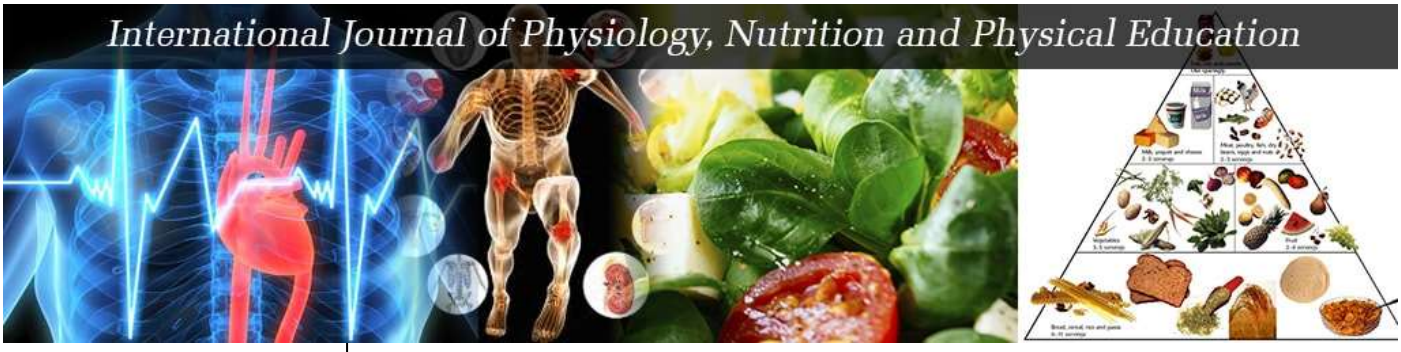

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The effect of special endurance training on some physical and functional variables and the achievement of cross-country running (8 km)

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Abstract
The research aims to prepare special endurance exercises to develop my ability to withstand speed and endurance of strength to complete the cross-country run (8 km) and to develop some functional variables represented by the maximum oxygen consumption and blood sugar level before the effort at rest and immediately after the effort. Moreover, the port and the army), and the researchers used some tests, devices, and additional tools to help them complete the research. The researchers adopted the experimental approach to suit the nature of the research. The period of special endurance training is (10) weeks, starting from 1/21/20/20 to 12/28/2020, with (3) training units per week, and the researchers used the statistical bag (SPSS). The unique endurance training showed a development in my ability to withstand strength and speed, some functional variables such as the maximum oxygen consumption and blood sugar level before resting effort, and a slight development in one variable. The blood sugar level increased immediately after the effort, and the researchers recommend using special endurance exercises within the vocabulary of the training curriculum.

Keywords: The effect of endurance training on physical and functional variables

Introduction
The cross-country running event is one of the sporting events that had developed distinctively in recent years, especially in 1973 AD when the International Association of Athletics Federations decided to hold the first world championship. In 2011 AD, the race distance was set for all age groups. General physical preparation by the coaches, but at the present time it has become an independent event with its own training program, so sports training scientists, coaches and athletes alike have been developing training programs for this game, by developing their physical level that leads to an improvement in capabilities physical and functional; Which contributes to the development of the level of achievement, and the effectiveness of cross-country running requires continuous and repeated physical efforts because it depends on enduring physical fatigue for the longest possible period of time, and this would require a high level of special abilities such as the ability to carry speed and carry strength, which are essential capabilities that play a decisive role in The effectiveness of cross-country running (8 km), and the importance of the research lies in the preparation of special endurance exercises that the researcher developed to develop unique endurance capabilities that lead to adaptation in functional indicators such as enhancing aerobic and anaerobic capacity and a significant improvement in the metabolism process, and these exercises are consistent with runners Suburban running (8 km), as for the problem of research concentrated in the low level of achievement in Iraq in recent years in the effectiveness of suburban running (8 km), and through the field and training experience of the two researchers and being former players in athletics and in the cross-country running race, they have noticed that there Weakness in the level of remarkable endurance, and this Weakness was reflected in my decline in the level of some physical and functional variables. Therefore, the researchers prepared special exercises to develop my exceptional endurance (speed endurance, speed endurance). To strength) which in turn leads to an improvement in functional indicators; this leads to an increase in the achievement level of the 8 km cross-country runners.

Research AIMS

1. Preparing special endurance exercises for the effectiveness of cross-country running (8 km).
2. To identify the effect of special endurance training on some physical and functional variables of cross-country runners (8 km).
3. To identify the effect of special endurance training on the achievement level of cross-country runners (8 km).

Presumably, search

1. There are statistically significant differences between the pre and post-tests and the two post-tests in the tests of physical and functional variables in favor of the post-test.
2. There are statistically significant differences between the pre and post-tests and the post-test in the cross-country run achievement test (8 km).

Search procedures

The researcher used the experimental approach by designing two equal groups (control and experimental) with pre and post-tests. To suit the nature of the research.

The research community consisted of runners who ran the suburbs (8 km) in the youth category in Iraq, who numbered (96) runners representing (100%) of the entire research community. Their number is (12) runners, who constitute (12.5%) of the entire research community, divided into (10) runners for the sample of the main experiment, and (2) runners for the sample of the reconnaissance experiment. The sample of the main experiment was distributed into two groups (control and experimental) in an unexpected way. Each group included (5) runners. The researchers conducted homogenization for the research sample members in the variables (height, body mass, chronological age, and training age). The researchers also conducted parity for the research sample members in the physical and functional tests.

The tests used in the research

- The researchers used physical and physiological tests, as the physical tests included the particular speed endurance test (2000 m), where the researchers prepared an endurance test for the effectiveness of cross-country running (8 km). It was standardized by conducting the test's honesty, stability, and objectivity, which measures the remarkable speed endurance for a distance (2000 m). 200 m jumping and sprinting test (Altarafi, 2013) [6]. To measure strength endurance, and to test the completion of the cross-country run (8 km) (Athletics, 2013) [7] to measure the runner's performance time during the race distance (8 km), while the physiological tests included a one-mile jogging test (1609 meters) to measure the maximum oxygen consumption (George J., Vehrs, P.R, Allsen, P.E., Fellingham, G.W, & Fisher, A.G, 1993) [10], the data was recorded in the registration form The one-mile jog test, which included data: body mass, time spent, and heart rate, and then the following equation for the male test was applied
- VO 2max = 108.844 – 0.1636 W – 1.438 T – 0.1928 H
- In other words, the maximum oxygen consumption for males from 18-29 years = 108,844 - 0.1636 x body mass in kg - 1,438 x time in minutes - 0.1928 x heart rate immediately after the test. Physiological tests also included a glucose test. With blood (ACON, 2014) [2], Rest before and immediately after effort.

Pretests

The researcher conducted their pretests on the control and experimental groups on Sunday and Monday, corresponding to 18-19/ 1 0/20 20

The main experiment

The researchers conducted the main experiment, which lasted (10 weeks) for the implementation of special endurance training, starting from 1/21/20/20 to 12/28/2020 on Monday, with (3) training units per week, as the total number of units was (29) a training unit, where the time of the training unit was (90 minutes), while the time allotted for the special endurance exercises was (40-60 minutes), where the researchers put the special endurance exercises as follows:

The control group practiced the coach's approach, while the experimental group used the special endurance exercises prepared by the researchers. For two, at the rate of (3) training units per week, the total number of units reached (29) training units, where the time of the training unit was (90 minutes), while the time allotted for special endurance training was (40-60 minutes), which was divided as follows:

1. Speed endurance training amounted to two training units per week, at a rate of (20) training units, and it was as follows:
   Enduring speed on Saturday was by performing the interval load "for ten parts of the real distance and the equivalent of (1.5) of the real race distance." (Allawi, 1994) [5], Training (75%), and rest between repetitions returning the pulse to (120 n / s) and between groups (90 n / s). Thus the total volume for Saturday was (12 km).
   Enduring speed on Monday by performing the "hierarchical fartlek style (ascending and descending)" (Al-Ali, Hussein Ali, & Shanghai, Amer Fakher, 2010) [3] (300 m, 600 m, 800 m, 600 m, 300 m) x (3) groups, and resting between repetitions, the pulse returning to (120 n / s) and between the groups, the pulse returning to (120 n / s) (90 n / s). The training intensity was (80%), and thus the total volume on Monday was (7.8 km).
2. Strength endurance training amounted to one training unit per week, i.e. (10) training units, and it was as follows:
   Strength endurance on Wednesday by climbing the hill, and it was as follows:
   (200 m x 6 x 2), i.e., (6) repetitions, in two groups, with a training intensity of (70%). As for rest, the pulse returned to (110 n / s) between repetitions, and the pulse returned to (80 n / s) between groups, and thus it reached The total size of strength endurance training (2.4 km) for Wednesday.

The total training volume during the special endurance training was (222 km).

Dimensional tests

After the researchers conducted special endurance exercises on the experimental group, they conducted their post-tests on Wednesday and Thursday corresponding to 30-31/12/20 20, using the same method as the pretests and under the same temporal and spatial conditions.

Statistical processors

The researchers used the statistical bag program (SPSS) and some of the following equations:

Post-test - Pretest

1. "Calculate the percentage of development _____ x 100"
2. Pre-test (Al-Kinani, Mamdouh Abdel Moneim, & Jaber, Qais Abdullah, 1995) [4].
3. The maximum oxygen consumption for males from 18-29 years = 108,844 – 0.1636 x body mass in kg – 1,438 x time in minutes – 0.1928 x heart rate immediately after taking the test (George ،1993: 401-406) [9].

Discussion

Table 1: Shows the arithmetic mean, standard deviation, sample size, and the calculated and tabulated (T) value in the pre and post-tests for the control and experimental groups for the speed endurance test (2000 m), the unit of measurement (second)

The group	Pre-test		Post-test		Sample volume	calculated t - value	tabular t - value	Significance level*
	s	± p	s	± p				
Control	432,00	22,23	428,40	21,95	5	2,508	2,776	non-moral
Experimental	436,80	22,60	399,20	27,92	5	6,600		moral

* At a degree of freedom (n - 1 = 4) and an error probability of (0.05)

Table 2: Significant differences between the arithmetic means of the results of the two groups in the post-measurement of the speed endurance test (2000 m), unit of measurement/second

The test	The control group		Experimental group		Sample volume	calculated t - value	tabular t – value	Significance level*
	s	± p	s	± p				
Carry speed ran (2000 AD)	428,40	21,95	399,20	27,92	10	1,838	2,306	non-moral

* At a degree of freedom (n + n – 2 = 8) and the probability of error is (0.05)

Table 3: Comparison of the rate of development in the arithmetic circles between the control and experimental groups in the speed endurance test (2000 m)

The group	The arithmetic mean in the post-test	The arithmetic mean in the pre-test	Evolution rate
control	428,40	432	0.833%
Experimental	399,20	436,80	8,608%

Table 4: Shows the arithmetic mean, standard deviation, sample size, and the calculated and tabulated (T) value in the pre and post-tests for the control and experimental groups to test the endurance of strength running by jumping (200 m), the unit of measurement (second)

The group	Pre-test		Post-test		Sample volume	calculated t - value	tabular t - value	Significance level*
	s	± p	s	± p				
Control	44,912	1,870	44,486	1,385	5	1,877	2,776	non-moral
Experimental	44,282	1,584	41,976	1,551	5	11,081		moral

* At a degree of freedom (n - 1 = 4) and an error probability of (0.05)

Table 5: Significant differences between the arithmetic means of the results of the two groups in the post-measurement of the strength endurance test, sprinting by jumping (200 m), measurement unit/second

The test	The control group		Experimental group		Sample volume	calculated t - value	tabular t - value	Significance level*
	s	± p	s	± p				
Jumping (200 m)	428,40	21,95	399,20	27,92	10	1,838	2,306	Jumping (200 m)

* At a degree of freedom (n + n – 2 = 8) and the probability of error is (0.05)

Table 6: Comparison of the rate of development in the arithmetic circles between the control and experimental groups in the force endurance test (200 m)

The group	The arithmetic mean in the post-test	The arithmetic mean in the pre-test	Evolution rate
Control	44,486	44,912	0.948%
Experimental	41,976	44,282	5,707%

Table 7: Shows the arithmetic mean, standard deviation, sample size, and the calculated and tabular (T) value in the pre and post-tests for the control and experimental groups to test the achievement of cross-country running (8 km), the unit of measurement (second)

The group	Pre-test		Post-test				tabular t - value	Significance level*
	s	± p	s	± p				
Control	1756,20	41,83	1741,00	51,71	5	2,056	2,776	non-moral
Experimental	1739,60	44,46	1646,20	53,63	5	3,238		moral

* At a degree of freedom (n - 1 = 4) and an error probability of (0.05)

Table 8: Significant differences between the arithmetic means of the results of the two groups in the dimensional measurement of the cross-country running achievement test (8 km), unit of measurement/second

The test	The control group		Experimental group		Sample volume	Calculated t - value	tabular t - value	Significance level*
	s	± p	s	± p				
Cross-country running achievement (8 km)	1741,00	51,71	1646,20	53,63	10	2,845	2,306	Moral

* At a degree of freedom (n + n – 2 = 8) and the probability of error is (0.05)

Table 9: Comparison of the rate of development in the arithmetic circles between the control and experimental groups in the cross-country run achievement test (8 km)

The group	The arithmetic mean in the post-test	The arithmetic mean in the pre-test	Evolution rate
Control	1741,00	1756,20	0.865%
Experimental	1646,20	1739,60	5,369%

Table 10: Shows the arithmetic mean, standard deviation, sample size, and the calculated and tabulated (T) value in the pre and post-tests for the control and experimental groups to test the maximum oxygen consumption, the unit of measurement (ml/kg / s)

The group	Pre-test		Post-test				tabular t - value	Significance level*
	s	± p	s	± p				
Control	63,79	1,09	64,02	1,42	5	1,098	2,776	non-moral
Experimental	64,46	2,06	65,43	2,06	5	4,135		moral

* At a degree of freedom (n - 1 = 4) and an error probability of (0.05)

Table 11: Significant differences between the arithmetic means of the results of the two groups in the post-measurement of the maximum oxygen consumption test, ml/kg / s

The test	The control group		Experimental group		Sample volume	calculated t - value	tabular t - value	Significance level*
	s	± p	s	± p				
Maximum oxygen consumption	64,02	1,42	65,43	2,06	10	1,258	2,306	Maximum oxygen consumption

* At a degree of freedom (n + n – 2 = 8) and the probability of error is (0.05)

Table 12: Comparison of the rate of development in the arithmetic circles between the control and experimental groups in the maximum oxygen consumption test

The group	The arithmetic mean in the post-test	The arithmetic mean in the pre-test	Evolution rate
Control	64,022	63,792	0.360%
Experimental	65,434	64,468	1,498%

Table 13: Shows the arithmetic mean, standard deviation, sample size, and the calculated and tabulated (T) value in the pre and post-tests for the control and experimental groups to test blood sugar before the effort, the unit of measurement (mg/deciliter)

The group	Pre-test		Post-test		Sample volume	calculated t - value	tabular t - value	Significance level*
	s	± p	s	± p				
Control	90,00	5,24	89,60	4,03	5	0,459	2,776	non-moral
Experimental	88,40	4,61	85,40	4,56	5	5,477		moral

* At a degree of freedom (n - 1 = 4) and an error probability of (0.05)

Table 14: Significant differences between the arithmetic means of the results of the two groups in the post-measurement of the pre-exercise blood sugar test, the unit of measurement is mg/dL.

Significance level*	tabular t - value	calculated t - value	Sample volume	Experimental group		The control group		The test
				± p	s	± p	S	
Blood sugar before exercise	2,306	1,542	10	4,56	85,40	4,03	89,60	Blood sugar before exercise

* At a degree of freedom (n + n – 2 = 8) and the probability of error is (0.05)

Table 15: Comparison of the rate of development in the arithmetic circles between the control and experimental groups in the pre-exercise blood sugar test

The group	The arithmetic mean in the post-test	The arithmetic mean in the pre-test	Evolution rate
Control	89,60	90,00	0.444%
Experimental	85,40	88,40	3,393%

Table 16: Shows the arithmetic mean, standard deviation, sample size, and the calculated and tabulated (T) value in the pre and post-tests for the control and experimental groups to test blood sugar levels immediately after effort, the unit of measurement (mg/deciliter)

The group	Pre-test		Post-test				tabular t - value	Significance level*
	s	± p	s	± p				
Control	123,80	5,80	123,60	5,12	5	0,535	2,776	non-moral
Experimental	123,20	5,06	123,80	5,21	5	1,177		not

* At a degree of freedom (n - 1 = 4) and an error probability of (0.05)

Table 17: Significant differences between the arithmetic means of the results of the two groups in the post-measurement of the blood sugar level test immediately after exertion, the unit of measurement is mg/dL.

The test	The control group		experimental group				tabular t - value	Significance level*
	s	± p	s	± p				
Blood sugar before exercise	123,60	5,12	123,80	5,21	10	0,061	2,306	blood sugar before exercise

* At a degree of freedom (n + n – 2 = 8) and the probability of error is (0.05)

Table 18: Comparison of the rate of development in the arithmetic circles between the control and experimental groups in the blood sugar test immediately after exertion

The group	The arithmetic mean in the post-test	The arithmetic mean in the pre-test	Evolution rate
Control	123,600	123,800	-0.161%
Experimental	123,800	123,200	0.487%

Discuss the results

The results of the speed endurance test (2000 m), Table (1), show the significant differences between the two groups in favor of the training group in the pre-post-test. The maximum that the runner can accomplish and the hierarchical fartlek method had a significant impact in developing the ability to withstand the speed of the effectiveness of cross-country running. "The fartlek method includes running different distances that develop speed endurance." (Al-Ali ،Hussein Aliو ، Shaghati, Amer Fakher ،2010) [3]. As the oxygen in it plays a crucial role in providing oxygen energy for the cross-country runners (8 km), while Table (2) shows non-significant differences between the two groups because the special endurance exercises achieved their purpose as the runners were able to perform the cross-country run (8 km) With a high degree without a decrease in the level of speed endurance for the two groups, although the preference was in favor of the experimental group and the rate of development was higher than that of the control group, which indicates that the exercises prepared by the researchers led to the development of the ability to withstand speed, which in turn led to the development of the achievement of cross-country running (8 km). And through what was presented in the force endurance test, Table (4) shows the results of the pre-post-test between the two groups, which were in favor of the experimental group, and the researchers attribute these significant differences to the unique strength endurance exercises represented in climbing the hill for a distance of (250 m) and with (6) repetitions. Moreover, by two groups with a training intensity (70%) led a clear development in the ability to withstand force, and Table (5) shows the significant differences between the two post-tests - post-test in favor of the experimental group because the special strength-bearing exercises developed by the researchers led to the elimination of the accumulation of lactic acid In the capillary passages and myofilaments in the working muscles, which led to a non-decrease in the functional and physical level of the runners, and this would lead to a development in the strength endurance capacity of the cross-country runners (8 km), and this was confirmed in Table (6) that shows the rate of development The strength endurance capacity of the experimental group was (5.7%), which is a good percentage compared to the rate of development of the control group.

Through what has been presented in Table (7), it is clear that there are significant differences between the two pre-posttests between the two groups and in favor of the experimental group. The excellent endurance prepared by the researchers scientifically and correctly, especially the ability to withstand the speed, whose distance was determined by a tenth of the race distance, with fixed and regular repetitions, and with specific rest periods based on the pulse rate because it is a measure of the level of effort exerted during the race. As for the results shown by the significant differences between the two groups in the test, the Post-dimension Table (8) shows that there are significant differences in favor of the experimental group, and the reason for this is the application of unique endurance training vocabulary that contained training volumes based on scientific foundations of repetitions and rest periods between repetitions and groups and stresses suitable for the effectiveness of cross-country running (8 km), and Table (9) shows the rate of development of the experimental group by (5%) more than the control group, and this is due to regular Training, as "training Regular and programmed use of rationed types of intensity in Training and the use of optimal types of rest between repetitions to lead to the development of achievement, "and this is what he mentioned (Abdel-Fattah & Abu El-Ela Ahmed, 1999) [1].

Moreover, through table (10), it is clear that the results of the maximum oxygen consumption test in the two pre-posttests between the two groups showed significant differences in favor of the experimental group. The researchers attribute these differences to the special endurance exercises that included the ability to carry speed and carry strength, as the fartlek method had It had a significant impact on the development of the maximum oxygen consumption, as this method works to develop sufficient resistance to fatigue at various speeds, and the interval method that included climbing the hill with repetitions that fit the nature of the effectiveness of cross-country running led to a clear development in the maximum oxygen consumption, and that confirmed this (Faraj. &, Jamal Sabry, 2017) [8]" Hill repetitions are repetitions of running with parts of the hard climb of the hill, and it increases the aerobic capacity as well as high resistance to the severity of fatigue and moderate pain." Table (11) shows non-significant differences, and the researchers attribute this to the fact that the maximum oxygen consumption test scores were close to that. The researchers resorted to calculating the rate of development between the arithmetic averages between the two groups shown in Table (12), which was (0.36%) for the control group, and (1.5%) for the control group. The experimental group and this ratio confirm that the special endurance training developed by the researchers had a significant impact on developing the maximum oxygen consumption of the experimental group.

Moreover, through table (13), it is clear that the results of the blood sugar test before the effort in the two pre-post tests for the two groups showed significant differences in favor of the experimental group. The researchers attribute these differences to the special endurance exercises that had a direct effect in reducing the blood sugar level in terms of The reduced percentage is a positive case within the normal limits (120-80 mg/dl) at rest time due to the adaptation of the body's organs to the physical efforts that have been developed through the development of the speed endurance and strength endurance capabilities. Table (14) showed non-significant differences between the two tests. Post-dimension for the two groups prompted the researchers to resort to the rate of development between the two groups, and the development was clear for the experimental group at a rate of (3.4%), which is a good percentage compared to the control group.

Through table (16), it is clear that there are non-significant differences between the two pre-post-tests of the control and experimental groups. The researchers attribute this to the fact that the scores of the two groups were close in the blood sugar test immediately after the achievement effort. Even in the two post-tests, the results were inconsistent. As shown in Table (17), the researchers resorted to calculating the evolution rate between the arithmetic averages of the two groups shown in

Table (20). The increase is because the blood sugar level during the exercise begins to rise and reaches more than (160) mg every 100 cm 3. This indicates that after the effort continues continuously "for more than (30) minutes, this amount decreases as a result of the excessive consumption of glucose and glycogen during the physical effort." (Kaabi, 2010) [13]. This explains why the blood sugar level reached 123,800 mg/dl after the achievement effort, which averaged (29 minutes), meaning that if the effort lasted more than 30 minutes, the sugar level would drop below that, but it does not fall below the first level. Normal and adult (80 mg / dL)

Conclusions and recommendations

Conclusions

1. The researcher concluded that the special endurance training showed a development in the physical variables (speed endurance and strength endurance).
2. The researcher concluded that the special endurance exercises showed development in achieving the cross-country run (8 km).
3. The researcher concluded that the special endurance exercises showed a development in the functional variables (maximum oxygen consumption - and the blood sugar level at rest before the achievement effort) and a slight development in the blood sugar level immediately after the achievement effort.

Recommendations

The researcher recommends the following recommendations

1. Work on the use of special endurance exercises within the vocabulary of the training curriculum.
2. Conducting similar studies on other samples.
3. Conducting other functional tests when carrying out special endurance exercises due to their importance in the training process.
4. Emphasis on following the scientific method when developing special endurance exercises.

References

1. Abdel-Fattah, Abu El-Ela Ahmed. Developing and measuring the maximum oxygen consumption for middle and long-distance runners. The International Association of Athletics Federations. 1999;4:64.
2. ACON. On Call plus Blood Glucose Monitoring System. Hanover, Germany; c2014. Retrieved from www.acondiabetescare.com.
3. Al-Ali, Hussein Ali, Shaghati, Amer Fakher. Strategies, methods, and methods of sports training. Baghdad: Baghdad: Al-Nour Office; c2010.
4. Al-Kinani, Mamdouh Abdel Moneim, Jaber, Qais Abdullah. Psychological and educational measurement and evaluation. (1, Ed.) Beirut: Beirut: Al-Falah Library; c1995.
5. Allawi M. Sports training science. (13, Ed.) cairo: Dar al-Maarif; c1994.
6. Altarafi AS. Applied tests in physical education - physical - motor - skill. Baghdad: Baghdad: Al-Nour Office; c2013.
7. Athletics I. Competition rules. Monaco; c2013.
8. Faraj, Jamal Sabry. Speed and athletic achievement, training - physiology - injuries, (1 ed.). Beirut: Beirut: Scientific Books House; c2017.
9. George. VO2max estimation from a submaximal 1-mile track jog for fit college-age individuals. Med Sci. Sports Exerc; c1993. p. 401-406.
10. George J, Vehrs PR, Allsen PE, Fellingham GW, Fisher AG. VO2 max estimation from a submaximal 1-mile track jog for fit college-age individuals. Med Sci Sports Exerc. 1993;3(25):401-406.
11. Glucometer; c2012. https://www.indiamart.com/proddetail/on-call-plus-blood-glucometer-13365770533.html. Germany.
12. https://www.indiamart.com/proddetail/on-call-plus-blood-glucometer-13365770533.html. (nd).
13. Kaabi JR. The effect of sports training on the circulatory and respiratory systems. 2010. Retrieved from www.husseinmardan.com/DrJabbar-06.htm.
14. Cefalu TMW. Standards of medical care in diabetes. American Diabetes Association: PRINTED IN THE USA. 2015;38(1):44-45.