

The efficiency of Cardio training program on some variables of the body composition and the performance level of the female students specialized in the dance .

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Introduction:

The scientific development becomes the main feature of this era, and the scientific research is the most important factor to develop the societies in all fields, specially the sport. The sport achieves a great progress in the dance, especially the modern dance. The modern dance is a creative art, as the dance taught in faculty of Physical Education (girls), Al Zagazig University includes ballet, modern dance and folk dance. The modern dance is a new development of an old art derived from the dancer, expressing himself; he used the body as a tool and the movement as an organized means to communicate his ideas.

It is worth noting that, developing the performance level of dance varies among the dancers. It depends on the body composition, the muscle composition and the ratio of fats in the body. **Abu Al aela Ahmed Abdul Fatah and Ahmad Nasr El Din Sayed (2003)** revealed that, there was an inverse relationship between the rate of the fat in the body and the performance level, as well as, the increase in the muscular mass and the decrease in the ratio of fat resulted from the different aerobic exercises. (1:69)

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As Cardio training is an aerobic exercise, it is considered as a modern training leading to the fat burning, improving the performance level of the body, healthcare and fitness through recording the certain level of heart beats during the training. (1:18)

Mc Tiernan et al. (2007) (7), Redman et al. (2007) (11), Trappeg et al. (2008) (17) pointed out the importance systemic different aerobic exercises according to the capabilities of the performers, as they positively affect the circulatory, respiratory, muscular systems, and lead to an increase in the muscular mass and the decrease in the ratio of fat in the body.

Problem and importance of the research:

The performance level of the sport in general and the modern dance in particular is related to the body composition in terms of the muscles and fats.

The researcher found out the underperforming of the female students, and they are tired quickly during the dance. She believed that is related the increase in the ratio of fat in the body compared to the mass of muscles according to the body mass index. As the body composition is the first pillar to improve the quality of modern dance, and the modern dance requires a certain muscular composition, hence, the specialized codified training programs is too significant to develop the dance. As the cardio training improves the fitness level, burns the fat, and strengthen the muscles, the cardio is the best exercise for the quality modern dance. So, the researcher prepared a cardio training program to define its effect on some variables of the body composition and the performance level of the female students specialized in the modern dance.

Objectives of the research:

It aims to define the:

- 1- The efficiency of the proposed program on some variables of the body composition (the fat body weight, light body weight, the fat and skin folds thickness in areas such as post humeral, low back (lumbar), abdominal, above the iliac bones, above the femur).
- 2- The performance level of the female students specialized in the modern dance.

Hypotheses of the research:

- 1- There are statistically significant differences between the pre and post measurements for both control and experimental groups in terms of some variables of the body composition and the performance level of the female students specialized in the modern dance, for the post measurements.
- 2- There are statistically significant differences between both post measurements for both control and experimental groups in terms of the variables (under the study), for the control group.

Terminologies of the research:

Cardio^(*): “aerobic exercises to improve the fitness level through the increase in the heart beats (50- 80%), to strengthen the heart and burn the fats”.

Body composition: “the ratio of fats compared to the other body components”.(1:315)

(*) Definition of procedurally

Modern dance: “a creative art using the different body movements according to the individual capabilities”. (12:151)

Procedures:

Methods of the research:

The researcher used the experimental approach using the experimental design with pre and post measurements for two experimental and control groups.

Sample and society of the research: The society was selected from the 3rd grade female students specialized in the dance, faculty of Physical Education (girls), Al Zaqaziq University (2014- 2015) (40) female students.

The researcher strikes a balance between the society subjects in terms of the variables (under study). Table no. 1 shows that:

Table (1)**Statistical balance to research society of the variables under study****N = 40**

	Variables	Unit	Average	Medium	Standard deviation	Torsion	
Anthropometric variables	Age	year	20.00	20.00	0.85	0.00	
	The length	cm	161.25	161.00	7.47	0.10	
	The weight	kg	65.66	65.00	5.49	0.36	
	BFW	kg	16.95	16.40	3.56	0.46	
	The percentage of BFW	%	25.94	26.20	5.81	-0.13	
	BW (without) F	kg	48.71	48.55	3.43	0.14	
	Skin folds	Behind the upper arm brachium	mm	2.66	2.50	0.46	1.04
		Lower back	mm	2.26	2.20	0.53	0.34
		Abs	mm	2.23	2.20	0.50	0.18
		Above the iliac bones	mm	2.84	3.00	0.83	-0.58
Above the femur		mm	2.44	2.50	0.56	-0.32	
Physical elements	Leg strength (dynamometer)	kg	63.63	65.00	15.99	-0.26	
	Back strength (dynamometer)	kg	62.77	65.00	15.77	-0.42	
	Flexibility	cm	28.91	29.49	3.91	-0.45	
	Agility	sec	10.94	11.00	0.83	-0.22	
	Compatibility	degree	1.83	2.00	0.99	-0.52	
	Balance	sec	2.72	2.39	1.17	0.85	
	Performance level in modern dance	degree	6.96	6.67	1.48	0.59	

All torsion coefficients values in terms of the variables are limited to ± 3 . It refers to the balance in the distribution of the sample subjects according to these variables. Then, the researcher drew a sample of (8) female students to conduct the reconnaissance study. So, the main sample consists of (32) female students which randomly distributed into control and experimental groups, each of them include (16) female students. The researcher made a match between both groups. Table no. 2 shows that:

Table (2)
Sign of differences between both groups pre and post of
the variables under study

N₁ = N₂ = 16

	Variables	Unit	Experimental group		Control group		“T”	
			Average	Standard deviation	Average	Standard deviation		
	BFW	kg	17.51	3.67	16.83	3.75	0.50	
	The percentage of BFW	%	26.76	4.59	25.85	7.36	0.41	
	BW (without) F	kg	45.21	2.71	45.83	4.15	0.48	
	Skin folds	Behind the upper arm brachium	mm	2.76	0.55	2.64	0.41	0.67
		Lower back	mm	2.45	0.44	2.22	0.60	1.21
		Abs	mm	2.30	0.54	2.21	0.53	0.45
		Above the iliac bones	mm	3.05	0.96	2.65	0.84	1.21
		Above the femur	mm	2.47	0.44	2.35	0.66	0.60
Physical elements	Leg strength (dynamometer)	kg	63.50	16.69	58.92	16.94	0.75	
	Back strength (dynamometer)	kg	65.58	13.43	57.25	19.74	1.35	
	Flexibility	cm	29.19	4.01	28.59	3.44	0.44	
	Agility	sec	10.85	1.00	10.80	0.80	0.15	
	Compatibility	degree	1.75	0.97	2.00	1.13	0.66	
	Balance	sec	2.69	1.17	2.66	1.08	0.07	
	Performance level in modern dance	degree	7.04	1.39	7.01	1.80	0.05	

“T” (0.05) = 2.032

There are no statistically significant differences between the control and experimental groups in terms of the variables (under study) before the program. That refers to the match between both groups in terms of the variables (under study).

Data collection tools:

1) Tools and equipments

- The Restameter equipment to measure the length (cm)

- The medical scale to measure the weight (kg)
- The fat and skin folds thickness equipment (mm)
- The body composition analyzer
- The dynamometer to measure the strength of the back and legs muscles (kg)
- The measuring tape to measure the circumference (cm)
- The stopwatch to measure the time (fitness, balance)
- Four bars to test the fitness
- A rope to test the adaptation

2- The tests:

The researcher presented the most important physical elements and the tests measuring them (appendix 2). They were submitted to the experts (appendix 1) to define the most suitable physical elements and the tests measuring them. The elements and tests that recorded “80%” or more were selected as follow:

Table (3)

The percentage of experts in physical elements and it’s tests

Physical elements	Physical test	Percentage
Leg strength	Dynamometer	100%
Back strength	Dynamometer	100%
Flexibility	Back trunk extension	100%
Agility	Zig-zag running	90%
Compatibility	Skipping rope	90%
Balance	Stand on the toe (Stork)	80%

The reconnaissance study:

The researcher conducted the reconnaissance study on a sample of (8) female students that were randomly selected inside and outside the main sample from Sunday 8/2/2015 to Thursday 12/2/2015, as the study aimed the following:

- Making sure of the safety of the tools and equipment used in the research.
- Defining the time necessary for the measurements
- Making sure of the validity and appropriateness of the tests
- The suitability of the timing distribution for the training unit
- The appropriateness of the training unit for the sample, and defining the deficiencies
- Identifying the suitable training and the daily time for the training unit
- Recognizing the difficulties faced by the researcher during the application of the cardio training program
- The relevance of the different music compositions accompanying the daily training
- Conducting the reliability and credibility coefficients for the tests.

The scientific coefficients for the tests:

The credibility:

To verify the credibility of the tests, the researcher used the differentiation credibility by applying the tests to two groups; each of them consisted of 8 female students. One of them was obtained from the research society and outside the sample (distinct group), and the other group

consisted of 3rd grade female students, faculty of Education at the university, they do not do and sport (non- distinct group), Table 4 showed that:

Table (4)

Sign of differences between distinct group and non-distinct group of physical tests under study

N₁ = N₂ = 8

Tests	Unit	Distinct group		Non-distinct group		“T”
		Average	Standard deviation	Average	Standard deviation	
Leg strength (dynamometer)	kg	73.31	8.51	42.01	17.06	4.64*
Back strength (dynamometer)	kg	68.15	7.81	43.03	16.33	3.93*
Flexibility	cm	34.86	3.16	27.93	4.45	3.59*
Agility	sec	11.31	0.46	16.43	0.77	16.00*
Compatibility	degree	1.67	0.83	0.50	0.35	3.66*
Balance	sec	2.87	1.52	1.31	0.28	2.84*

“T” (0.05) = 2.15

There were statistically significant differences between the distinct and non distinct groups in the physical tests. That means the credibility of these tests.

The reliability:

The reliability of the tests was calculated by applying and reapplying the test with interval up to 4 days between the two tests from Sunday 8/2/2015 to Thursday 12/2/2015, Table 5 showed that,

Table (5)

**The interrelationship coefficient between applying and reapplying
of the physical tests under study**

N = 8

Tests	Unit	Applying		Reapplying		Inter-relationship
		Average	Standard deviation	Average	Standard deviation	
Flexibility	cm	27.93	4.45	28.54	4.84	0.999*
Agility	sec	11.32	0.44	11.21	0.32	0.991*
Compatibility	degree	1.68	0.81	1.39	0.99	0.897*
Balance	sec	2.86	1.51	3.01	1.23	0.987*

“R” (0.05) and $\alpha = 0.707$

There were statistically significant interrelationships between applying and reapplying of the physical tests, referring to the reliability of these tests.

The steps necessary to prepare the proposed cardio training program (appendix 6):

The researcher prepared a cardio training program suitable for the female students in Egypt as follows:

How to prepare a cardio training program:

- 1- The cardio training program should achieve its targeted goal: developing some variables of the body composition, and then improving the performance level of the 3rd grade female students in the modern dance.
- 2- Focusing on the complex movements, and the movement of more than one body organ at the same time in variable directions and on different levels, leading to good quality modern dance.

- 3- Considering the good warm up (5- 10 minutes). It should include training for the elongation of all muscles before the start of the work-out training to be adapted, and to prevent any injuries to them.
- 4- The relevance of the program to the research society.
- 5- Caring for the intensity of the training load at the start of the program, as the aggressive training burns the glycogen not the fats, so the researcher was interested to launch the program with medium- intensity the training.
- 6- The training was accompanied with the music, starting from the warm up training, passing through the work-out training and ending with the cool down training, to keep training tirelessly.
- 7- While training, one must strain the muscles of the stomach and leave a small space between the back and the floor.

The content of the cardio training program:

Upon defining the main principles of the program, the researcher tried to know the opinions of the experts (appendix 1) on the content of the training and timing plan of the program in terms of (the whole time of training, the repetition of training per week, the time of the daily training unit, the training load intensity, the graduation of the training intensity) (appendix 4).

The evaluation of the proposed program:

The researcher demonstrated the program in its initial form before the experts, made the modifications they recommended, and demonstrated it again in its final form until they agree its validity to be applied and achieve its targeted goal.

The content of the daily training unit: it contains 3 main parts:

1-The worm up (10 min.):

It included a set of simple and variable exercises for the neck two arms, torso and two legs, along with a set of jumps and exercises of elongation and flexibility for the body muscles and joints, in order to activate the blood circulation, increase the temperature of the body, and prepare the body for the work-out training. Hence, the body, especially (tendons, ligaments, muscles) would not be vulnerable to the rupture or the cramp. The worm up training was continuously accompanied with music (10 minutes).

2- The main part (15- 50 min.):

It was the most important part, as it achieved the targeted goal. It included some free exercises for all muscles in all directions and on all levels. It was accompanied with suitable music. There was a graduation of the training intensity, as the training lasted for (15) min. in the first week, then the time increased (5) min. per week until the end of the program, as the training lasted for (50) min. in the last week.

3- The cool- down (5 min.)

It included a set of exercises for the elongation and relaxation of the working muscles, along with exercises to regulate the breathing (deep inhalation and slow exhalation with repetition) to cool down the body systems and the blood circulation, and to redistribute the blood in right way after ending the work out. This training was accompanied with slow music for relaxation and for the body to return to its natural state. it lasted for only (5 min.) during the program.

The evaluation of the performance level:

The performance level of the female students in the modern dance was evaluated by a committee of female arbitrators- (3) prof. of the dance. The degree for the performance level was defined as (30) degree.

The executive steps of the research

The pre measurement

The pre measurement was conducted for both control and experimental groups in terms of some body composition variables (fat body weight- light body weight- the fat and skin folds thickness in areas: post humeral, low back (lumbar), abdominal, above the iliac bones, above the femur), and the performance level of the female students in the modern dance on Saturday and Sunday 14, 15/2/2015.

The main experiment of the research

The researcher applied the cardio training program to the experimental group from Monday 16/2/2015 to Saturday 11/4/2015 for two months. The daily training was repeated (4) times per week (Monday, Wednesday, Thursday, Saturday) for (30) min. distributed into (10) min. for the worm up, (15- 50) min. for the workout, (5) min. for the cool down. There was a graduation of the training intensity, as the training lasted for (15) min. in the first week, then the time increased (5) min. per week until the end of the program, as the training lasted for (50) min. in the last week. The training intensity was calculated (50-80%) according to the heart beats through Carfo equation on the basis of (50%), then it was substituted on the basis of (80%) of the maximum heart beats. The output of both equations expressed the training scope (target heart rate) that the female student could afford.

The target heart rate (T.H.R.) = the percentage of the training (the maximum heart beats- the heart beats during the relaxation) + the heart beats during the relaxation- the maximum heart beats= 220- the age.

Since the average age of the female students= 20 years, the average heart beats during the relaxation= 70 beat per min., then, the maximum heart beats= 220-20= 200 beat per min.

The target heart rate during the training = $0.50(200-70)+70=135$ beat per min.

$= 0.80(200-70)+70=174$ beat per min.

Then, the heart beats ranged between 135: 174 beat per min. during the training, and the training zone ranged between 135: 174 beat per min.

The same program was completely applied to the control group for two days after the end of the school day and two days before the start of the school day in exchange for the experimental group. The focal point was learning the skills and movements included in the curriculum regardless the development of the fitness of the female students.

The follow- up measurement:

It was conducted after 4 weeks from the start of the program, on the variables (under study) for both control and experimental groups on Sunday and Monday 15, 16/3/2015.

The post measurement:

It was conducted on the variables (under study) for both control and experimental groups on Sunday and Tuesday 12, 14/4/2015, under the same circumstances related to the pre and follow- up measurements

The statistical processing

- The mean or average
- The percentage or the change rate
- The interrelationship coefficient differences, F test
- The standard deviation differences, T test
- The coefficient of torsion
- The median
- The significance of
- The significance of

The presentation and discussion of the results:

Firstly, the presentation of the results:

Table (6)
F-test between three measurements for control group of
the variables under study

N = 40

Variables		Source of variation	Sum of squares	Degree of freedom	Average squares	“F”	
BFW		Between measurements	3.88	2	1.94	0.12	
		Inside measurements	513.50	33	15.56		
The percentage of BFW		Between measurements	80.39	2	40.20	0.76	
		Inside measurements	1740.48	33	52.74		
BW (without) F		Between measurements	17.44	2	8.72	0.60	
		Inside measurements	476.05	33	14.43		
Skin folds	Behind the upper arm brachium	Between measurements	0.16	2	0.08	0.42	
		Inside measurements	6.18	33	0.19		
	Lower back	Between measurements	0.02	2	0.01	0.03	
		Inside measurements	12.82	33	0.39		
	Abs	Between measurements	0.02	2	0.01	0.06	
		Inside measurements	6.97	33	0.21		
	Above the iliac bones	Between measurements	0.40	2	0.20	0.35	
		Inside measurements	18.43	33	0.56		
	Above the femur	Between measurements	0.12	2	0.06	0.15	
		Inside measurements	11.72	33	0.36		
	Performance level in modern dance		Between measurements	377.01	2	188.51	72.97*
			Inside measurements	82.98	33	2.51	

“F” (0.05) = 3.20

Table no. 6 showed that, there were no statistically significant differences between the three measurements (pre- post- follow up) for the control group in terms of the variables (under study) except the skilled performance level variable. The researcher would conduct L.S.D. test to define the differences of the skilled performance level variable.

Table (7)

Sign difference between three measurements for control group of performance level

Variable	Measurements	Average	Follow-up	Post	L.S.D. "0.05"
Performance level	Pre	6.11	3.51*	7.83*	1.31
	Follow-up	8.99		4.32*	
	Post	12.98			

Table no. 7 showed that, there were statistically significant differences in terms of the skilled performance level variable in the control group between the pre and post measurements for the post measurement. There were statistically significant differences between the post and follow up measurements for the post measurement. There were statistically significant differences between the pre and follow up measurements for the follow up measurement.

Table (8)

**The percentage between three measurements for control group
of the variables under study**

Variables		Measurement	Average	Follow-up	Post	
Variables of body composition	BFW	Pre	12.83	0.39%	1.17%	
		Follow-up	12.78		1.01%	
		Post	12.65			
	The percentage of BFW	Pre	19.99	0.20%	0.30%	
		Follow-up	19.95		0.10%	
		Post	19.93			
	BW (without) F	Pre	47.88	0.20%	0.69%	
		Follow-up	47.87		0.67%	
		Post	47.55			
	Skin folds	Behind the upper arm brachium	Pre	2.66	4.89%	7.14%
			Follow-up	2.53		2.37%
			Post	2.47		
		Lower back	Pre	2.34	5.56%	5.98%
			Follow-up	2.21		0.45%
			Post	2.20		
		Abs	Pre	2.23	1.79%	2.69%
			Follow-up	2.19		0.91%
			Post	2.17		
Above the iliac bones		Pre	2.69	4.09%	10.78%	
		Follow-up	2.58		6.98%	
		Post	2.40			
Above the femur	Pre	2.43	3.70%	1.24%		
	Follow-up	2.43		2.56%		
	Post	2.40				
Performance level in modern dance	Pre	6.11	47.14%	112.44%		
	Follow-up	8.99		44.38%		
	Post	12.98				

Table no. 8 showed that, the highest rate of variability (112.44%) was between pre and post measurements in terms of the skilled performance level variable. It was followed by the variability rate between pre and post measurements in terms of the fat and skin folds thickness above the femur (10.78%), while the least variability rate between pre and follow up measurements was in variable of the light body weight (0.02%).

Table (9)
F-test between three measurements for experimental group
of the variables under study

Variables		Source of variation	Sum of squares	Degree of freedom	Average squares	“F”	
BFW		Between measurements	4.88	2	2.44	0.17	
		Inside measurements	431.71	33	13.05		
The percentage of BFW		Between measurements	2.06	2	1.03	0.06	
		Inside measurements	672.98	33	20.71		
BW (without) F		Between measurements	8.66	2	4.33	0.55	
		Inside measurements	252.67	33	7.71		
Skin folds	Behind the upper arm brachium	Between measurements	1.44	2	0.72	2.96	
		Inside measurements	6.78	33	0.21		
	Lower back	Between measurements	1.18	2	0.59	2.44	
		Inside measurements	8.02	33	0.24		
	Abs	Between measurements	0.86	2	0.43	1.31	
		Inside measurements	11.01	33	0.34		
	Above the iliac bones	Between measurements	4.64	2	2.32	4.84*	
		Inside measurements	16.71	33	0.52		
	Above the femur	Between measurements	2.01	2	1.01	5.93*	
		Inside measurements	5.71	33	0.17		
	Performance level in modern dance		Between measurements	1379.99	2	687.21	229.98*
			Inside measurements	92.05	33	2.77	

“F” (0.05) = 3.20

Table no. 9 showed that, there were statistically significant differences between the three measurements (pre- post- follow up) for the experimental group in terms of the fat and skin folds thickness above the femur and above the iliac bones, while the differences were not statistically significant in other variables of the body composition. There were statistically significant differences between the three measurements in the skilled performance level variable. The researcher would conduct the test L.S.D to recognize the differences direction.

Table (10)
Sign differences between three measurements for experimental group of skin folds above the femur, above the iliac bones and performance level

Variables		Measurement	Average	Follow-up	Post	L.S.D. "0.05"
Skin folds	Above the iliac bones	Pre	3.06	0.58	0.85*	0.58
		Follow-up	2.46		0.28	
		Post	2.19			
	Above the femur	Pre	2.48	0.34	0.57*	0.34
		Follow-up	2.11		0.23	
		Post	1.88			
Performance level in modern dance		Pre	6.06	8.03	16.10*	1.31
		Follow-up	14.08		8.11*	
		Post	21.22			

Table no. 10 showed that, there were statistically significant differences in terms of the fat and skin folds thickness above the femur for the experimental group between the pre and post measurements for the post measurement, while the differences were not significant between the pre and follow up measurements and between the post and follow up measurements. There were also statistically significant differences in terms of the fat and skin folds thickness above the iliac bones between the pre and post measurements for the post measurement, while the differences were not significant between the pre and follow up measurements and between the post and follow up measurements. There were statistically significant differences in the skilled performance level variable between the pre and follow up measurements for the follow up measurement, between the post and follow up measurements for the post measurement, and between the pre and post measurements for the post measurement.

Table (11)

The percentage between three measurement for experimental group of the variables under study

Variables		Measurement	Average	Follow-up	Post	
Variables of body composition	BFW	Pre	12.55	3.51%	3.90%	
		Follow-up	12.11		0.41%	
		Post	12.06			
	The percentage of BFW	Pre	19.87	2.16%	3.67%	
		Follow-up	19.44		1.54%	
		Post	19.14			
	BW (without) F	Pre	48.22	2.03%	2.26%	
		Follow-up	49.20		0.22%	
		Post	49.31			
	Skin folds	Behind the upper arm brachium	Pre	2.77	9.39%	17.69%
			Follow-up	2.51		9.16%
			Post	2.28		
		Lower back	Pre	2.45	5.71%	17.96%
			Follow-up	2.31		12.99%
			Post	2.01		
		Abs	Pre	2.31	8.66%	17.32%
			Follow-up	2.11		9.48%
			Post	1.91		
Above the iliac bones		Pre	3.06	19.61%	28.43%	
		Follow-up	2.46		10.98%	
		Post	2.19			
Above the femur	Pre	2.48	14.92%	42.19%		
	Follow-up	2.11		10.90%		
	Post	1.88				
Performance level in modern dance		Pre	6.06	132.34%	250.17%	
		Follow-up	14.08		50.71%	
		Post	21.22			

Table no. 11 showed that, the highest rate of variability (250.17%) was between pre and post measurements in terms of the skilled performance level variable. It was followed by the variability rate between pre and post measurements in terms of the fat and skin folds thickness above the femur (28.43%), while the least variability rate between follow up and post measurements was in variable of the light body weight (0.22%).

Table (12)

**The sign difference between post measurements for both
group of the variable under study**

N₁ = N₂ = 16

	Variables	Control group		Experimental group		“T”	
		Average	Standard deviation	Average	Standard deviation		
Variables of body composition	BFW	12.65	3.19	12.06	3.14	0.51	
	The percentage of BFW	19.93	4.18	19.14	4.11	0.52	
	BW (without) F	47.55	3.66	49.31	2.77	1.48	
	Skin folds	Behind the upper arm brachium	2.47	0.49	2.28	0.41	1.12
		Lower back	2.20	0.66	2.01	0.49	0.91
		Abs	2.17	0.27	1.91	0.22	2.92*
		Above the iliac bones	2.40	0.65	2.19	0.43	1.05
		Above the femur	2.40	0.34	1.88	0.21	4.73*
	Performance level in modern dance	12.98	1.56	21.22	2.09	12.30*	

“T” (0.05) = 2.032

Table no. 12 showed that, there were statistically significant differences between both control and experimental groups in the post measurements in terms of some body composition variables (the fat and skin folds thickness in the abdominal area and above the iliac bones) for the experimental group, while the differences were not statistically significant in terms of other body composition variables (under study). There were statistically significant differences in the skilled performance level variable for the experimental group in the post measurement.

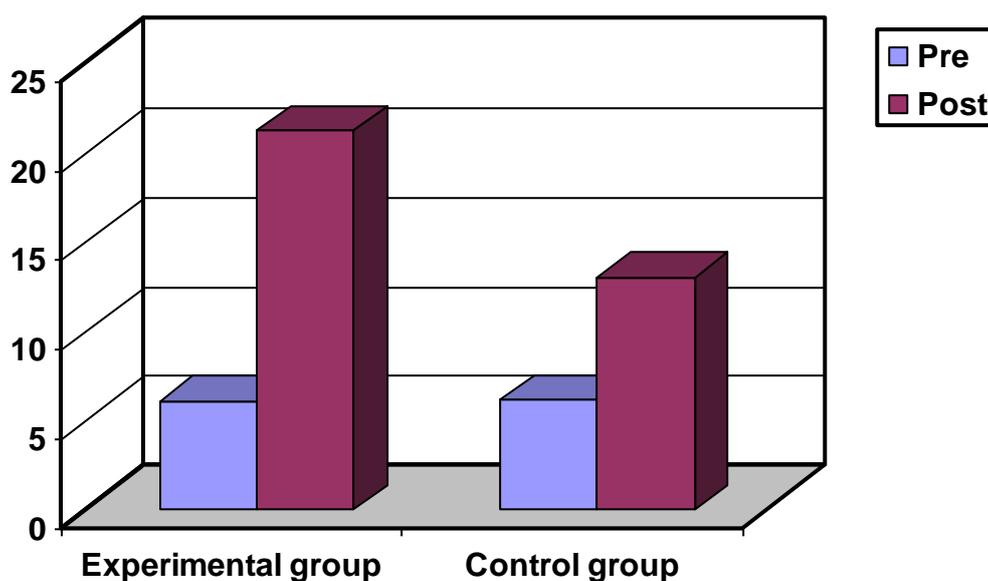


Figure no. 1

The differences between the control and experimental groups in terms of the performance level before and after applying the program

Secondly, Discussion of the results:

Table no. (6) concerning the variance analysis between the three measurements (pre- follow up- post) in terms of the body composition variables and the skilled performance level – under the study-for the control group, showed that, there were no statistically significant differences between the three measurements between the body composition variables (under study), but the difference were statistically significant for the skilled performance level variable. Table (7) concerning the significance of the differences the three measurements for the control group, showed that, these differences were for the follow up and post measurements. Table no. (8) concerning the variability rate between the three measurements, showed that, the highest rate of variability (112.44%)

was between pre and post measurements in terms of the skilled performance level variable. It was followed by the variability rate between pre and post measurements in terms of the fat and skin folds thickness above the femur (10.78%), while the least variability rate between pre and follow up measurements was in variable of the light body weight (0.02%).

The researcher attributed the absence of the statistically significant differences between the body composition variables –under study- for the control group, to the type of the program, as it did not contain enough cardio training to improve these variables, and to burn the extra calories in the body, leading to the decrease in the fats, so the skilled performance level would be improved. The researcher also attributed that to the continuous stopping, as the followed program contained a set of complex skills requiring more time to be learnt, so, there was a continuous stopping to correct the errors. The training should be lasted for (25- 30) minutes at least to decrease the fat and for having a light body weight. That was consistent with what was pointed out by **Silver.E and Francine (2002)** (15), **Trapp E.F et al (2008)** (17), **Barbara. J et al (2009)** (2), **Jama. F(2012)** (6), **Tamlyn Shields et al (2012)** (16) as the training should be lasted for 30 minutes without stopping if the objective was to reduce the ratio of fats in the body. Regarding the skilled performance level, the researcher attributed the statistically significant differences in the control group to applying the followed program at the faculty 4 times per week for 8 weeks as follows: 30 minutes in the first week, and this time increased 5 minutes weekly starting from the worm up and the training of the modern dance, including related and complex skills with focusing on the repetition and correction of the errors. That conformed to what was said by **Serge J.M. et al (2003)** (13) as the performance level would be improved if there

was training on the practiced activity. Table no. 9 concerning the variance analysis between the three measurements in the body composition variables and the skilled performance level- under study- in the experimental group, showed that, there were statistically significant differences in terms of the fat and skin folds thickness above the femur and above the iliac bones, and the skilled performance level variable.

Table no. (10) concerning the significance of the differences between the three measurements in the body composition variables and the skilled performance level- under study- in the experimental group; showed that, the statistically significant differences were for the post and follow up measurements. Table no. (11) concerning the variability rates between the three measurements in the body composition variables and the skilled performance level- under study- in the experimental group; showed that, the highest rate of variability (250.17%) was between pre and post measurements in terms of the skilled performance level variable. It was followed by the variability rate between pre and post measurements in terms of the fat and skin folds thickness above the femur (28.43%), while the least variability rate between follow up and post measurements was in variable of the light body weight (0.22%). The researcher considered that as a result of applying the proposed cardio training program on the experimental group, as the program contained a set of trainings that focused the complex movements, and the movement of more than one body organ at the same time in variable directions and on different levels, leading to good quality modern dance, along with the trainings focusing on reducing the space between the femur and the sternum. This training received a great resistance from both areas (above the femur, above the iliac bones). This meant that, the number of muscles in these both areas

were great due to the continuously systematic training. That was consistent with what was concluded by **Donnelly J. et al. (2003)** (4) **Mc Tiernan. A. et al (2007)** (7) and **Hechler. T et al (2008)** (5), **Boutcher, S. et al. (2011)** (3) as the training made a crucial change in the body composition, the performance level would be improved by the systematic training. The effect and change should differ from one person to another, from one equipment to another, and from one activity to another.

The researcher attributed the statistically significant differences in the skilled performance level in the experimental group to that, the female students benefited from the main principles of the cardio training program, as it was an aerobic training that developed the fitness level, as well as the graduated increase in the heart beats (50- 80%), and the training zone ranged between (135: 174) beat per min. That improved the performance level, burnt the fats and reduce its ratio in the body, as the work out included the training on the main skills of the modern dance. That conformed to what was revealed by **Ohkawara.K et al (2007)** (9), **Patrick Dale (2015)** (10), **Shannon Clark (2015)** (14), as the training programs, especially the aerobic ones improved the skilled performance level. From the previous discussion, it was shown the realization of the first hypothesis “there were statistically significant differences between the pre and post measurements in the control and experimental groups in some variables of the body composition and the performance level of the female student specialized in the modern dance for the post measurements. Table no. 12 concerning the significance of the differences between the post measurements in the control and experimental groups in some variables of the body composition and the skilled performance level- under study, showed that, , there were statistically significant differences in terms of

some body composition variables (the fat and skin folds thickness in the abdominal area and above the iliac bones) and the skilled performance level for the experimental group, while the differences were not statistically significant in terms of other body composition variables (under study), as shown by figure no. 1 regarding the differences between the control and experimental groups in terms of the performance level before and after applying the program.

The researcher attributed the statistically significant differences for the experimental group, as the female students of this group keep training regularly. The cardio training program included continuous aerobic training for (30) min. in the beginning, and the time increased gradually until it reached (65) min. in the last week. The systematic training, the gradual increase in the heart beats (50-80%), with focusing on the training reducing the space between the sternum and the femur and the vice versa, strengthened these areas, burnt the fats in it, which in turn improved some body composition variables in these areas, leading to positive change in the muscular, circulatory and respiratory systems and high quality performance. The researcher attributed the absence of the statistically significant differences in terms of the other body composition variables – under study- to that, these variables could require more time to find out the significance of these differences. This paid attention to the importance of modifying the followed program at the faculty to include the cardio training program that would burn the fats, improve some body composition variables, in order to reach the high quality modern dance by the female students specialized in the dance. That was consistent with **Mc Tiernan.A et al (2007) (7)**, **Redman.L et al (2007) (11)**, **Trapp.E et al (2008) (17)**, **Boutcher .S (2011) (3)**, **Patrick Dale (2015) (10)**, as the body composition

is the main base of the sport to reach high quality performance. The extra fats in certain areas leads to quick fatigue due to the increasingly exerted efforts, leading to the difficulty and then the deterioration of the dance.

From the previous discussion, it was shown the realization of the second hypothesis “there were statistically significant differences between both post measurements in the control and experimental groups in terms of the variables-under study, for the experimental group.

Conclusions and recommendations:

Firstly, the conclusions:

- 1-The cardio training program improved some variables of the body composition in terms of the fat and skin folds thickness in areas such as the abdominal, above the iliac bones, above the femur).
- 2- The cardio training program improved the performance level of the female student specialized in the modern dance.
- 3- The study results showed that, experimental group outperformed the control one in terms of some variables of the body composition “the fat and skin folds thickness in areas such as the abdominal, and above the iliac bone” and the skilled performance level in the modern dance.

Secondly, the recommendations:

- 1-The use of the cardio training program in the beginning of the lecture on the dance due to its effective impact on some areas such as “the abdominal, above the iliac bones, above the femur”, that positively affect the skilled performance level of the female students specialized in the modern dance.

- 2- Applying the cardio training program and using it in the similar studies and researches with increasing the whole time of the program to materialize the statistically significant differences in other body composition variables, under the study.
- 3- Conducting more researches and studies on the most important training programs that help improve the skilled performance level in the modern dance for the female students specialized in the dance.

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