heart Rate, the distance which is covered in the Cooper 12 minute run, maximal oxygen consumption (mm/kg/min), and the pulse after the Cooper test was done. And to identify the differences between the experimental and control groups in the pre- measure and on the tests of the study, the researcher used Independent Sample T-test as it is illustrated in table (6).

Table (6) The results of the Independence Samples T- test between the experimental and control groups in the post measure regarding the variables ; Resting Heart Rate, the distance which is covered in the Cooper 12 minute run, maximal oxygen consumption (mm/kg/min), and the heart rate after the Cooper test was finished.

Sig	)T(	diff	Control		experimental		Variables
			std	Mean	std	mean	
0.025	2.44	2.4	2.27	68.4	2.1	66	Resting heart rate
0.018	2.61	4.86	70.64	1925.6	76.99	2012	Distance
0.041	2.22	2.52	2.51	37.97	2.87	40.49	maximal oxygen consumption (mm/kg/min)
2.261	2.26	6.7	6.66	171	6.58	164.3	the heart rate after the Cooper test

*sig at the level(α=0.05),T(t) 2.25 with FD(18).

It is clear from table (6) that there were statically significant differences at the significance of level (α=0.05)between the experimental and control groups in favor of the control group regarding all the variables. And to achieve the second objective of the study, which is to identify the relation between   the distance which is covered in the Cooper 12 minute run and the maximal oxygen consumption of the students of the basic stage, the researcher used Pearson correlation coefficient in the post measure for the control group as it illustrated in table (7).

Table (7) Te relation between the between   the distance which is covered in the Cooper 12 minute run and the maximal oxygen consumption(n=10)

Sig.	correlation	Maximal consumption				Distance	
		Skew ness	Std	mean	Skew ness	Std	mean
0.001	0.88	0.268	6.58	164.3	0.035	2.87	40.49

*sig at the level (α=0.05),®value =(0.765),fd(n-2)

It is clear from table (7) that there was a statically significant inverse relation at the level of significance ($\alpha = 0.05$) between the between   the distance which is covered in the Cooper 12 minute run and the maximal oxygen consumption of the students of the basic stage . And this result assured that the distance which is covered in the Cooper 12 minute run gives an indication for the extent of the fitness of the cardio respiratory system ,especially the maximal oxygen consumption, and the increase in one of them means an increase on the other one. This result agrees with what the study of Mary and others (1990) concluded that there was an inverse relation between these two variables , so the increase of the distance means that the heart and the lung work efficiently by supplying the working muscles with the necessary fuel through a quantity of oxygen tat suits the muscular work.

The results of the study :

1. There were statically significant differences between the pre and post measures regarding resting heart rate , that the distance which is covered in the Cooper 12 minute run, the maximal oxygen consumption (mm/kg/min) in favor of the post measure of the experimental group.

2. There were no statically significant differences between the pre and post measures regarding resting heart rate , that the distance which is covered in the Cooper 12 minute run, the maximal oxygen consumption (mm/kg/min)and the heart rate after Cooper`s test in   the control group.

3. There were statically significant differences between the experimental and control group in favor of the experimental group in the post measure regarding the variables ; regarding resting heart rate , that the distance which is covered in the Cooper 12 minute run, the maximal oxygen consumption (mm/kg/min)and the heart rate after finishing Cooper`s test

Conclusion :

1- The continuous training of run of the moderate intensity improve the efficiency and the functions of the lungs of the sample of the study.

2- The distance which is covered in the Cooper 12 minute run is a high indicator of the level of the maximal oxygen consumption so the possibility of using this test to identify the efficiency and the functions of the lungs.

3- The proposed training program has made effective contribution in upgrading the endurance of the cardio respiratory of the sample of the study.

Recommendations :

1- The necessity of using Cooper test by the teachers of physical education so as to reveal the fitness of the students' cardio respiratory system.

2- The use of the tests' results to guide the students and their choice of the events of the long-distance run.

3- Conducting further studies to identify the impact of the training programs on developing the cardio respiratory endurance regarding the sex variable.

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