

Morphologic and systemic alterations in obese and overweight subjects after a physical activity intervention program

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1. Introduction

The prevalence of obesity is increasing in the developed societies [1]. Obesity and weight gain are major risk factors for type 2 diabetes [2], cardiovascular diseases [2, 3] and even certain forms of cancer [4].

Weight loss improves insulin sensitivity, glycemic control [5] and may be associated with reduced mortality [6]. For every kilogram of weight loss, there are a 16% reduction in risk of type 2 diabetes [7].

One major problem associated with obesity and weight gain is lifestyle behaviors, where inactivity has great importance [8].

Purpose

The purpose of our study was to analyse the variation of some morphologic and systemic variables in 16 obese and overweight type 2 diabetic patients during participation in a regular physical activity program.

2. Material and Methods

Subjects

Sixteen obese and overweight (mean BMI 31.4 ± 5.7 Kg/m²) type 2 diabetic patients, 7 males and 9 females, (mean age 64.5 ± 7.2 years; mean height 159 ± 9.2 cm; mean body mass 79.8 ± 16.7 kg), performed the present study. In the moment of the study, all subjects had oral anti-diabetic and no insulin, and they had not diabetic complications. The medication was not altered during the time of the present study.

Experimental protocol

The subjects perform a regular physical activity intervention program, named "MEXA-se em Bragança", which consists on sessions of 50 minutes each, every week days (5 days), during 8 months, and no diet intervention.

Each session has as minimum 35 minutes of fast walking (±6 Km/h) and 15 minutes of some light strength and stretching exercises.

On Wednesdays it was performed water aerobics sessions (middle of the week), in order to alleviate stress induced to inferior members joints of the subjects.

Adherence to the physical activity program was reinforced and monitored daily by the exercise staff.



Morphologic Data

Height was measured twice to the nearest 0,1 cm using a wall mounted digital stadiometer (Seca, mode 242, Hamburg, Germany). Weight was measured twice to the nearest 0,1 kg on an electronic scale (Seca, 884, Hamburg, Germany). In both weight and height the average of the two measures was used.

Blood pressure was analyzed through an electronic sphygmomanometer (model OMRON 7051T).

Waist was measured twice to the nearest 0,1 cm using a conventional tape measure.

Systemic Data

It was collected 5 ml of venous blood from antecubital vein on the left arm, with BRAUN sterilized squirt.

Total cholesterol, LDL, HDL and TG, where analyzed by an auto-analyzer of clinical chemistry through calorimetric method (photometric enzymatic test - Mira Plus model, ABX).

Insulin was analyzed in serum by chemiluminescence method.

In total cholesterol, LDL, HDL, TG and insulin the changes were analyzed in an 4 months period and in weight, BMI, waist and blood pressure were analyzed in an 8 months period.

Statistic analysis

Repeated measures ANOVA was used to analyse changes, using SPSS 13 for Windows.



3. Results and Discussion

3.1. Morphologic alterations during the physical activity program

Table 1 - Mean values (± SD) of different moments analysed for: Weight, BMI and Waist.

		Moment	
		Pretest	Posttest
Weight (kg)	Mean	79.75	78.04
	StdDev	16.72	15.21
BMI (kg/m ²)	Mean	31.43	30.74
	StdDev	5.73	5.09
Waist (cm)	Mean	104.50	102.00
	StdDev	13.24	13.46

Legend: * p<0.05

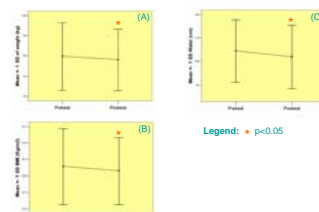


Figure 1 - Graphic representation of mean values (± SD) of different moments analysed for: Weight (A), BMI (B) and Waist (C).

All the morphologic parameters analysed revealed significant decreases, namely in weight [F(1, 15) = 6.688; p=0.021], BMI [F(1, 15) = 7.396; p=0.016] and waist [F(1, 15) = 43.032; p=0.000] - table 1 and figure 1 (A, B and C).

3.2. Systemic alterations during the physical activity program

Table 2 - Mean values (± SD) of different moments analysed for: Systolic Blood Pressure; Diastolic Blood Pressure; Triglycerides; Insulin; Total Cholesterol; LDL and HDL.

		Moment		
		Pretest	Intermediate	Posttest
SystBP (mmHg)	Mean	141.00	150.06	131.81
	StdDev	12.21	25.01	13.88
DiasBP (mmHg)	Mean	79.13	78.25	72.56
	StdDev	9.52	7.50	9.87
Insulin (µU/mL)	Mean	9.57		7.93
	StdDev	3.23		3.59
Total Cholesterol (mg/dL)	Mean	186.13	173.58	184.25
	StdDev	40.68	28.43	48.95
LDL (mg/dL)	Mean	128.22		111.88
	StdDev	29.86		24.28
HDL (mg/dL)	Mean	38.42	43.00	45.43
	StdDev	5.82	6.28	5.77
TG (mg/dL)	Mean	118.42	101.22	101.43
	StdDev	44.94	39.52	55.41

Legend: * p<0.05

Thereby, these results shows that obese and overweight subjects can have good health benefits by participating in community physical activity programs without changing diet. This programs can also have good effects in kipping participants motivated to be enrolled in an active lifestyle.

In systemic alterations it was observed only an significant reduction in LDL concentrations [F(1, 7) = 14,264; p=0.007] - table 2 and figure 2 (I).

These results are consistent with other studies, where only with physical activity programs was possible to improve LDL concentrations [9].

Despite the best improves are seen as a result of combine strategies (diet and exercise interventions), namely including very low-caloric diets or low-caloric diets [10], the present study shows that with an long-term physical activity program only, it's possible to achieve significant changes in some health parameters.

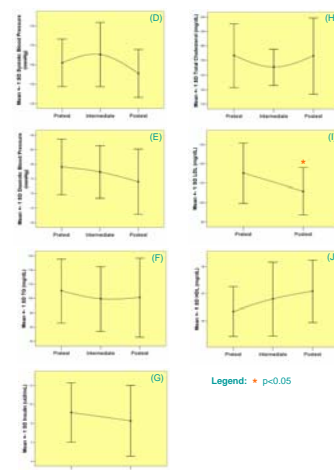


Figure 2 - Graphic representation of mean values (± SD) of different moments analysed for: Systolic Blood Pressure (D); Diastolic Blood Pressure (E); Triglycerides (F); Insulin (G); Total Cholesterol (H); LDL (I) and HDL (J).

4. Conclusions

The participation in the physical activity program described above enables the subjects to improve their morphologic and systemic parameters without alterations in their diet. Namely, an reduction on weight, BMI, waist and LDL.

5. Bibliography

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