

# The Effect of Anaerobic Training on Cardio-respiratory Endurance, Muscular Endurance and Agility in Fitness Female Practitioners 40-45 Years Old

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## ABSTRACT

Health is one of the main priorities for individuals. Health cannot be present unless with fitness. If humans lose their fitness, they shall lose the most important factor of health and happiness as these are the pillars of his existence and survival, so they have to exert efforts to restore them, perform their roles, and enjoy their existence and private lives. Therefore, the researcher decided to prepare a legalized training course consistent with the sample of the study of women who aim to obtain good health fitness which means the general health of individuals at first before considering other aspects. The researcher hopes that this work is a scientific simple addition. Hence, to understand the fact of women's bodies and resistance to internal environmental conditions came the research problem, which is studying what happens to a women's body during exposure to effort with different intensities to be subject to the anaerobic system and their effect of cardio-respiratory and muscular endurance with fitness practices of age 40-45 years old, and thus the return of good health to the practice of sport activity. The study aimed to identify the impact of the training curriculum, anaerobic cardio-respiratory, muscular endurance, and agility in a sample of the study. The researcher used the empirical method as it helps to solve the problem of the study and selected a sample of 10 female fitness practitioners and aged 40-45 years using the purposive method. The researcher concluded that anaerobic training has an effect on the research variables in post-tests more than pre-tests with different proportions. In addition, cardio-respiratory endurance is important to reduce fatigue through body adaptation after physical effort. Moreover, muscular endurance is affected by physical effort as well as agility according to training's intensity, consistency, and duration requirements. The researcher recommended that sample of the study had to be subject to continuous examinations at the response to determine short- and long-term effects with continuous and periodical medical follow-up to ensure functionality of vital systems.

**Keywords:** Anaerobic training, cardio-respiratory endurance, muscular endurance, agility, fitness

## INTRODUCTION AND SIGNIFICANCE OF THE STUDY

Sport medicine physiology is one of the main and necessary sciences for workers in sports field. It is

the science that brings development in the level of physical performance as a result of the physiological effects of training through which adaptation of various systems of the body comes to the level of that training. Knowing that scientists, researchers, and trainers are still striving and exert effort to reach facts and studies that help the training process to develop the capacity of systems, tissues, and functional cells of the body to reach high-level sports achievements as well as the development of public health practitioners' activity. Accordingly, science and scientists throughout ages have provided humanitarian service to address a

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number of diseases, which have been caused in the most ages due to lack of physical effort, whether walking types, running, jogging or swimming, and other. Yet, with the attention of scientists and researchers of the importance of health for humans, societal culture has become important to explain causes of diseases, eating healthy food, and identifying meals per day. They affected all members of society in changing their convictions toward the direction of practicing sport activity, which played an important role in the modern era.

We all know that women in general and women in our society, in particular, are more likely to face such unhealthy phenomena because of lack of physical activity, increasing functionality and sitting on offices. This encourages women to have foods that are loaded with high calories. Thus, they may suffer from obesity and degrading fitness which is also encouraged by the nature of society, nature of eaten foods, and not practicing any physical activity (Rowland, 1996: p. 1).

Speaking about type of training or physical effort for ½ h and three training units from oxygenic view, it was studied but with specific types in addition to not inclusion of high and low-intensity interval training depending on oxygenic and non-oxygenic system. Hence, to set correct solutions of using different types of anaerobic training systems, the study significance came in the need to determine the effect of physical training based on the anaerobic system provided in different testing periods on cardio-respiratory endurance, muscular endurance, and agility for fitness practices for ages 40-45 years.

### Problem of the Study

Health is one of the main priorities for individuals. Health cannot be present unless with fitness. If humans lose their fitness, they shall lose the most important factor of health and happiness as these are the pillars of his existence and survival, so they have to exert efforts to restore them, perform their roles, and enjoy their existence and private lives. Therefore, the researcher decided to prepare a legalized training course consistent with the sample of the study of women who aim to obtain good health fitness which means the general health of individuals at first before considering other aspects. The researcher hopes that this work is a scientific simple addition. Hence, to understand the fact of women’s bodies and resistance

to internal environmental conditions came the research problem, which is studying what happens to a women’s body during exposure to effort with different intensities to be subject to the anaerobic system and their effect of cardio-respiratory and muscular endurance with fitness practices of age 40-45 years old, and thus the return of good health to the practice of sport activity.

### Objectives of the Study

1. Setting a training program including anaerobic training for the sample of the study
2. Determining the effect of the anaerobic training program on cardio-respiratory endurance, muscular endurance, and agility for the sample of the study.

## METHODOLOGY

The researcher used the empirical method as it helps to solve problem of the study “attempting to adjust the main factors affecting the change of dependent variables in the trial except for one factor controlled by the researcher and changed in a certain manner to determine its effect and measurement in dependent variable(s) (Mahgoub, 2001: p. 7).”

### Sample of the Study

The researcher selected a sample from the original population of 10 female fitness practitioners and aged 40-45 years using the purposive method in a single empirical group, and the remaining two of the sample were subject to exploratory study through anaerobic training. To determine sample homogeneity, the researcher extracted skewness coefficient for the selected sample (under study) to make the main trial in high accuracy. The researcher extracted skewness coefficient for length, weight, and age after extracting arithmetic mean, median, and standard deviation for each item. Results showed sample homogeneity because it was between  $\pm 3$  as shown in Table 1.

**Table 1:** Sample properties, statistical features, and sample homogeneity values

Tests	Mean±SD	Median	Skewness value
Weight (kg)	84.12±10.09	82.5	1.023
Total body length (cm)	161.25±3.59	160	0.119
Age (year)	38±8.82	38	2.867

SD: Standard deviation

## Field Procedures of the Study

### Determining tests of the study

Through reference research and consulting the supervisor, the following tests were adopted:

- Cardio-respiratory endurance test (Radwan, 1988: p. 6)
- Muscular endurance test for abdomen muscles (Al Jameeli, 1983: p. 2)
- Fitness-shuttle run test 104 m × 40 m (Ali, 1999: p. 5).

### Pre-tests

Pre-tests were conducted on the sample of the study (10 females) at 10 am on Sunday, 09/11/2015. The researcher applied muscular endurance test and endurance test for arm muscles with the same consistent variables in tests (time, place, devices, tools, and assistant team) in post-tests.

## The Training Program

The empirical group was subject to items of the training program prepared by the researcher in a period of 4-month starting from 11/11/2015 to 21/02/2016. Training rate in a single week was three training units for the following days: Saturday, Monday, and Wednesday.

### First - Objectives: The researcher's training course

- 1<sup>st</sup> month includes general preparation of fitness development for the sample of the study of the empirical group
- The group was subject to training period of 3-month, in which the training group was trained through the anaerobic system.

### Second - Training methods

The most significant characteristic in training is the use of suitable methods to achieve objectives of its items. The researcher used the circulatory training through less intensity interval method. Training intensity ranged between 35% and 70% in general preparation exercises. In anaerobic system exercises, the researcher used high-intensity training ranged between 80% and 95% of practice.

### Third - Components and items of the training program

Items of the course included a set of exercises that contributed to develop the physical and functional potential in general in the 1<sup>st</sup> month and then 3 months

of training the group using anaerobic training system. Items of the course included the following:

- The training course's limit is 4 months
- Total course limit id is 16 weeks
- Number of training units per week is 3 units
- Training days: Saturday, Monday, and Wednesday
- Number of training units in the course is 48 units
- Time period in preparation section is 10 min
- Time period of aerobic training in the single unit is 45 min
- Time period of anaerobic training in the single unit is 45 min
- Final section time duration is 5 min
- Duration of the single training unit is 60 min
- Total time period of training units within 4 months is 2880 min
- Total time period in preparation section is 480 min
- Total time period in main section is 2160 min
- Total time period in final section is 240 min.

The researcher conducted sample observation during implementation of the training course in terms of any overload that may cause fatigue which may lead to stop the training course implementation.

### Post-tests

Post-tests were conducted on the sample of the study on February 24, 2016, with the same sequence as pre-tests. The researcher committed to follow the same method in pre-tests and provided the same conditions and requirements including time, place, work team, assistant team, and the applied method in tests.

## DISCUSSING AND ANALYZING RESULTS

### Presenting and Analyzing Results of Pre- and Post-tests for the Sample

Table 2 shows results of pre- and post-tests for the sample of the study in health fitness component tests using the *t*-test for symmetric samples.

From results of Table 2, we can find that there is a notable development showing the effectiveness of the training course in general with low and medium intensity exercises in developing cardio-respiratory endurance for the sample. References show that the cardio-respiratory system training works in big muscles which lead to consume amounts of oxygen more than speed training. This agrees with Ahmed (1999: p. 3), who refers that "functional effect through continuous load method is working on raising functional work of the heart, circulatory system,

**Table 2:** Results of pre- and post-tests for the sample of the study in health fitness at significance level (0.05) and freedom degree (19)

Features	Variables	Measure unit	Mean±SD		Counted T	Error level	Significance
			Pre-tests	Post-tests			
Cardio-respiratory endurance	Cooper's test	Meter	1300±2.256	1458±2.20	4.387	0.00	Significant
Muscular endurance	Sitting from lying	Repetition	16.916±5.16	23.75±5.479	12.792	0.00	Significant
Agility	Shuttle run test		15.09±0.607	14.87±0.796	0.911	0.001	Significant

SD: Standard deviation

and respiratory system, organizing oxygenic exchange process, increasing the ability of blood on carrying the biggest amount of oxygen and necessary fuel to continue exerting effort, and then increasing cardio-respiratory loads as happened with the sample of the study.”

The researcher noticed that there were statistically significant differences in terms of results of muscular endurance test results between pre- and post-tests in favor of post-test. The researcher attributes this to continuous aerobic training that develops general endurance, especially if there is optimal period to make ability through the use of muscular system with the circulatory system which leads to muscular endurance. This was approved in the researcher’s course.

Through enhancing the function of the circulatory system and increasing blood’s ability to carry bigger amount of oxygen and necessary fuel to continue exerting effort at aerobics, continuous training develops oxygenic ability which works on “enhancing muscular work that depends mainly on oxygen in producing anaerobic energy for a long period before feeling fatigue (Abdel-Fattah, 1998: p. 1).” As for agility, the researcher found that the development in results was attributed to the used training. This agrees with Hossam et al. (2000: 4) as “The most important thing that can be achieved by these types of exercises is to improve the level of balance and agility being the basic physical components in many sporting activities. Concerning agility, it is known that flexibility works on the consistency of allowing free movement as well as to increasing synergy either in performance and agility.”

## CONCLUSIONS

- Anaerobic training has an effect on variables of the study more in post-tests than in pre-tests

- Cardio-respiratory endurance is important to reduce fatigue through body adaptation after physical effort
- Muscular load is affected by physical effort and according to intensity requirements, consistency, and period of training
- Agility is affected by physical effort under study.

## Recommendations

Through the researcher’s trial and findings, the following are her recommendations:

- The sample of the study shall be subject to continuous investigations at response to determine short- and long-term effects
- Continuous and periodic medical follow-up to check vital systems of the body
- It is important to practice physical effort in enhancing general health and body systems
- Conduct similar studies but with different ages
- Conducting studies using functional topics that agree with the idea of the study.

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## Annex 1

### Model of the main training unit for general preparation

Month:	First	Date:	19/10/2015	Unit duration:	45 min
Week:	(1)	Unit:	(1)	Unit objective:	Developing cardio-respiratory system
Exercises	Intensity %	Repetition	Break between exercises	Number of groups	Break between groups
10, 11, 12, 22	40	20	1 min	3	3 min
13, 14, 15	45	15	1 min	3	3 min
7, 8, 9	45	15	1 min	3	3 min
16, 17, 18	40	15	1 min	3	3 min
21, 23, 24, 30	45	20	1 min	3	3 min
32, 40, 35, 63, 64	40	25	1 min	3	3 min

## Annex 2

### Model of the main training unit for general preparation

Month:	Second	Date:	07/12/2015	Unit duration:	45 min
Week:	(4)	Unit:	(1)	Unit objective:	Developing maximum and under maximum strength
Exercises	Intensity %	Break between exercises	Number of groups	Break between groups	
74, 75, 66, 67	80	1 min	2	3 min	
70, 71, 72	85	1 min	2	3 min	
3	90	30 s	-	1 min	
4	95	30 s	-	1 min	
73, 66, 78	85	1 min	2	3 min	
65, 56	90	1 min	2	3 min	

## Annex 3

### Exercises used in training

1. Running on speed 5
2. Jogging on speed 5
3. Running on speed 7
4. Jogging on speed 7
5. Hand push on the multi-training device
6. Feet push on the multi-training device
7. Feet push on the multi-training device consecutively with each leg separately
8. Push by right and feet on the multi-training device
9. Abdomen training on the multi-training device from lying position
10. Dash in place with raising arms alternatively
11. Dash in place with cross arms upward
12. Steps forward with raising heels at walking
13. Side lying – legs bent, open upward and side bent
14. Side lying – lower legs stretched, higher legs bent on the ground and legs open upward
15. Side lying – legs stretched and legs open upward
16. Lying on the back – legs and arms bent behind head and raise head upward
17. Lying on the back – legs bent and putting the other leg on the knee from motor and back elbow
18. Lying on the back – bent legs and thigh rising upward

19. Leaning on four and thigh rising upward
20. Leaning on four and thigh lowering downward
21. Bending trunks forward in long sitting
22. Side spreading arms – opening and closing legs by jumping on two sides
23. Stretching leg forward and raising arms upward alternatively
24. Bending and stretching legs with trunks press downward and stretch upward
25. Dash in place with cross arms upward – downward with inclined trunks
26. Dash in place with side rotation of arms
27. Forward and other side steps with two backward jumps
28. Standing with side stretching arms – side opening and closing of legs
29. Bending legs and arms from elbows before the body with opening and closing in two right and left steps
30. Forward physical training
31. Sitting on a chair and raising legs upward
32. Standing with a stick behind head and side trunks
33. Side lying – bending legs while opened upward
34. Side lying – stretched legs, bending, and stretching and then opened upward
35. Back lying – bending leg, putting the other leg on knee, and touch elbow by the opposed leg's knee
36. Inclined lying with head on legs bent below and trunks bent forward
37. Lying on abdomen – raising thigh off the ground
38. Lying on the back – raising thigh off the ground
39. Lying on abdomen – arms behind head and raising head upward
40. Jumping with hitting thigh by heels
41. Jumping with spreading trunks and stretching elbow backward
42. Forward and side and the other side, steps with bent legs and two jumps backward
43. Standing with side spread arms – side opening and closing legs by jumping
44. Position of sitting on a chair with raised legs
45. Standing with stretching legs upward and raising arms upward alternatively
46. Standing, bending, and stretching legs with downward trunks press and upward stretch
47. Physical training with raised weight
48. Side bending trunks with raised weight by one hand
49. Lying on the back, raised legs, upward and downward
50. Inclined lying, head below, legs upward, trunks bend and stretch
51. Standing with stretched waist, trunks bending on both sides alternatively
52. Lying on abdomen, raising arms, and legs upward
53. Sitting and carrying a stick behind head, bending trunks on both sides
54. Sitting with opening right hand overhead and bent left hand on chest, trunks bent on both sides alternatively
55. Side lying – raised legs, lowering lower leg
56. Side lying – bent legs, opening legs upward while being bent
57. Standing with open legs, stretched arms, carrying weights and side inclination
58. Standing and carrying a weight with one hand while side trunks bending
59. Lying on the back with bicycle movement
60. Lying on the back, raising and lowering legs.