Effect of Dancing Using Tools on Fat Thickness and Body Image Disturbance for Lipedema Patients

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Introduction and Research Problem:

Lipedema is an inherited hormonal disease which is a severe disorder in the adipose tissue that leads to an abnormal accumulation of fat in the body's lower extremity. This results in a completely asymmetrical shape and a disproportionate circumference between the bodies' upper and lower extremities. It is often limited to women, with an infection rate of approximately 11% among them. (7)

Lipedema is often misdiagnosed because the symptoms are very similar between it, obesity (excess weight) and lymphedema. But there is a big difference between them, where obesity is a general increase in body weight with the accumulation of fat in some areas of the body and occurs for both genders. As for lymphedema, it is an abnormal tumor that occurs as a result of lymph fluid accumulation in the arm or leg as an effect of some lymph nodes malfunction or removal. But lipedema is a genetic hormonal disease that is triggered by factors such as hormonal changes, puberty, pregnancy or after menopause, and leads to an abnormal accumulation of fat in the body's lower extremity. (9: 92-81)

Lipedema has four stages; the disease can develop from one stage to another if a treatment protocol is not followed. But with the protocol, the lipedema declines from one stage to another, but it does not disappear permanently except after surgical intervention. Lipedema is treated either by complete decongestive therapy (CDT), which includes (Manual lymphatic drainage MLD, medical compression stocking, sequential pneumatic compression) or surgical intervention. The following are the treating lipedema methods according to its stages:

- First Stage: diet + exercise + wear a medical compressive stocking.
- Second Stage: complete decongestive therapy+ diet + exercise + wear a medical compressive stocking.
- Third & fourth stage: undergoing liposuction surgery + wear a medical compression stocking according to the patient's health condition. (10: 95-86)

Lipedema leads to changes in the affected part, such as the appearance of varicose veins, skin infections, heaviness in the legs, lymphatic system vessels blocking, joints inflammation and some problems in bones as a result of the fat accumulation increase which puts pressure on the bones and many other physiological and biological changes that have a clear psychological impact such as low self-esteem, anxiety and depression. In addition, many patients are unsatisfied with their body shape and are exposed to physical disorders that increase their anxiety and lead to withdrawal and social isolation. (15)

Body-Image Disturbance means the individual excessive preoccupation with one or more existing or minor defects in physical appearance that lead to significant distress or poor performance.

"**Foster Schubert**" (2012) indicated that exercising improves a person's mood, self-image, appearance and weight control, and it is one of the effective methods for the mind to get rid of anxious and stressful thoughts, as the body releases endorphins, which act as antidepressants. He also pointed out that sports practice has a significant impact on body image satisfaction. (11)

Dancing is one of the arts that express opinions, ideas and emotions through various and multiple movements that the body performs within the limits of its capabilities. It includes kinetic arts, which contains (ballet - modern dance – folk dance) (37:1). Dancing performs important functions for practitioners, whether in terms of physical, psychological, health, aesthetic or social aspects. (3: 43)

The interest in dancing programs began because of its many health and psychological benefits. It depends on performing repetitive exercises and movements that combine strength and melody through dancing to the music rhythm, as it is considered one of the physical activities that strengthen the core muscles and burn fat by working on different rhythms of performance. (8)

Dancing many branches, lead to the variation of tools used in all its branches. Many specialists agreed that exercises with tools, whether it's small or large with various shapes, where the individual performs exercises with, whether alone or with a colleague or in a group, increases his physical, motor, physiological and psychological capabilities. These tools are represented by ballet bars, step, chair, the trampoline, stick, veil and many other expression tools. (16)

From the above and through the researcher's review of many references and related studies, the researcher though about providing a community service for these women to alleviate their suffering and overcome the Lipedema effects through designing dancing using tools

program, which may have a positive effect on improving the skinfolds thickness, fat and their body image, which gives them energy and vitality to continue their life path in a better way.

Research Objectives:

This research aims to develop a dancing using tools program for Lipedema patients to identify this program effect on:

1. Skinfolds and fat thickening in (mid-thigh, calf) areas.
2. Body image disturbance.

Research Hypothesis:

1) There are statistically significant differences between experimental group pre and post measurement in the skinfolds and fat thickness and the body image disturbance in favor of the post measurement.

2) There are statistically significant differences between control group pre and post measurement in the skinfolds and fat thickness and the body image disturbance in favor of the post measurement.

3) There are statistically significant differences between the two post measurements of the control and experimental groups in the skinfolds and fat thickness and the body image disturbance in favor of the experimental group.

4) The improvement percentages (change rates) vary between the control and experimental groups in the skinfolds and fat thickness and the body image disturbance in favor of the experimental group.

Research Procedures:

Research Methodology:

The researcher used the experimental method for its suitability with the research nature by using the experimental design of two groups; experimental and control, and conducting its pre and post measurements.

Research Community:

Women infected with Lipedema for the year 2020/2021.

Research Sample:

The researcher selected the research sample with the purposive random method from women with Lipedema from "Lipoedema awareness Egypt" group on Facebook that was established on 10/15/2020 with the aim of raising awareness about lipedema. The sample number was (58) women and homogeneity was conducted for the sample members in the growth variables (age - height - weight) and test variables as shown in Table (1). The sample was divided into pilot sample consisting of (10) women, and the basic research sample number is (48) women divided into (24) for the experimental group and (24) for the control group, their ages ranged between (36-54) years. The conditions for selecting the sample are:

- To have Lipedema in the first and second stages only.
- They do not follow any complete decongestive therapy (CDT).
- They should not have any health issues that prevent them from practicing sports.
- They scored low on the Body Image Disturbance Scale.

Table (1)

Arithmetic mean, standard deviation, median and torsion coefficient of the growth and test variables for the total research sample (sample homogeneity)   N=58

	Variable	Measuring Unit	Mean	Standard divergence	Arithmetic Mean	Twist co-effected
growth variable	Age	Year	48.34	4.02	49.00	-1.036
	Height	Cm	160.81	3.98	160.00	0.374
	Weight	Kg	83.83	6.30	85.00	-٠.٠٥٦
Skinfolds and fat thickening	Thigh Right	Cm	28.69	3.37	28.50	-٠.٠٤١
	Thigh Left	Cm	28.45	3.14	29.00	0.030
	Calf Right	Cm	19.14	2.44	19.00	0.233
	Calf Left	Cm	18.88	2.43	19.00	0.511
	Body Image Disturbance	Grade	65.91	7.78	66.00	0.027

Table (1) shows the torsion coefficients of the total research sample growth and test variables. The torsion coefficients value ranged between (-1.036, 0.511), that is, they were limited between (+3), which indicates that the total research sample is free from non-moderate distributions and indicates the homogeneity of the total sample members in those variables.

Table (2)

The significance differences between the experimental and control groups for the growth variables and test variables under study

(Sample Equivalence)   N1=N2=24

	Variable	Experimental group		Control group		Means Differences	T. Value & Index
		Mean	SD	Mean	SD		
growth variable	Age	48.38	3.81	48.46	3.96	-0.08	-٠.٠٤٧
	Height	160.21	4.32	161.21	3.88	-1.00	-٠.٨٤٣
	Weight	82.96	6.92	83.96	6.15	-1.00	-٠.٥٢٩
s and fat thickenin	Thigh Right	29.21	3.22	28.21	3.41	1.00	1.045
	Thigh Left	29.04	3.26	27.83	3.02	1.21	1.332
	Calf Right	19.21	2.64	19.33	2.44	-0.13	-٠.١٧٠

Calf Left	19.08	2.50	19.00	2.55	0.08	.114٠
Body Image Disturbance	66.92	8.20	65.29	7.18	1.63	.730٠

"T" tabuar value 46 , 0.05 = 1.678

Table (2) shows that there are no statistically significant differences at the significance level (0.05) between the experimental and control groups in the growth and test variables. As calculated "T" value in all variables is less than the tabular "T" value, which indicates the equivalence of the research sample in those variables.

Data Collecting Methods:
A. Sample data and measurements registration form. Attachment (1)
B. Medical Scale; to measure weight and height.
C. Skinfold caliper: to measure the skinfolds and fat thickness. Attachment (2)
D. Body Image Disturbance Scale Prepared by: "**Magdy Mohamed El Desouky**" (2008). Attachment (3) Reference (4)
E. Tools used in the program:
   (Ballet bar, chair, rebounder trampoline, and step) Attachment (4)

Pilot Study:
The researcher conducted the pilot study on a sample of (10) women from 4/9/2021 to 18/9/2021, with the aim of:
● The suitability of the place in which the application will take place.
● The suitability of the program to the basic research sample.
● The appropriateness of the exercises, tools and the time allotted to them.
● To test the validity of the Body Image Disturbance Scale (validity and reliability).

Body Image Disturbance Scale Scientific Procedures:
First: Validity:
Table (3) shows the validity coefficient of the body image disturbance scale on the members of the pilot research sample.

Table (3)
Significant Differences between the significant and insignificant groups in the body image disturbance scale of the pilot research sample (validity scale)   N=10

Variable	Significant group N=5		insignificant group N=5		Means Differences	T. Value & Index
	Mean	SD	Mean	SD		
Body Image Disturbance	71.20	6.98	58.80	4.97	12.4	3.236

"T" tabuar value 9 , 0.05 = 2.306

Table (3) shows that there are statistically significant differences at the significance level (0.05) between the two pilot research groups (significant and insignificant) in the body image disturbance variable, and calculated "T" value reached (3.236), which is greater than the tabular "T" value, which confirms the scale's ability to differentiate between the significant and insignificant, which indicates the scales validity.

Second: Reliability:

Table (4) shows the correlation coefficients between the body image disturbance scale results in both the application and re-application on the pilot research sample.

Table (4)
Correlation co-efficient between application and re-application results of the body image disturbance scale for the pilot study research (Reliability scale)   N=10

Variable	First Application		Re-application		Means Differences	R. Value & Index
	Mean	SD	Mean	SD		
Body Image Disturbance	65.00	8.68	65.10	8.75	0.10	0.979

"R" tabuar value 8 , 0.05 = 0.632

Table (4) shows that there is a statistically significant correlation coefficient at the significance level (0.05) between the body image disturbance scale first application and re-application; where the correlation coefficient between them reached (0.979), a value greater than the value of the tabular correlation coefficient. This indicates the scale stability.

Dancing Using Tools Program Application: Attachment (5)

After the researcher reviewed the most important theoretical studies, previous research and scientific references, she noticed the lack of programs for dancing using standardized tools for patients with lipedema. Hence, the researcher designed a dancing using tools program according to the scientific bases of training programs for patients with similar cases as the sample, according to the reference framework of scientific references and previous research and consistent with the research sample capabilities and the performance level in the Egyptian environment, according to the following scientific foundations:

A. The Program Objective:

Improve the skinfolds and fat thickness and the body image disturbance of patients with lipedema.

B. Program Setting Foundations:

- The program suits the research sample characteristics.
- A good warm-up to prepare the muscles to work in the main part.
- Gradation from easy to difficult and in the exercise performing time and the repetitions number.
- The program should include intermittent rest periods in which breathing exercises are performed correctly.
- Stay away from complex exercises that require neuromuscular compatibility and use easy exercises that require simple muscular compatibility so as not to reach the fatigue stage.
- The program should be flexible so that it can be modified or changed if necessary, as the patient's condition never remains constant, but is always changing.
- The musical accompanying the performance is an important and exciting factor for the performance continuation.
- Pay attention to the fun spirit and pleasure during the program implementation, as this leads to improving the psychological state.

C. Determine the Load Intensity

The training load was formed based on the findings of similar studies in this field, so the average load used was (50-60%) and reaching the load that is less than the maximum at the end of the program (75-85%) from the maximum pulse rate by using the "Carvonin equation"   Maximum heart rate = 220 - chronological age.

Example:

Age = 50 Maximum predicted heart rate per minute 220-50 = 170

The desired heart rate percentage at the 75% level = 170 x 75 = 128 beats per minute.

D. Program Schedule:

Based on doctors treating these cases opinion, as well as what similar studies and references have shown in terms of the time period that can positively affect the variables under study. The researcher determined the program duration for three months, with (3) training units per week. The program included (36) training units, the unit time is (45: 60) minutes, distributed as follows:

Table (5)
Training unit components and duration

Training unit components	Duration	Exercises
Preliminary part	10 min	Private and general warm-up exercises for all body organs and systems.
The main part	25:40 min	- Bar Exercises. - Chair Exercises. - Trampoline Exercises. - Step Exercises.
The final parts	10 min	relaxation exercises

Research Implementation Steps:
1. Pre Measurements:

The researcher conducted the pre measurements on the skinfolds and fats thickness and the body image disturbance for the control and experimental groups on 22 and 23/9/2021.

2. Program Application:

The researcher applied the dancing using tools proposed program on the experimental group for a three months period; (3) training units per week, running on a course of (36) training units, the training unit time is (45: 60) minutes in the period from 25/9/2021 to 15/12/ 2021. The control group also applied the walking program at the same time period as the experimental group. Attachment (6)

3. Post Measurements:

After completing the program application, the researcher conducted the post measurements on the skinfolds and fats thickness and the body image disturbance for the control and experimental groups on 18 and 19/12/2021 with the commitment to the same timing and conditions of the pre measurement.

Statistics:

The researcher used the following statistics (arithmetic mean – standard divergence – mean – curve co-efficient – differences function test (T. Test). Correlations co-efficient – variation rate).

Results Presentation and Discussion:

Table (6)
Significance differences between the pre and post measurements for the test variables of the experimental group sample   N=24

	Variable	Pre Measurements		Post Measurements		Means Differences	T. Value & Index
		Mean	SD	Mean	SD		
and rat thickening	Thigh Right	29.21	3.22	22.88	2.66	6.33	16.108
	Thigh Left	29.04	3.26	23.08	2.57	5.96	16.619
	Calf Right	19.21	2.64	15.25	1.78	3.96	11.539
	Calf Left	19.08	2.50	15.50	2.11	3.58	9.798
	Body Image Disturbance	66.92	8.20	95.58	7.32	-28.66	-25.690

"T" tabuar value 23 , 0.05 = 2.069

Table (6) shows that there are statistically significant differences at the significance level (0.05) between the experimental group research sample pre and post measurements, where calculated "T" value ranged between (9.798, -25.690) a value greater than the tabular "T" value. These differences are in favor of the post measurement.

Table (7)
Significance differences between the pre and post measurements for the test variables of the control group sample N=24

	Variable	Pre Measurements		Post Measurements		Means Differences	T. Value & Index
		Mean	SD	Mean	SD		
rat thickening	Thigh Right	28.21	3.41	24.79	2.93	3.42	13.051
	Thigh Left	27.83	3.02	24.50	2.67	3.33	12.487
	Calf Right	19.33	2.44	16.92	2.54	2.41	11.171
	Calf Left	19.00	2.55	16.63	2.32	2.37	12.596
	Body Image Disturbance	65.29	7.18	80.04	7.59	-14.75	-20.058

"T" tabuar value 23 , 0.05 = 2.069

Table (7) shows that there are statistically significant differences at the significance level (0.05) between the control group research sample pre and post two measurements, where calculated "T" value ranged between (11.171, -20,058), a value greater than the tabular "T" value. These differences are in favor of the post measurement.

Table (8)

The significance differences between the experimental and control groups in the test variables of the post measurement

N1=N2=24

Variable		Experimental group		Control group		Means Differences	T. Value & Index
		Mean	**SD**	**Mean**	**SD**		
and fat	Thigh Right	22.88	2.66	24.79	2.93	-1.92	-2.371
	Thigh Left	23.08	2.57	24.50	2.67	-1.42	-1.873
	Calf Right	15.25	1.78	16.92	2.54	-1.67	-2.638
	Calf Left	15.50	2.11	16.63	2.32	-1.13	-1.760
	Body Image Disturbance	95.58	7.32	80.04	7.59	15.54	7.219

"T" tabuar value 46 , 0.05 = 1.678

Table (8) shows that there are statistically significant differences at the significance level (0.05) between the two post measurements for the experimental and control groups in all the test variables under study, and these differences are in favor of the post measurement of the experimental group.

Table (9)

Improvement rates (change rates) between the pre and post measurements in the research variables of the experimental and control groups.

N1=N2=24

Variable		Experimental group			Control group			Improvement %
		Pre	**Post**	**%**	**Pre**	**Post**	**%**	
Skinfolds and fat	Thigh Right	29.21	22.88	21.67	28.21	24.79	12.12	8.38
	Thigh Left	29.04	23.08	20.52	27.83	24.50	11.97	6.14
	Calf Right	19.21	15.25	20.61	19.33	16.92	12.47	10.93
	Calf Left	19.08	٠15.5	18.76	19.00	16.63	12.47	7.26
	Body Image Disturbance	66.92	95.58	42.83	65.29	80.04	22.59	16.26

Table (9) shows the improvement rates (change rates) for the test variables between the experimental and control groups ranged between (6.14%, 16.26%) in favor of the experimental group.

Figure (1) the improvement rates (change rates) for the test variables in favor of the experimental group
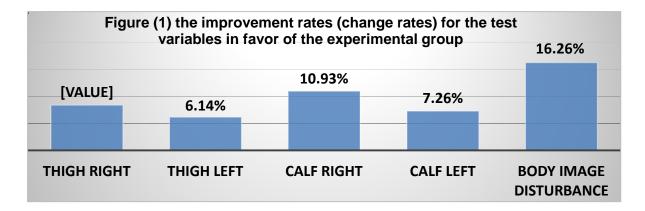
Table (6) shows that there are statistically significant differences at the significance level (0.05) between the experimental group research sample pre and post measurements, where calculated "T" value ranged between (9.798, -25.690); a value greater than the tabular "T" value . These differences are in favor of the post measurement.

The researcher attributes these results to the effect dancing using tools proposed program and what it contains from warming up for all body parts, and the main part containing exercises varieties using different dancing tools such as (ballet bar, chair, rebounder trampoline, step), which focused heavily on the body lower part, which helped the good distribution of fat in this part, in addition to most of the exercises using the bar or sitting, that helped to perform safely and gave a sense of agility and lightness while performing with the music. This positively affected the fat thickness in the research sample, which was positively reflected on the sample members' feeling satisfied with their appearance.

This is in agreement with what "**Ayman Al Husseini**" (2002) indicated that it is preferable for women over the age of thirty-five to play sports; preferably sports during which the body does not hit the ground, especially when the woman reaches menopause, in order to avoid any health problems in the joints. (2:37)

This also agreed with what "**Mohamed Hassan Elawi**" (1998) pointed out, quoting from "**Helms & Turners**" that the individual's feeling about his body is related to his confidence in himself and in the way he deals with the surrounding environment, and that individuals who have positive perceptions towards their bodies enjoy a high degree of their self-esteem. (5:131)

This is also consistent with what "**Foster Schubert**" (2012) indicated about the importance of sports practice in being satisfied with body image, improving a person's mood, his image in front of himself, his shape, and his control over his weight.

These findings are in agreement with those of **"José Smeenge"** (2015) (12), **"van Esch-Smeenge J. & et al"** (2017) (14), **"Kathleen-Lisson"** (2018) (13) in which lipedema patients practicing sports programs has a good effect on their affected part muscle strength, fat percentage and body mass index, as well as raising morale and improving health and psychological status.

This achieved the first hypothesis which states: **There are statistically significant differences between experimental group pre and post measurement in the skinfolds and fat thickness and the body image disturbance in favor of the post measurement.**

Table (7) shows that there are statistically significant differences at the significance level (0.05) between the control group research sample pre and post two measurements, where calculated "T" value ranged between (11.171, -20,058), a value greater than the tabular "T" value. These differences are in favor of the post measurement.

The researcher attributed this indication to the walking program the control group followed; as walking is one of the easy physical activities that reduces the disease chances and raises the practitioners' psychological state.

"Hani Mohamed & Mahmoud Ismail" (2014) confirmed that walking improves the psychological state, relieves depression and improves the social aspect, especially walking with a group, and that lack of movement is usually a cause of many psychological and social diseases and symptoms. (6: 295, 296)

This achieved the second hypothesis which states: **There are statistically significant differences between control group pre and post measurement in the skinfolds and fat thickness and the body image disturbance in favor of the post measurement.**

Table (8) shows that there are statistically significant differences at the significance level (0.05) between the two post measurements for the experimental and control groups in all the test variables under study, and these differences are in favor of the post measurement of the experimental group.

The researcher attributes this indication to the dancing using tools proposed program, which included various exercises using (ballet bars, chair, rebounder trampoline, step) for the lower part and with intensity load (50 - 85%) with a diversity in movement speed with musical accompaniment, that led to fatty lumps detoxification and simple consistency in the lower part shape and improve the body image satisfaction percentage.

This achieved the third hypothesis which states: **There are statistically significant differences between the two post measurements of the control and experimental groups in the skinfolds and fat thickness and the body image disturbance in favor of the experimental group.**

Table (9) and Figure (1) shows the improvement rates (change rates) for the test variables between the experimental and control groups ranged between (6.14%, 16.26%) in favor of the experimental group.

The researcher attributes this improvement, which came in favor of the experimental group, to the dancing using tools proposed program success extent, taking into account the scientific foundations and principles that led to an improvement in the fat thickness and the lower part shape consistency, which had a positive impact on body image satisfaction by a large percentage.

This achieved the fourth hypothesis which states: **The improvement percentages (change rates) vary between the control and experimental groups in the skinfolds and fat thickness and the body image disturbance in favor of the experimental group.**

Conclusion

In light of the research aim, hypotheses, procedures and results, the researcher reached:

❖ The dancing using tools proposed program and its content of various exercises using different tools based on the body's lower part with musical accompaniment has a positive effect on improving the skinfolds and fat thickness and the body image disturbance for patients with lipedema.

Recommendations

In light of the research objective, results and conclusions, the researcher recommends the following:

1. Putting the dancing using tools proposed program within the treatment protocol recommended for patients with lipedema, because of its positive effect on them in general and on improving the skinfolds and fat thickness and body image disturbance in particular.
2. Raising doctors' awareness about the importance of exercising for this category.
3. Increasing patients' with Lipedema awareness about the importance of exercising.

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