RESULTS

Our study comprised sixty patients with simple obesity selected from the outpatient clinic of the Rheumatology and Rehabilitation Department, Benha University Hospitals, Their Body Mass Indices (BMI) were ≥ 30.

They were classified randomly into four groups according to the method of treatment adopted:

Group I

Comprised twenty patients treated with low caloric diet, physical training exercise program for twelve weeks. They were 16 (80%) females and 4 (20%) males (table 8) and figure (31). Their ages ranged between 18 to 47 years with a mean of 29.2 ± 1.76 years (table 9).

Group II

Comprised twenty patients treated with low caloric diet, physical training exercise program and auricular acupuncture (twice weekly) for twelve weeks. They were 16(80%) females and 4(20%) males (table 8) and figure (31). Their ages ranged between 17 to 51 years with a mean of 30.5 ± 8.04 years (table 9).

Group III

Comprised twenty patients treated with low caloric diet, physical training exercise program and combined auricular and meridian acupuncture (twice weekly) for twelve weeks. They were 15 (75%) females and 5 (25%) males (table 8) and figure (31). Their age ranged between 18 to 50 years with a mean of 31.55 ± 9.31 years (table 9).

Table 10 (a) and figure (32) show:

Weights in (kg) of the studied groups before and after treatment and the percentage of changes in weight after treatment. The mean values before treatment were 94.12 ± 8.85, 93.3 ± 9.83 and 95.1 ± 2.48 which became 89.13 ± 11.13, 85.3 ± 9.13 and 82.5 ± 8.35 with percentage of weight reduction 5.31%, 8.71% and 15.23% in groups I, II and III respectively. No significant difference ($p > 0.05$) was found between all groups before treatment, but a significant difference ($p < 0.05$) was found between them after treatment and a highly significant difference ($p < 0.01$) was found in improvement.

Table 10 (b) shows :

Highly statistically significant differences ($P < 0.01$) between all groups as regard the percentage of weight reduction after treatment.

Table 11 (a) and figure (33) show:

Body mass indices (BMI) of the studied groups before and after treatment and the percentage of change in BMI in each group after treatment. The mean values before treatment were 36.7 ± 3.15, 35.5 ± 4.12 and 36.8 ± 5.12 which became 34.63 ± 3.59 , 32.51 ± 6.17 and 31.51 ± 6.14 with a percentage of reduction in BMI 5.62%, 8.42% and 14.31% in groups I, II and III respectively. No significant difference ($p > 0.05$) was found between all groups before treatment, but a significant difference ($p < 0.05$) was found between them after treatment and a highly significant difference ($p < 0.001$) was found in improvement.

Table 11 (b) shows:

Highly statistically significant differences ($P < 0.01$) between all groups as regard the percentage of BMI reduction after treatment.

Table 12 (a) and figure (34) show:

Systolic blood pressure (SBP) in mmHg of the studied groups before and after treatment and the percentage of changes in SBP in each group after treatment. The mean values before treatment were 126.1 ± 10.95, 128.2 ± 13.59 and 129.3 ± 19.67 which became 123.15 ± 6.71, 121.71 ± 8.91 and 120.31 ± 10.12 with a percentage of reduction in (SBP) 2.31%, 5.61% and 6.92% in groups I, II and III respectively. No significant difference ($p > 0.05$) was found between all groups before treatment, but a significant difference ($p < 0.05$) was found between them after treatment and a highly significant difference ($p < 0.001$) was found in improvement.

Table 12 (b) shows :

Highly statistically significant differences ($p < 0.01$) between groups I vs II and I vs III. However, no statistically significant difference ($p > 0.05$) between group II and III as regard the percentage of decrease in (SBP).

Table 13 (a) and figure (35) show:

Diastolic blood pressure (DBP) in mmHg of the studied groups before and after treatment and the percentage of changes in DBP in each group after treatment. The mean values before treatment were 83.12 ± 10.12, 84.12 ± 9.71 and 85.71 ± 10.71 which became 80.71 ± 7.85, 80.91 ± 8.75 and 80.71 ± 8.31 with a percentage of reduction in (DBP) 2.49%, 4.76%, 9.31%in groups I, II and III respectively. No significant difference ($p > 0.05$) was found between all groups before treatment, but a significant difference ($p < 0.05$) was found between them after treatment and a highly significant difference ($p < 0.01$) was found in improvement.

Table 13 (b) shows :

Highly statistically significant differences (P < 0.01) between groups I vs III and II vs III and a statistically significant difference (p < 0.05) between groups I vs II as regard the percentage of decrease in (DBP).

Table 14 (a) and figure (36) show:

Right arm circumference (Rtac) in cm of the studied groups before and after treatment and the percentage of changes in (Rtac) in each group after treatment. The mean values before treatment were 36.71 ± 2.42 35.91 ± 3.14 and 35.61 ± 5.12 which became 34.12 ± 2.12, 33.07± 2.19 and 32.71 ± 3.09 and with a percentage of changes in 5.51%, 6.1% and 8.52% in groups I, II and III respectively. No significant difference (p > 0.05) was found between all groups before treatment, but a significant difference (p < 0.05) was found between them after treatment and a highly significant difference (p < 0.001) was found in improvement.

Table 14 (b) shows:

Statistically insignificant differences (p < 0.05) between groups I vs III and II vs III and a statistically insignificant difference (p > 0.05) between groups I vs II as regard the percentage decrease in (Rtac).

Table 15 (a) and figure (37) show:

Rt thigh circumferences (Rttc) of the studied groups before and after treatment and the percentage of change in (Rttc). The mean values before treatment were 70.49 ± 4.88, 69.51±5.12 and 72.03 ± 5.03 which became 66.12 ± 5.12, 65.31 ± 54.71 and 63.91 ± 5.32 with percentage of changes 5.71%, 6.03% and 12.51% in groups I, II and III respectively. No significant difference (p > 0.05) was found between all groups before

treatment, but a significant difference ($p < 0.05$) was found between them after treatment and a highly significant difference ($p < 0.001$) was found in improvement.

Table 15 (b) shows:

Highly statistically significant difference ($P < 0.01$) between groups I vs III and II vs III and a statistically insignificant difference ($p > 0.05$) between groups I vs II as regard the percentage decrease in (Rttc) after treatment.

Table 16 (a) and figure (38) show:

Chest circumferences (Chc) in cm of the studied groups before and after treatment and the percentage of change in (Chc) in each group after treatment. The mean values before treatment were 114.12 ± 4.18, 114.71 ± 5.09 and 115.61 ± 4.81 which became 112.5 ± 5.13, 111.3 ± 6.12 and 110.5 ± 4.12 with a percentage of change 1.79%, 2.63% and 4.56% in groups I, II and III respectively. No significant difference ($p > 0.05$) was found between all groups before and after treatment, but a significant difference ($p < 0.05$) was found in improvement.

Table 16 (b) shows:

Highly statistically significant difference ($P < 0.01$) between groups I vs III and statistically significant differences ($P < 0.05$) between groups I vs II and II vs III as regard the percentage decrease in (Chc).

Table 17 (a) and figure (39) show:

Abdominal circumferences (Abc) in cm of the studied groups before and after treatment and the percentage of changes in (Abc) in each group after treatment. The mean values before treatment were 110.69 ±

3.4, 109.13 ± 4.71 and 110.01 ± 5.3 and became 105.1 ± 3.71, 104.52 ± 5.18 and 102.07 ± 5.19 with a percentage of changes in (Abc) 4.51%, 6.12% and 7.31% in groups I, II and III respectively. No significant difference ($p > 0.05$) was found between all groups before treatment, but a significant difference ($p < 0.05$) was found between them after treatment and a highly significant difference ($p < 0.001$) was found in improvement.

Table 17 (b) shows:

Highly statistically significant differences ($P < 0.01$) between groups I vs II, I vs III and a statistically significant difference ($P < 0.05$) between groups II vs III as regard the percentage decrease changes in (Abc).

Table 18 (a) and figure (40) show:

Hip circumference (Hc) in cm of the studied groups before and after treatment and the percentage of changes in (Hc) in each group after treatment. The mean value before treatment were 123.4 ± 5.27. 124.11 ± 5.38 and 123.3 ± 6.71 which became 117.51 ± 4.75, 116.71 ± 5.47 and 114.01 ± 6.71 with a percentage of changes in (Hc) 4.1%, 6.21% and 7.52% in groups I, II and III respectively. No significant difference ($p > 0.05$) was found between all groups before treatment, but a significant difference ($p < 0.05$) was found between them after treatment and a highly significant difference ($p < 0.001$) was found in improvement.

Table 18 (b) shows:

Statistically significant differences ($P < 0.05$) between groups I vs II, I vs III and a statistically insignificant difference ($P > 0.05$) between groups II vs III as regard the percentage decrease in (Hc).

Table 19 (a) and figure (41) show:

Waist to hip ratio (WHR) of the studied groups before and after treatment and the percentage of changes in (WHR) in each group after treatment. The mean values before treatment were 0.89 ± 0031, 0.88 ± 0.0037 and 0.89 ± 0.0028 and became 0.88 ± .002, 0.87 ± 0.0031 and 0.87 ± 0.002 with a percentage of changes 1.21%, 1.31%, 2.44% in groups I, II and III respectively. No significant difference ($p > 0.05$) was found between all groups before and after treatment, but a highly significant difference ($p < 0.001$) was found in improvement.

Table 19 (b) shows:

Highly statistically significant differences ($P < 0.01$) between groups I vs III, II vs III and a statistically insignificant difference ($p > 0.05$) between groups I vs II as regard the percentage decrease in (WHR).

Table 20 (a) and figure (42) show:

Biceps skin fold thickness in (cm) of the studied group before and after treatment and the percentage of changes in biceps skin fold thickness in each group after treatment. The mean values were 2.5 ± 0.71, 2.53 ± 0.81 and 2.61 ± 0.91 which became 2.31 ± 0.91, 2.26 ± 0.82 and 2.21 ± 0.71 after treatment with a percentage of changes 8.91%, 12.31% and 15.31% in groups I, II and III respectively. No significant difference ($p > 0.05$) was found between all groups before and after treatment, but a highly significant difference ($p < 0.001$) was found in improvement.

Table 20 (b) shows:

Highly statistically significant difference ($P < 0.01$) between groups I vs III and a statistically significant difference ($P < 0.05$) between

groups I vs II and a statistically insignificant difference ($p > 0.05$) between groups II vs III as regard the percentage decrease in biceps skin fold thickness.

Table 21 (a) and figure (43) show:

Triceps skin fold thickness in (cm) of the studied group before and after treatment and the percentage of changes in triceps skin fold thickness in each group after treatment. The mean values before treatment were 3.41± 0.85, 3.5 ± 0.92 and 3.6 ± 0.81 which became 3.27 ± 0.72, 3.15 ± 0.67 and 3.12 ± .73 after treatment with a percentage of changes 8.21%, 11.7% and 13.51% in groups I, II and III respectively. No significant difference ($p > 0.05$) was found between all groups before and after treatment, but a highly significant difference ($p < 0.001$) was found in improvement.

Table 21 (b) shows:

Statistically significant differences ($P < 0.05$) between groups I vs II and I vs III, and a statistically insignificant difference ($p > 0.05$) between groups II vs III as regard the percentage decrease in triceps skin fold thickness.

Table 22 (a) and figure (44) show:

Subscapular skin fold thickness of the studied groups, before and after treatment and the percentage of changes in subscapular skin fold thickness after treatment. The mean values before treatment were 4.25 ± 0.81, 4.2 ± 0.71, 4.4 ± 0.81 which became 3.92 ± 71, 3.72 ± 0.81, 3.52 ± 0.71 after treatment with a percentage of changes 7.12%, 11.93% and 19.31% in groups I, II and III respectively. No significant difference ($p > 0.05$) was found between all groups before treatment, but a significant

difference ($p < 0.05$) was found between them after treatment and highly significant difference ($p < 0.001$) was found in improvement.

Table 22 (b) shows :

Highly statistically significant differences ($P < 0.01$) between groups I vs III and II vs III and a statistically significant difference ($P < 0.05$) between groups I vs II as regard the percentage decrease in subscapular skin fold thickness.

Table 23 (a) and figure (45) show:

Suprailiac skin fold thickness in (cm) of the studied groups before and after treatment and the percentage of changes in suprailiac skin fold thickness in each group after treatment. The mean values before treatment were 4.42 ± 61, 4.62 ± 0.52 and 4.82 ± 0.61 which became 4.23 ± 71, 4.25 ± 0.92 and 4.12 ± 0.84 with a percentage of changes 4.51%, 8.6% and 14.31% in groups I, II and III respectively. No significant difference ($p > 0.05$) was found between all groups before and after treatment, but a highly significant difference ($p < 0.001$) was found in improvement.

Table 23 (b) shows:

Highly statistically significant differences ($P < 0.01$) between groups I vs III and II vs III and a statistically significant difference ($p < 0.05$) between groups I vs II as regard the percentage decrease in suprailiac skin fold thickness.

Table 24 (a) and figure (46) show:

Triglycride (TG) level in (mg/dl) of the studied groups before and after treatment and the percentage of changes in (TG) level in each group

after treatment. The mean values before treatment were 111.75 ± 19.85, 112.76 ± 20.12 and 113.56 ± 21.71 which became 105.1 ± 16.76, 100.71 ± 20.12 and 99.7 ± 15.12 with a percentage of changes 5.41%, 10.31% and 12.81% in groups I, II and III respectively. No significant difference ($p > 0.05$) was found between all groups before treatment, but a significant difference ($p < 0.05$) was found between them after treatment and highly significant difference ($p < 0.001$) was found in improvement.

Table 24 (b) shows:

Highly statistically significant differences ($P < 0.01$) between groups I vs II, I vs III, and a statistically insignificant difference ($p > 0.05$) between groups II vs III as regard the percentage decrease in (TG) level.

Table 25 (a) and figure (47) show:

Total cholesterol (TC) level in (mg/dl) of the studied groups before and after treatment and the percentage of changes in (TC) level in each group after treatment. The mean values before treatment were 141.71 ± 30.12, 143.21 ± 29.17 and 144.32 ± 0.12 which became 128.12 ± 35.12, 125.12 ± 41.12 and 123.12 ± 51.21 with a percentage of changes 9.21%, 12.35% and 14.59% in groups I, II and III respectively. No significant difference ($p > 0.05$) was found between all groups before treatment, but a significant difference ($p < 0.05$) was found between them after treatment and highly significant difference ($p < 0.001$) was found in improvement.

Table 25 (b) shows:

Highly statistically significant difference ($p < 0.01$) between groups I vs III and a statistically significant difference ($P < 0.05$) between

groups I vs II and a statistically insignificant difference ($p > 0.05$) between II vs III as regard the percentage decrease in (TC) level.

Table 26 (a) and figure (48) show:

High density liproprofien (HDL) cholesterol in (mg/dl) of the studied groups before and after treatment and the percentage of changes in (HDL) level in each group after treatment. The mean values before treatment were 31.95 ± 6.19, 33.12 ± 7.12 and 34.12 ± 8.71 which became 40.12 ± 6.12, 42.71 ± 5.15 and 43.12 ± 5.12 with a percentage of changes 20.1%, 23.1%, 26.41% in groups I, II and III respectively. No significant difference ($p > 0.05$) was found between all groups before and after treatment, but a highly significant difference ($p < 0.01$) was found in improvement.

Table 26 (b) shows:

Statistically significant differences ($P < 0.05$) between all groups as regard the percentage increase in (HDL) level.

Table 27 (a) and figure (49) show:

Low density liproprotien (LDL) cholesterol level in (mg/dl) of the studied groups before and after treatment and the percentage of changes in (LDL) level in each group after treatment. The mean values before treatment were 115.51 ± 18.15, 117.12 ± 19.12 and 118.30 ± 20.32 which became 103.51 ± 20.12, 101.12 ± 16.71 and 100.21 ± 15.71 with a percentage of change 6.93%, 9.32%, 18.31% in groups I, II and III respectively. No significant difference ($p > 0.05$) was found between all groups before and after treatment, but a highly significant difference ($p < 0.001$) was found in improvement.

Table 27 (b) shows:

Highly statistically significant differences ($P < 0.01$) between all groups as regard the percentage decrease in (LDL) level.

Table 28 (a) and figure (50) show:

Serotonin level in (ug/ml) of the studied groups before and after treatment and the percent of changes in serotonin level in each group after treatment. The mean values before treatment were 222.5 ± 16.78, 219.31 ± 20.17, and 220.19 ± 18.19 and became 225.12 ± 20.17, 270.7 ± 20.17 and 284.7 ± 15.71 with a percentage of changes 1.3%, 23.28% and 29.09% in groups I, II and III respectively. No significant difference ($p > 0.05$) was found between all groups before treatment, but highly significant difference were found between them after treatment and in improvement ($p < 0.001$).

Table 28 (b) shows :

Highly statistically significant differences between groups I vs II, I vs III ($p < 0.001$) and II vs III ($p < 0.01$) as regard the percentage of increase in serotonin level.

Table 29 and figure (51) show:

The best model for improvement with acupuncture treatment of obese patient. Serum serotonin level, high density lipoprotein (HDL) cholesterol, weight and biceps skinfold thickness respectively were the most improved variables in acupuncture treatment of obese patients.

Table 8: Sex of the studied groups

Group / Sex	I	II	III	X^2	P
Female (%)	16 (80)	16 (80)	15 (75)	0.229	0.97 [NS]
Male (%)	4 (20)	4 (20)	5 (25)		

[NS] = non significant P> 0.05

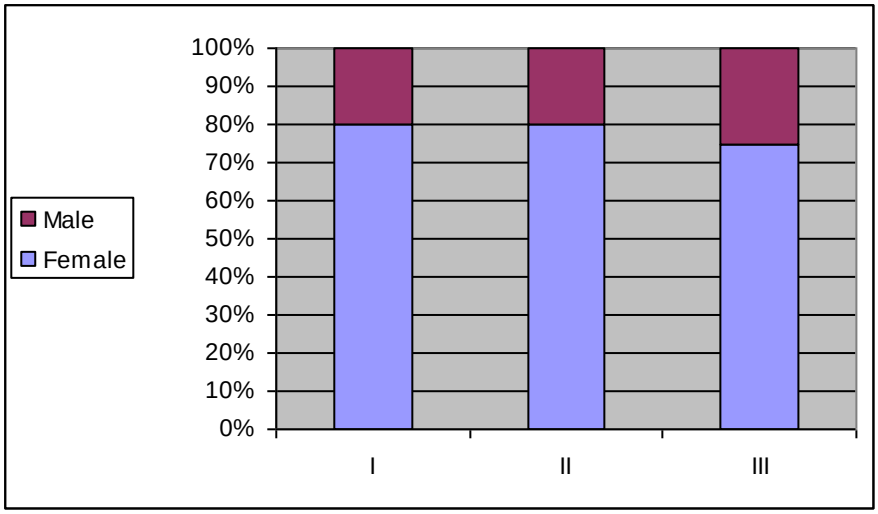

Figure (31): Female to male ratio of the studied groups.

Table 9: Age in (years) of the studied groups

Group / Age (years)	I	II	III	F	P
Mean + SD	29.2±1.76	30.5±8.04	31.55±9.31	2.3	0.86 [NS]
Range	18-47	17-51	18-50		

[NS] = non significant P > 0.05

Table 10 (a): Weight in (kg) before and after treatment and the percentage of changes in weight in the studied groups.

Group	Before treatment (mean ± SD)	After treatment (mean ± SD)	Percentage of change (%)
I	94.12 ± 8.85	89.13 ± 11.31	5.31
II	93.3±9.83	85.3±9.13	8.71
III	95.1±2.48	82.5±8.35	15.23
F	2.01	3.14	22.1
P	> 0.05 [NS]	< 0.05 [S]	< 0.001 [HS]

Table 10(b): Comparison of the percentage of weight reduction after treatment between each of the studied groups

Compared groups	x^2	p
I vs II	6.77	< 0.01 [HS]
I vs III	15.21	< 0.001 [HS]
II vs III	7.12	< 0.01 [HS]

NS= non significant P > 0.05
S= significant P < 0.05
HS= Highly significant P < 0.01

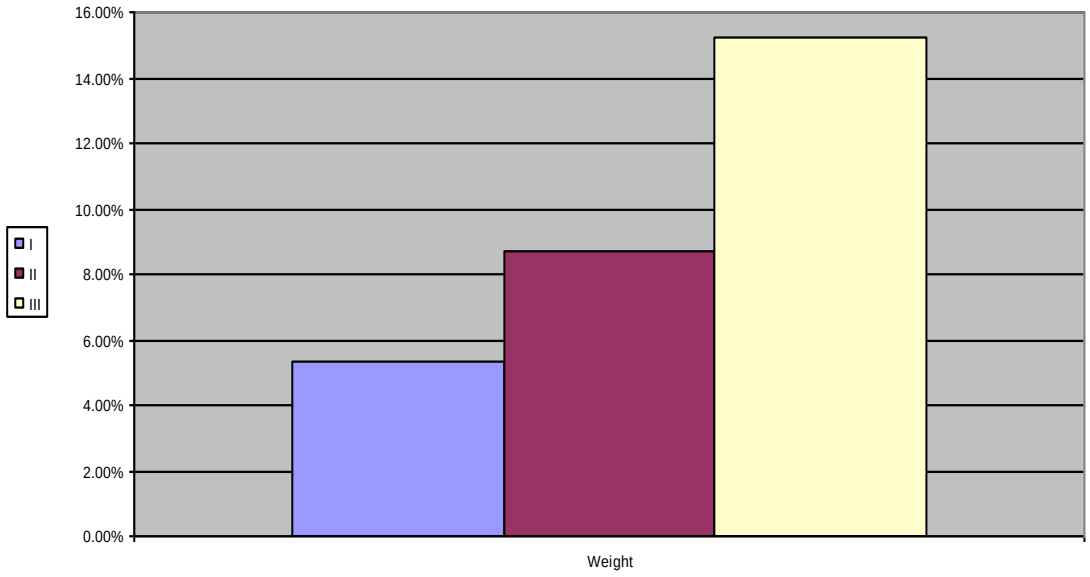

Figure (32): Percentage of changes in weights in the studied groups.

Table 11(a): Body mass indices (BMI) before and after treatment and the percentage of the changes in (BMI) in the studied groups.

Group	Before Treatment (mean ± SD)	After treatment (mean ± SD)	Percentage of change (%)
I	36.7 ± 3.15	34.63 ± 3.59	5.62
II	35.5 ± 4.12	32.51 ± 6.17	8.42
III	36.8 ±5.12	31.51 ± 6.14	14.31
F P	2.09 > 0.05 [NS]	3.72 < 0.05 [S]	26.12 < 0.001 [HS]

Table 11(b): Comparison of the percentage of reduction in BMI after treatment between each of the studied groups.

Compared groups	x^2	P
I vs II	5.55	< 0.01 [HS]
I vs III	9.71	< 0.01 [HS]
II vs III	6.12	< 0.01 [HS]

NS= non significant P > 0.05
S= significant P < 0.05
HS= Highly significant P < 0.01

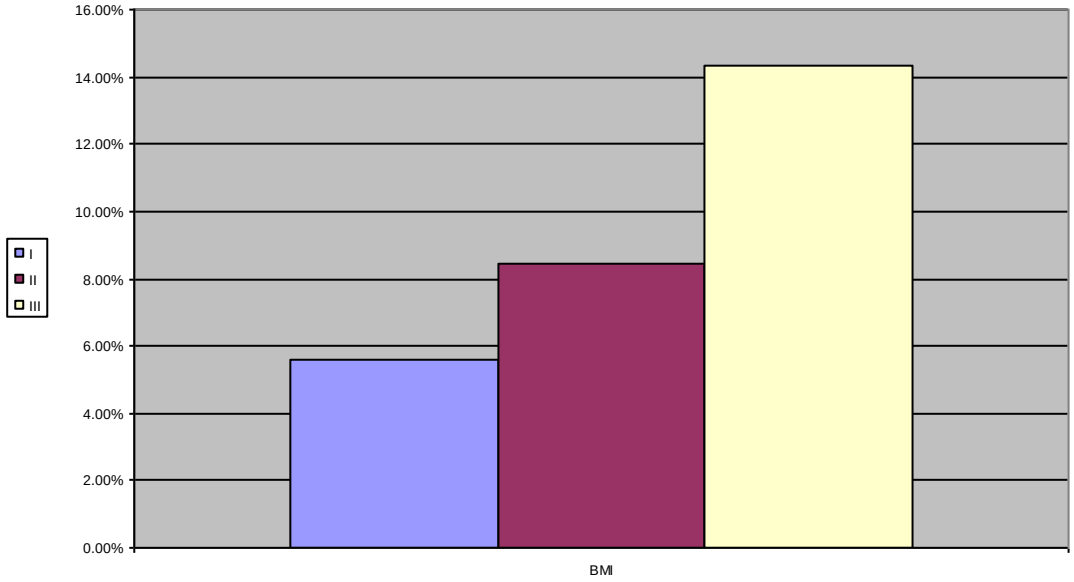

Figure (33): Percentage of changes in BMI in the studied groups.

Table 12(a): Systolic blood pressure (SBP) in (mmHg) before and after treatment and the percentage of the changes in (SBP) in the studied groups.

Group	Before Treatment (mean ± SD)	After treatment (mean ± SD)	Percentage of change (%)
I	126.1± 10.95	123.15 ± 6.71	2.31
II	128.2 ± 13.59	121.71 ± 8.91	5.61
III	129.3 ±19.67	120.31 ± 10.12	6.92
F P	2.07 > 0.05 [NS]	3.45 < 0.05 [S]	12.13 < 0.001 [HS]

Table 12(b): Comparison of the percentage of reduction in (SBP) after treatment between each of the studied groups.

Compared groups	x^2	P
I vs II	6.78	< 0.01 [HS]
I vs III	8.12	< 0.01 [HS]
II vs III	1.25	> 0.05 [NS]

NS= non significant P > 0.05
S= significant P < 0.05
HS= Highly significant P < 0.01

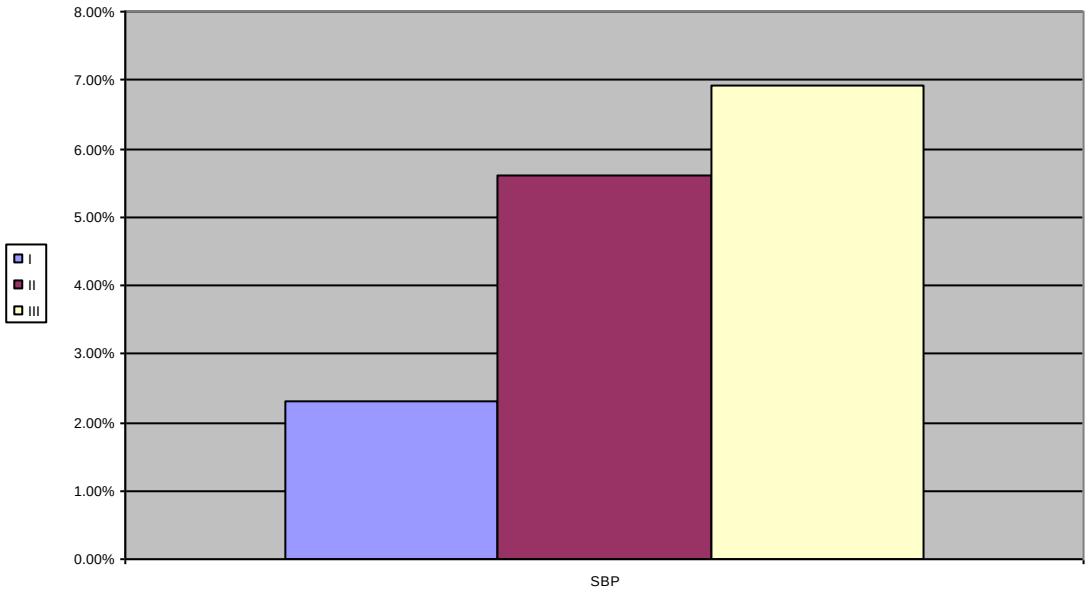

Figure (34): Percentage of changes in (SBP) in the studied groups.

Table 13(a): Diastolic blood pressure (DBP) in (mmHg) before and after treatment and the percentage of the changes in DBP in the studied groups.

Group	Before Treatment (mean ± SD)	After treatment (mean ± SD)	Percentage of change (%)
I	83.12± 10.12	81.71 ± 7.85	2.49
II	84.12 ± 9.71	80.91 ± 8.75	4.76
III	85.71 ±10.71	78.71 ± 9.31	8.31
F p	2.12 > 0.05 [NS]	3.4 < 0.05 [S]	21.31 < 0.001 [HS]

Table 13(b): Comparison of the percentage of reduction in (DBP) after treatment between each of the studied groups.

Compared groups	x^2	P
I vs II	3.95	< 0.05 [S]
I vs III	7.12	< 0.01 [HS]
II vs III	6.32	< 0.01 [HS]

NS= non significant P > 0.05
S= significant P < 0.05
HS= Highly significant P < 0.01

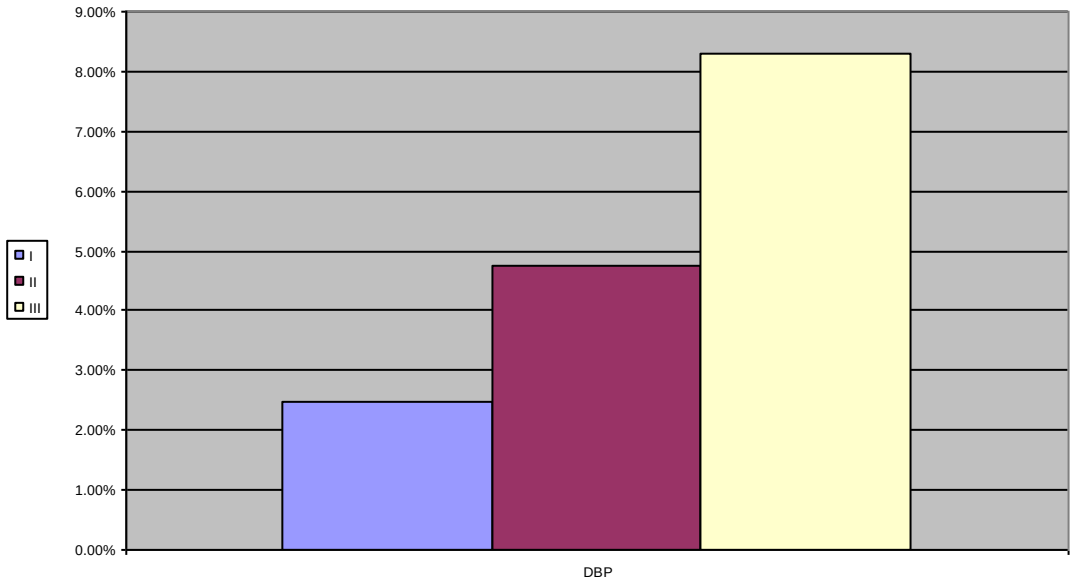

Figure (35): Percentage of changes in (DBP) in the studied groups.

Table 14(a): Right arm circumference (Rtac) in (cm) before and after treatment and the percentage of the changes in (Rtac) in the studied groups.

Group	Before Treatment (mean ± SD)	After treatment (mean ± SD)	Percentage of change (%)
I	36.71 ± 2.42	34.12 ± 2.12	5.51
II	35.91 ± 3.41	33.07 ± 2.19	6.1
III	35.61 ± 5.12	32.71 ± 3.09	8.52
F p	1.71 > 0.05 [NS]	2.93 < 0.05[S]	21.71 < 0.001 [HS]

Table 14(b): Comparison of the percentage of decrease in (Rtac) after treatment between each of the studied groups.

Compared groups	x^2	p
I vs II	1.58	> 0.05 [NS]
I vs III	4.91	< 0.05 [S]
II vs III	2.51	< 0.05 [S]

NS= non significant P > 0.05
S= significant P < 0.05
HS= Highly significant P < 0.01

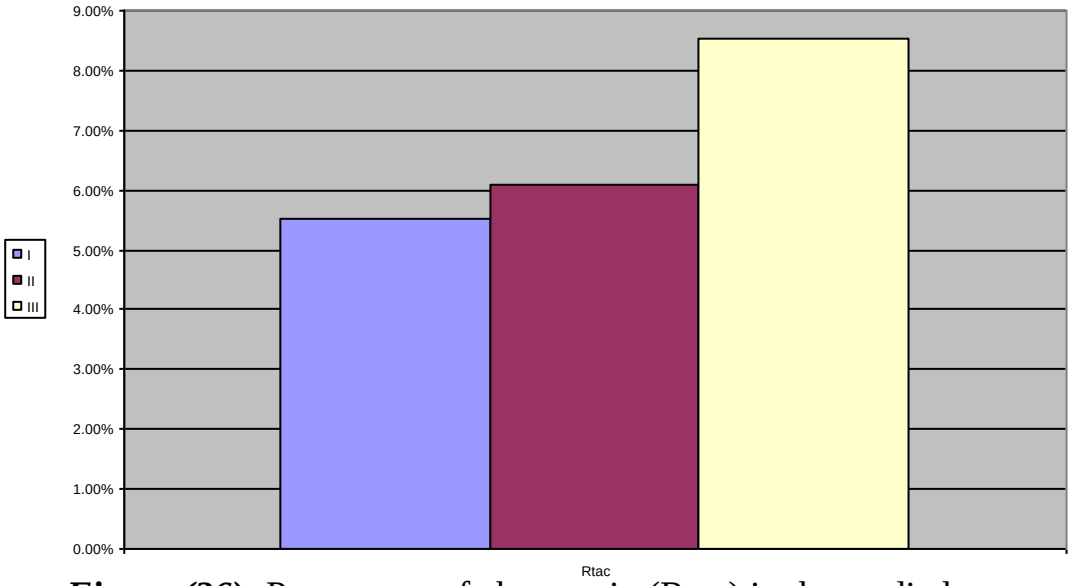

Figure (36): Percentage of changes in (Rtac) in the studied groups.

Table 15(a): Right thigh circumference (Rttc) in (cm) before and after treatment and the percentage of the changes in (Rttc) in the studied groups.

Group	Before Treatment (mean ± SD)	After treatment (mean ± SD)	Percentage of change (%)
I	70.49 ±4.88	66.12 ± 5.12	5.71
II	69.51 ±5.12	65.31 ± 54.71	6.03
III	72.03 ± 05.03	63.91 ±5.32	12.51
F p	1.95 > 0.05 [NS]	3.92 < 0.05 [S]	35.1 < 0.001 [HS]

Table 15(b): Comparison of the percentage of decrease in (Rttc) after treatment between each of the studied groups.

Compared groups	x^2	p
I vs II	2.01	P > 0.05 [NS]
I vs III	6.51	P < 0.01 [HS]
II vs III	5.21	P < 0.01 [HS]

NS= non significant P > 0.05
S= significant P < 0.05
HS= Highly significant P < 0.01

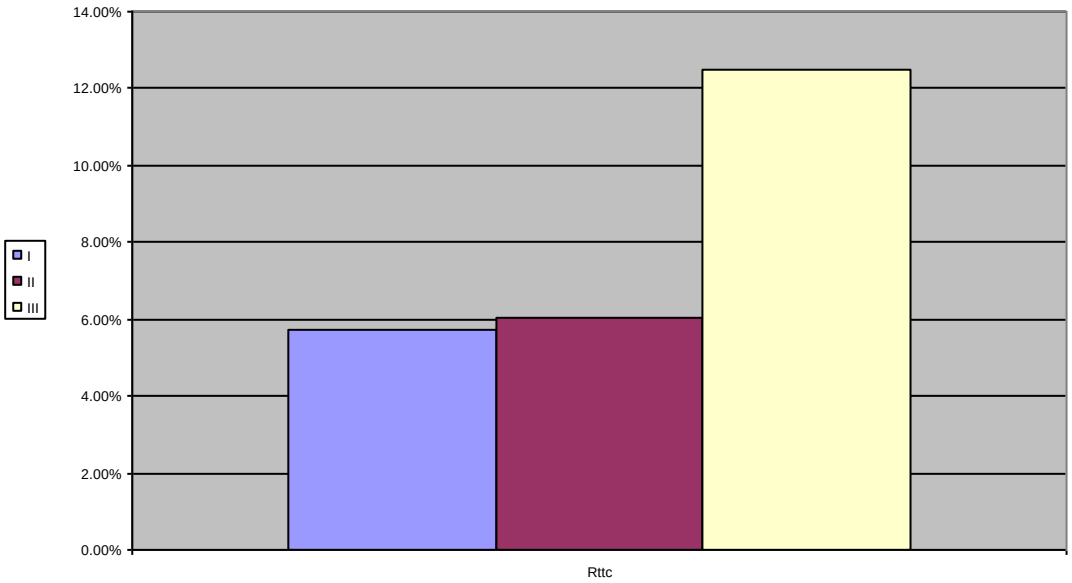

Figure (37): Percentage of changes in (Rttc) in the studied groups.

Table 16(a): Chest circumference (Chc) in (cm) before and after treatment and the percentage of the changes in (Chc) in the studied groups.

Group	Before Treatment (mean ± SD)	After treatment (mean ± SD)	Percentage of change (%)
I	114.12±4.18	112.5 ± 5.13	1.79
II	114.71 ± 5.09	111.3 ± 6.12	2.63
III	115.61 ± 4.81	110.5 ± 4.12	4.56
F	1.95	2.12	4.45
p	> 0.05 [NS]	> 0.05[NS]	< 0.05 [S]

Table 16(b): Comparison of the percentage of decrease in (Chc) after treatment between each of the studied groups.

Compared groups	x^2	p
I vs II	2.59	< 0.05 [S]
I vs III	8.56	< 0.01 [HS]
II vs III	5.12	< 0.05 [S]

NS= non significant P > 0.05
S= significant P < 0.05
HS= Highly significant P < 0.01

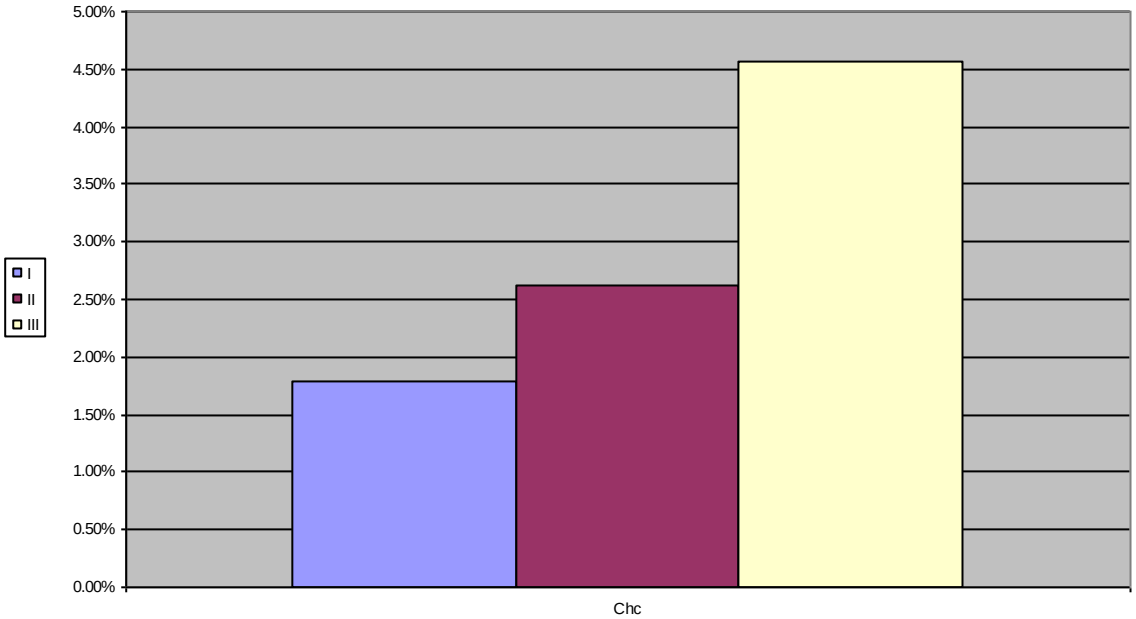

Figure (38): Percentage of changes in (Chc) in the studied groups.

Table 17(a): Abdominal circumference (Abc) in (cm) before and after treatment and the percentage of the changes in (Abc) in the studied groups.

Group	Before Treatment (mean ± SD)	After treatment (mean ± SD)	Percentage of change (%)
I	110.69 ± 3.4	105.1 ± 3.71	4.51
II	109.13 ± 4.71	104.52 ± 5.18	6.12
III	110.01 ± 5.32	102.07 ±5.19	7.31
F P	1.79 > 0.05 [NS]	2.69 < 0.05 [S]	10.12 < 0.001 [HS]

Table 17(b): Comparison of the percentage of decrease in (Abc) after treatment between each of the studied groups.

Compared groups	x^2	p
I vs II	5	< 0.01 [HS]
I vs III	6.31	< 0.01 [HS]
II vs III	3.31	< 0.05 [S]

NS= non significant P > 0.05
S= significant P < 0.05
HS= Highly significant P < 0.01

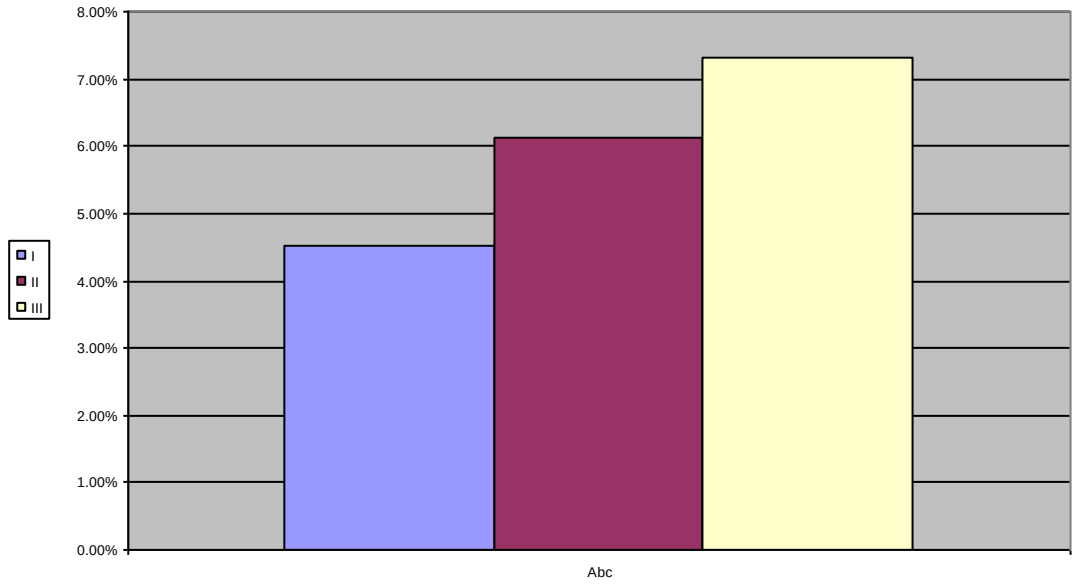

Figure (39): Percentage of changes in (Abc) in the studied groups.

Table 18(a): Hip circumference (Hc) in (cm) before and after treatment and the percentage of the changes in (Hc) in the studied groups.

Group	Before Treatment (mean ± SD)	After treatment (mean ± SD)	Percentage of change (%)
I	123.4 ± 5.27	117.51 ± 4.75	4.1
II	124.11 ± 5.38	116.71 ± 5.47	6.21
III	123.3 ±6.71	114.01 ± 6.71	7.52
F p	1.75 > 0.05 [NS]	2.78 < 0.05 [S]	13.77 < 0.001 [HS]

Table 18(b): Comparison of the percentage of decrease in (Hc) after treatment between each of the studied groups.

Compared groups	x^2	p
I vs II	2.66	< 0.05 [S]
I vs III	3.09	< 0.01 [S]
II vs III	1.71	> 0.05 [NS]

NS= non significant P > 0.05
S= significant P < 0.05
HS= Highly significant P < 0.01

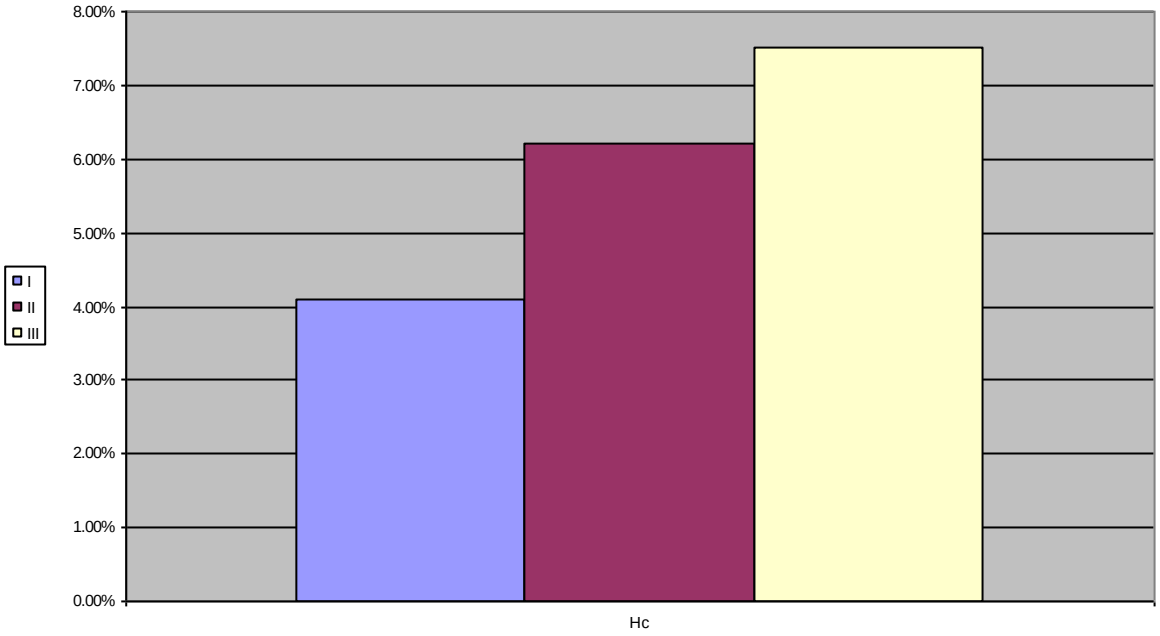

Figure (40): Percentage of changes in (Hc) in the studied groups.

Table 19(a): Waist to hip ratio (WHR) before and after treatment and the percentage of the changes in (WHR) in the studied groups.

Group	Before Treatment (mean ± SD)	After treatment (mean ± SD)	Percentage of change (%)
I	0.89 ± 0.0031	0.88 ± 0.002	1.21
II	0.88 ± 0.0037	0.87 ± 0.0031	1.31
III	0.89 ± 0.0028	0.87 ± 0.002	2.44
F	1.71	2.09	13.55
p	> 0.05 [NS]	> 0.05 [NS]	< 0.001 [HS]

Table 19(b): Comparison of the percentage decrease in (WHR) after treatment between each of the studied groups.

Compared groups	x^2	p
I vs II	1.95	> 0.05 [NS]
I vs III	5.73	< 0.01 [HS]
II vs III	5.51	< 0.01 [HS]

NS = non significant P > 0.05
S = significant P < 0.05
HS = Highly significant P < 0.01

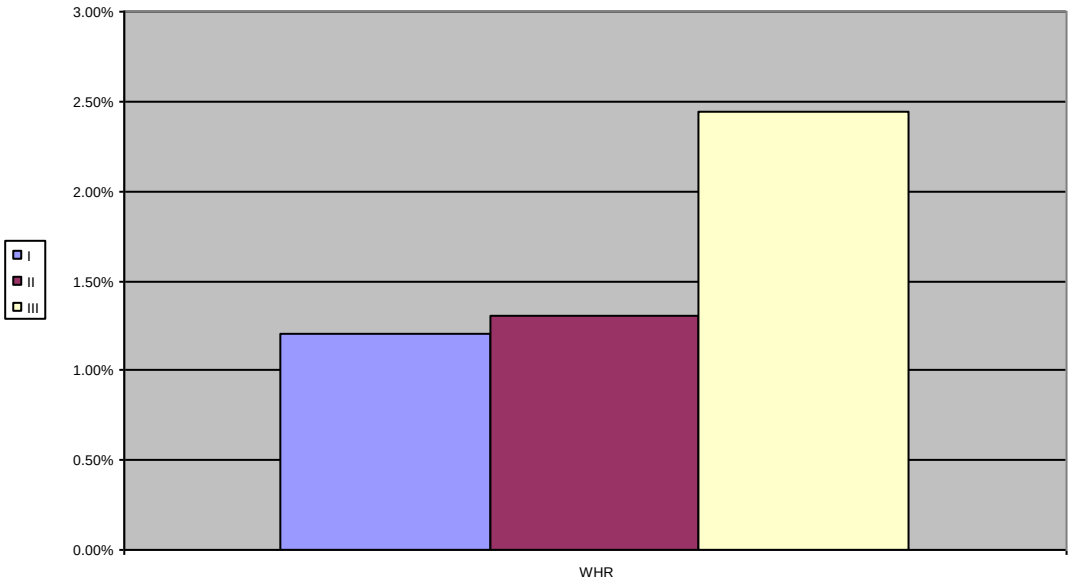

Figure (41): Percentage of changes in (WHR) in the studied groups.

Table 20(a): Biceps skin fold thickness in (cm) before and after treatment and the percentage of the changes in Biceps skin fold thickness in the studied groups.

Group	Before Treatment (mean ± SD)	After treatment (mean ± SD)	Percentage of change (%)
I	2.5 ± 0.71	2.31 ± 0.91	8.91
II	2.53 ± 0.81	2.26 ± 0.82	12.31
III	2.61 ± 0.91	2.21 ± 0.71	15.31
F p	2.03 > 0.05 [NS]	2.21 > 0.05[NS]	15.92 < 0.001 [HS]

Table 20(b): Comparison of the percentage of decrease in biceps skin fold thickness after treatment between each of the studied groups.

Compared groups	x^2	p
I vs II	4.12	< 0.05 [S]
I vs III	5.31	< 0.01 [HS]
II vs III	1.71	> 0.05 [NS]

NS= non significant P > 0.05
S= significant P < 0.05
HS= Highly significant P < 0.01

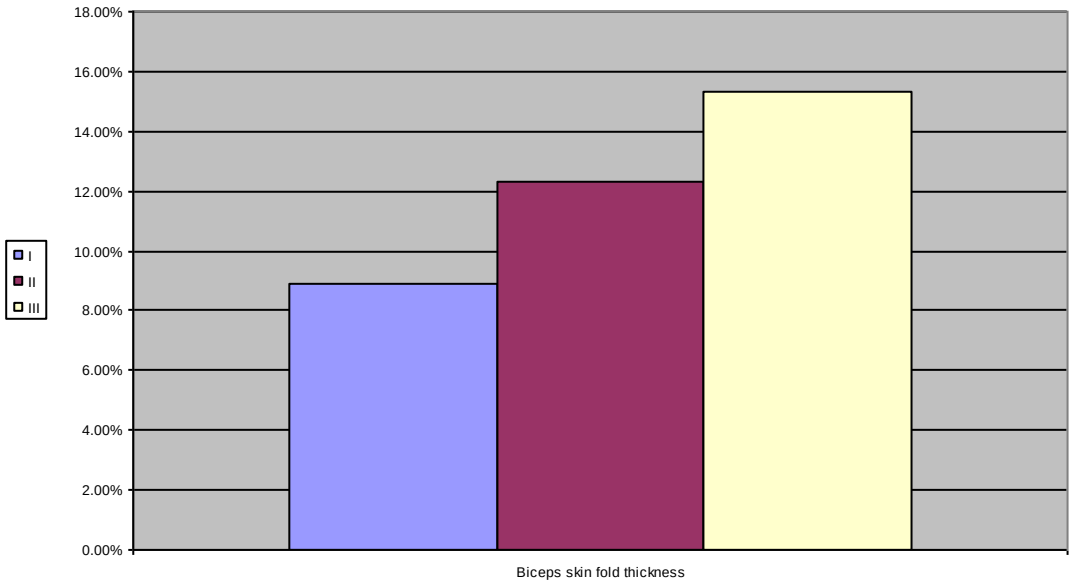

Figure (42): Percentage of changes in biceps skin fold thickness in the studied groups.

Table 21(a): Triceps skin fold thickness in (cm) before and after treatment and the percentage of the changes in triceps skin fold thickness in the studied groups.

Group	Before Treatment (mean ± SD)	After treatment (mean ± SD)	Percentage of change (%)
I	3.41 ± 0.85	3.27 ± 0.72	8.21
II	3.5 ±0.92	3.15 ±0.67	11.7
III	3.6 ± 0.81	3.12 ± 0.73	13.51
F	2.01	2.31	17.12
p	> 0.05 [NS]	> 0.05[NS]	< 0.001 [HS]

Table 21(b): Comparison of the percentage of decrease in triceps skin fold thickness after treatment between each of the studied groups.

Compared groups	x^2	P
I vs II	2.3	P < 0.05 [S]
I vs III	3.15	P < 0.05 [S]
II vs III	1.91	P > 0.05 [NS]

NS= non significant P > 0.05
S= significant P < 0.05
HS= Highly significant P < 0.01

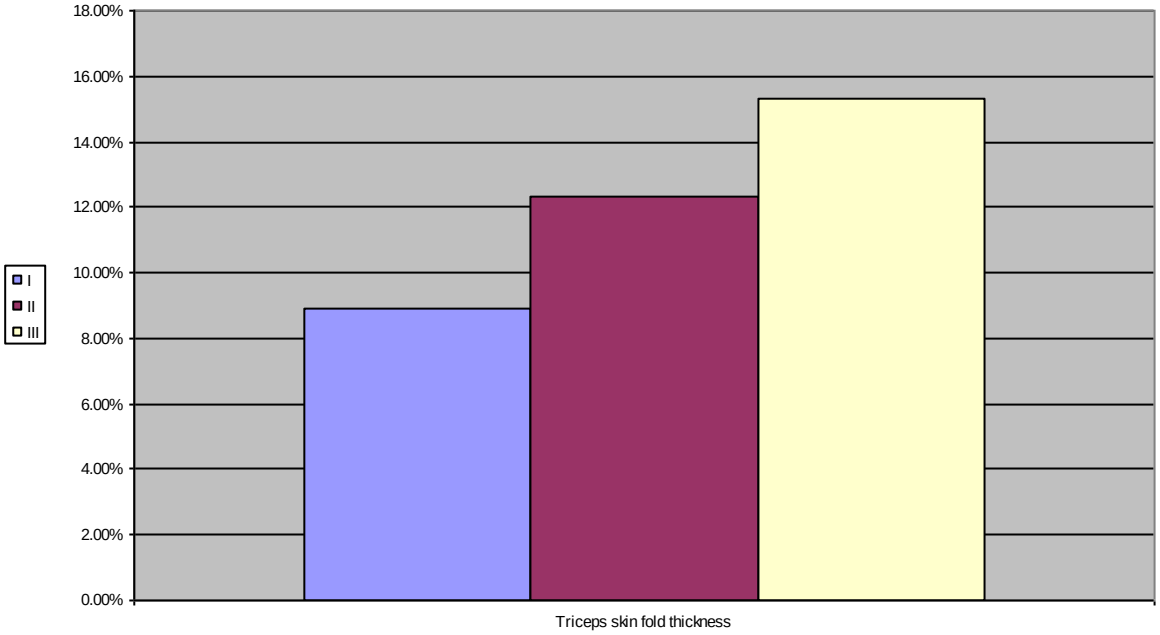

Figure (43): Percentage of changes in triceps skin fold thickness in the studied groups.

Table 22(a): Subscapular skin fold thinkness in (cm) before and after treatment and the percentage of the changes in subscapular skin fold thickness in the studied groups.

Group	Before Treatment (mean ± SD)	After treatment (mean ± SD)	Percentage of change (%)
I	4.25 ± .81	3.92 ± .71	7.12
II	4.2 ± .71	3.72 ± .81	11.93
III	4.4 ± .81	3.52 ± .71	19.31
F	1.95	2.61	23.1
p	> 0.05 [NS]	< 0.05 [S]	< 0.001 [HS]

Table 22(b): Comparison of the percentage of decrease in subscapular skin fold thickness after treatment between each of the studied groups.

Compared groups	x^2	p
I vs II	2.21	< 0.05 [S]
I vs III	6.12	< 0.01 [HS]
II vs III	5.23	< 0.01 [HS]

NS= non significant P > 0.05
S= significant P < 0.05
HS= Highly significant P < 0.01

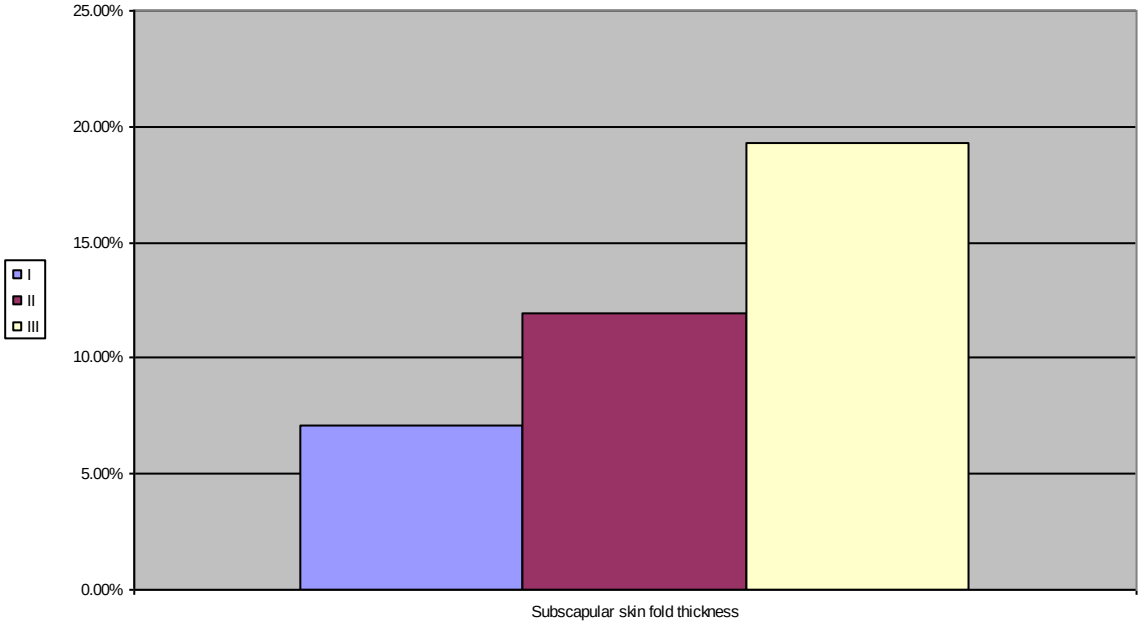

Figure (44): Percentage of changes in subscapular skin fold thickness in the studied groups.

Table 23(a): Suprailiac skin fold thickness in (cm) before and after treatment and the percentage of the changes in suproiliac skin fold thickness in the studied groups.

Group	Before Treatment (mean ± SD)	After treatment (mean ± SD)	Percentage of change (%)
I	4.42 ±0.61	4.23 ± 0.71	4.51
II	4.62 ± 0.52	4.25 ± 0.92	8.6
III	4.82 ±0.61	4.12 ± 0.84	14.31
F	2.07	2.32	19.12
p	> 0.05 [NS]	> 0.05[NS]	< 0.001 [HS]

Table 23(b): Comparison of the percentage decrease in suprailiac skin fold thickness after treatment between each of the studied groups.

Compared groups	x^2	p
I vs II	3.12	< 0.05 [S]
I vs III	7.12	< 0.01 [HS]
II vs III	5.12	< 0.01 [HS]

NS= non significant P > 0.05
S= significant P < 0.05
HS= Highly significant P < 0.01

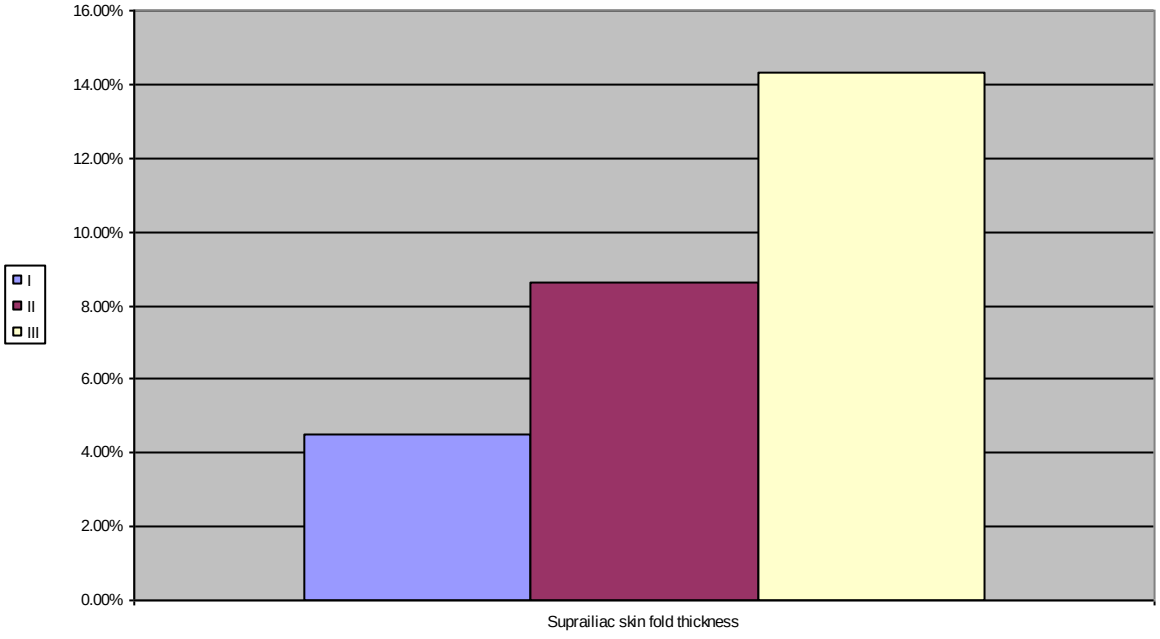

Figure (45): Percentage of changes in suprailiac skin fold thickness in the studied groups.

Table 24(a): Triglycride (TG) level (mg/dl) before and after treatment and the percentage of the changes in (TG) level in the studied groups.

Group	Before Treatment (mean ± SD)	After treatment (mean ± SD)	Percentage of change (%)
I	111.75 ± 19.85	105.1 ± 16.76	5.41
II	112.76 ± 20.12	100.71 ± 20.12	10.31
III	113.56 ±21.71	99.7 ± 15.12	12.81
F P	1.98 > 0.05 [NS]	2.85 < 0.05 [S]	25.1 < 0.001 [HS]

Table 24(b): Comparison of the percentage of decrease in (TG) level after treatment between each of the studied groups.

Compared groups	x^2	p
I vs II	5.12	< 0.01 [HS]
I vs III	6.71	< 0.01 [HS]
II vs III	1.81	> 0.05 [NS]

NS= non significant P > 0.05
S= significant P < 0.05
HS= Highly significant P < 0.01

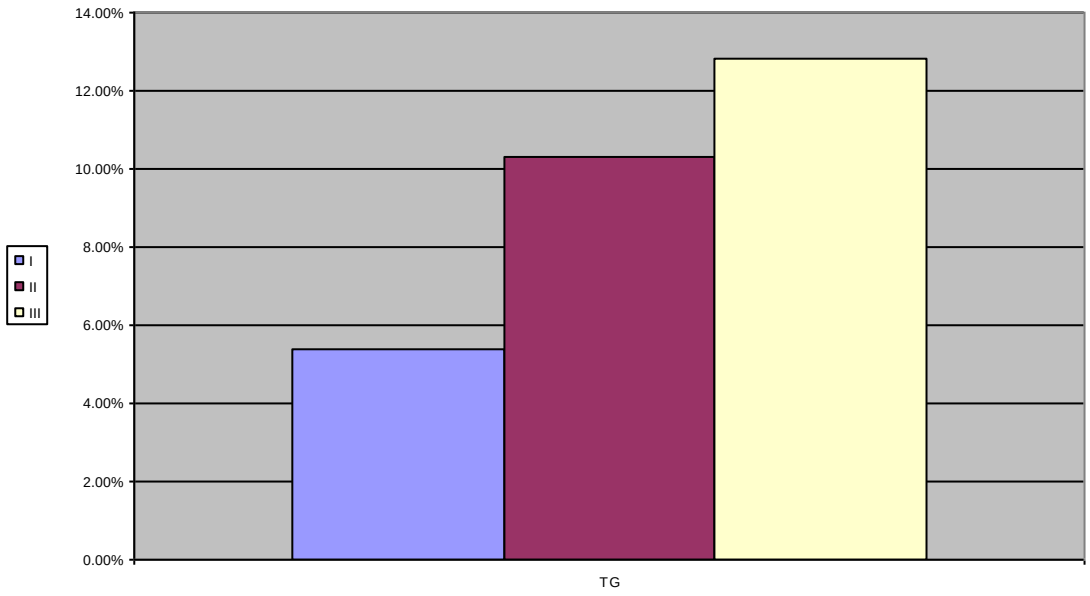

Figure (46): Percentage of changes in (TG) in the studied groups.

Table 25(a): Total cholesterol (TC) level in (mg/dl) before and after treatment and the percentage of the changes in (TC) level in the studied groups.

Group	Before Treatment (mean ± SD)	After treatment (mean ± SD)	Percentage of change (%)
I	141.71 ± 30.12	128.12 ± 35.12	9.21
II	143.21 ± 29.17	125.12 ± 41.12	12.35
III	144.32 ±40.12	123.12 ± 51.21	14.59
F p	2.07 > 0.05 [NS]	3.93 < 0.05 [S]	33.1 < 0.001[HS]

Table 25(b): Comparison of the percentage of decrease in (TC) level after treatment between each of the studied groups.

Compared groups	x^2	p
I vs II	3.71	< 0.05 [S]
I vs III	5.21	< 0.01 [HS]
II vs III	1.71	> 0.05 [NS]

NS= non significant P > 0.05
S= significant P < 0.05
HS= Highly significant P < 0.01

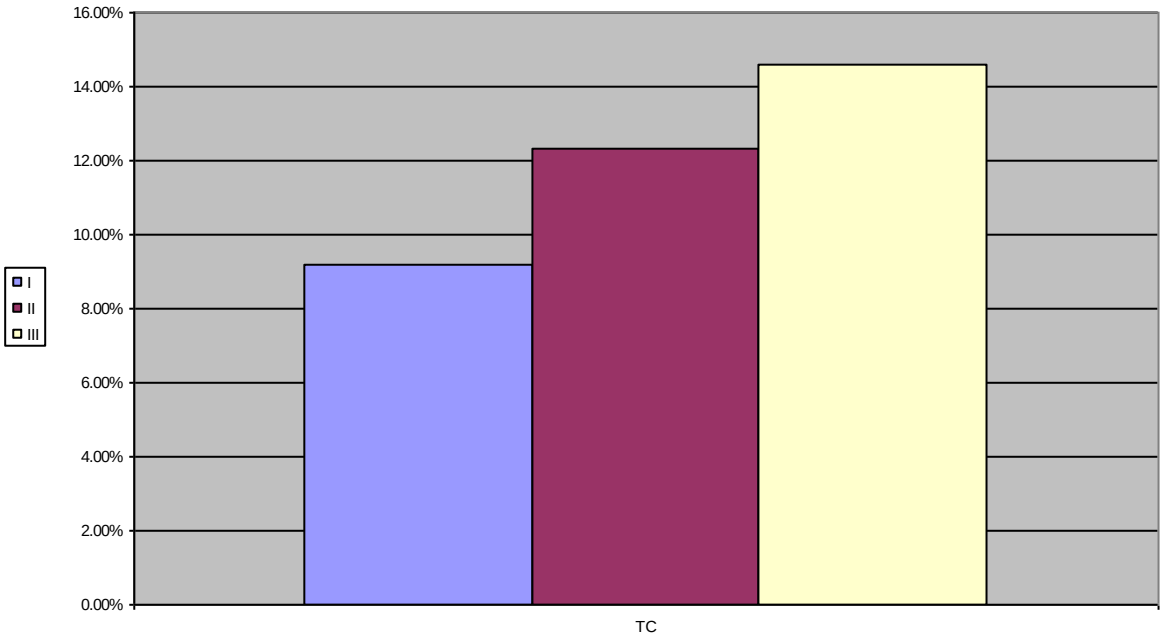

Figure (47): Percentage of changes in (TC) in the studied groups.

Table 26(a): High Density liproprotein (HDL) cholesterol level in (mg/dl) before and after treatment and the percentage of the changes in (HDL) in the studied groups.

Group	Before Treatment (mean ± SD)	After treatment (mean ± SD)	Percentage of change (%)
I	31.95 ± 6.19	40.12 ± 6.12	20.1
II	33.12 ± 7.12	42.71 ± 5.15	23.1
III	34.12 ±8.71	43.12 ± 5.12	26.41
F P	2.09 > 0.05 [NS]	2.25 > 0.05[NS]	7.51 < 0.01 [HS]

Table 26(b): Comparison of the percentage of increase in (HDL) after treatment between each of the studied groups.

Compared groups	x^2	p
I vs II	3.72	< 0.05 [S]
I vs III	4.52	< 0.05 [S]
II vs III	3.93	< 0.05 [S]

NS= non significant P > 0.05
S= significant P < 0.05
HS= Highly significant P < 0.01

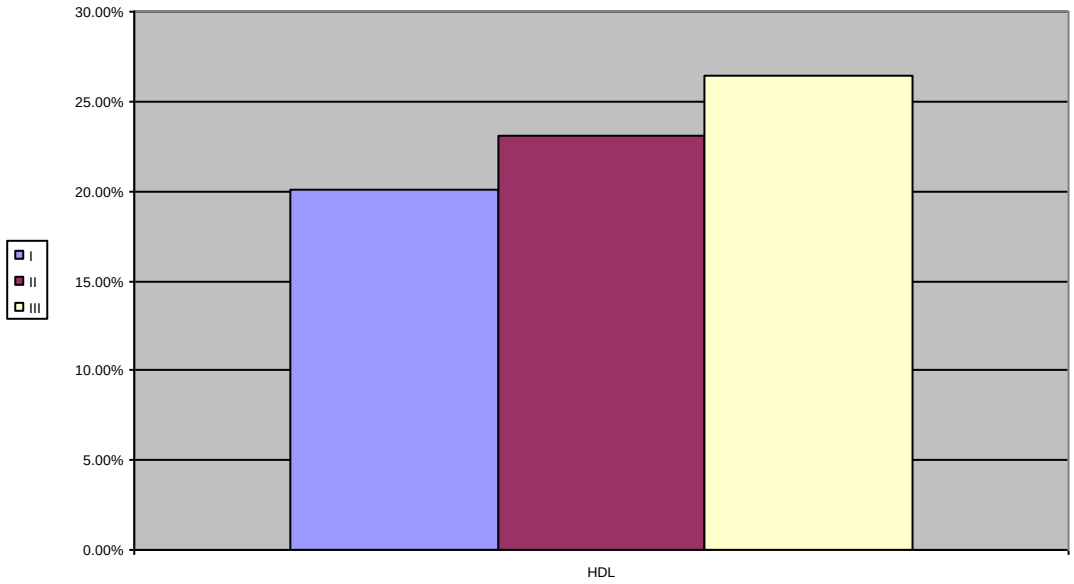

Figure (48): Percentage of changes in (HDL) in the studied groups.

Table 27(a): Low density liproprotein (LDL) cholesterol level in (mg/dl) before and after treatment and the percentage of the changes in (LDL) level in the studied groups.

Group	Before Treatment (mean ± SD)	After treatment (mean ± SD)	Percentage of change (%)
I	115.51 ± 18.15	103.51 ± 20.12	6.93
II	117.12 ± 19.12	101.12 ± 16.71	9.32
III	118.30 ±20.32	100.21 ± 15.71	18.31
F p	1.95 > 0.05 [NS]	2.34 > 0.05[NS]	31.7 < 0.001 [HS]

Table 27(b): Comparison of the percentage of decrease in (LDL) level after treatment between each of the studied groups.

Compared groups	x^2	p
I vs II	7.11	< 0.01 [HS]
I vs III	9.13	< 0.01 [HS]
II vs III	5.12	< 0.01 [HS]

NS= non significant P > 0.05
S= significant P < 0.05
HS= Highly significant P < 0.01

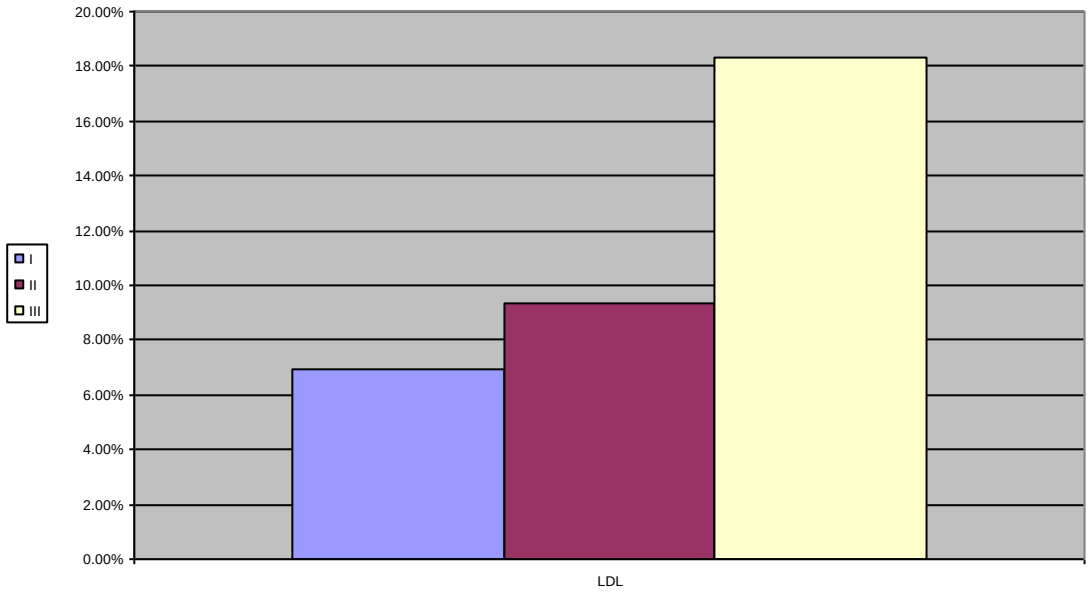

Figure (49): Percentage of changes in (LDL) in the studied groups.

Table 28(a): Serotonin level in (ug/ml) before and after treatment and the percentage of the changes in serotonin level in the studied groups.

Group	Before Treatment (mean ± SD)	After treatment (mean ± SD)	Percentage of change (%)
I	222.5 ± 16.78	225.12 ± 20.17	1.3
II	219. 31 ± 20.17	270.7 ± 20.17	23.28
III	220.19 ± 18.19	284.7 ±15.71	29.09
F	1.76	15.12	40.81
p	> 0.05 [NS]	< 0.001 [HS]	< 0.001 [HS]

Table 28(b): Comparison of the percentages of elevation in serotonin level after treatment between each of the studied groups.

Compared groups	x^2	p
I vs II	16.99	< 0.001 [HS]
I vs III	21.12	< 0.001 [HS]
II vs III	5.01	< 0.01 [HS]

NS= non significant P > 0.05
S= significant P < 0.05
HS= Highly significant P < 0.01

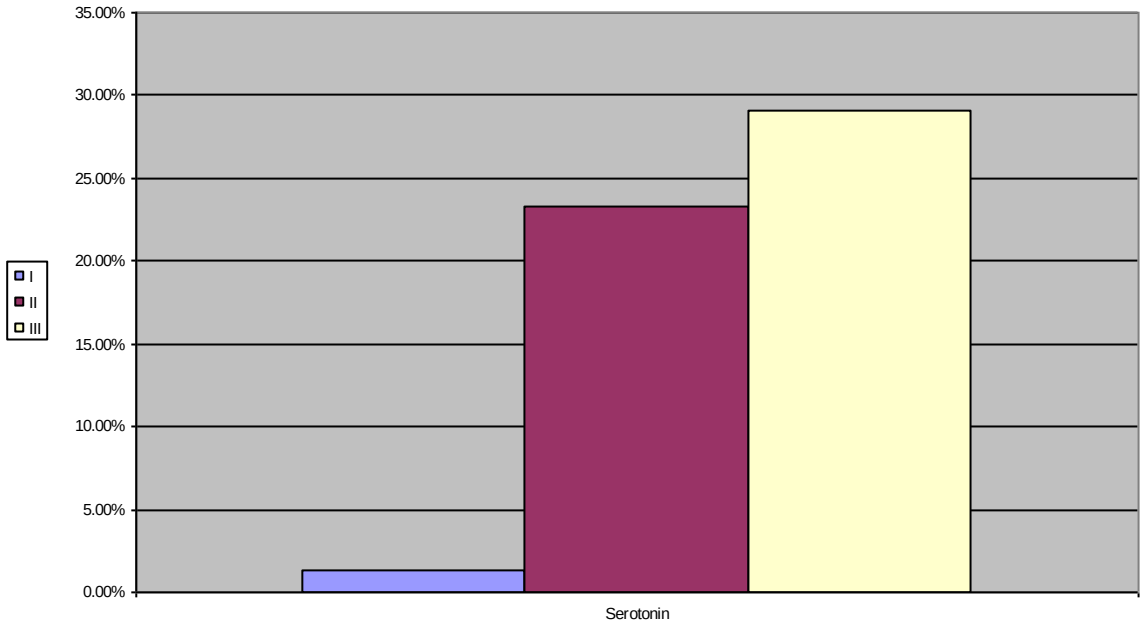

Figure (50): Percentage of changes in serotonin level in the studied groups.

Table 29: The best model for improvement with acupuncture treatment of obese patients.

Best model	Regression	t-test	p-value
s. serotonin levels	0.980	2.74	< 0.01
HDL	0.978	2.70	< 0.01
Weight	0.973	2.66	< 0.01
Biceps skin fold thickness	0.962	2.18	< 0.05

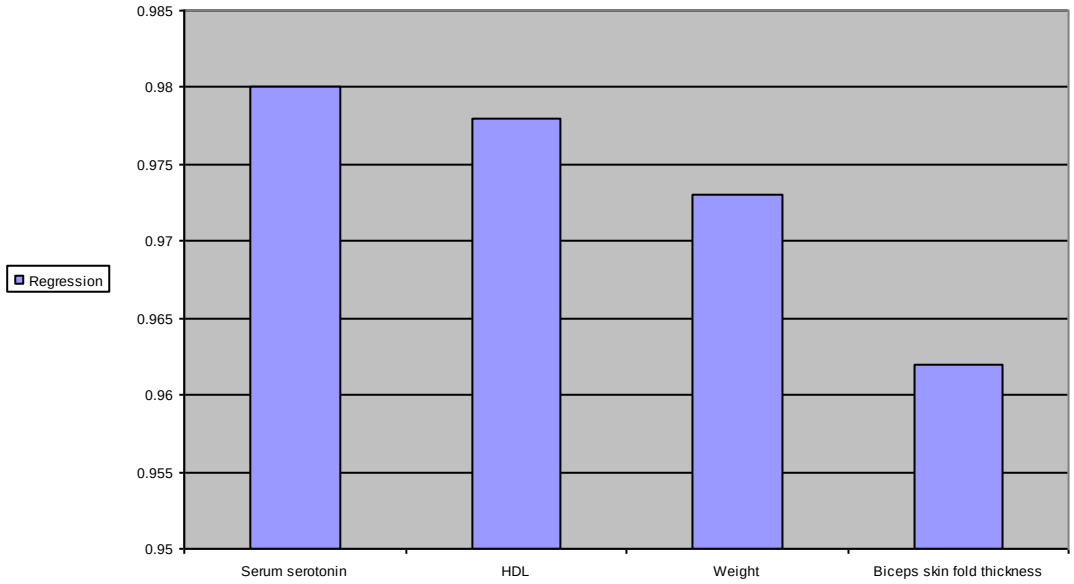

Figure (51): The best model for improvement with acupuncture treatment of obese patients.