-Effectiveness of Intensive Physical Exercise and Very Low Calorie Diet in Maintaining Weight Loss among Obese Women

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Abstract

Back ground:There is a problem of increasing overweight and obesity all over the world ,Iraq is suffering from this problem also. Weight regain after weight reduction is emerging as additional problem to obesity and over weight.

Aim: to study the effect of Intensive Physical Exercise adding to very low calorie diet on weight loss maintenance after an initial very low calorie diet program in obese women.

Method: An intervention study applied to 84 women attending the Obesity Research and Therapy Unit in AL-Kindy Hospital, Baghdad, Iraq, who achieved weight loss after a very low calorie deit program for 12 weeks. Then those women were divided blindly into intervention group (walking exercise + very low calorie deit) and control group on very low calorei deit only for another 12weeks.

Result: Very low calorie diet is highly effective in weight reduction. The mean weight loss after 12week of very low calorie deit was 7.6±1.3 kg. Demographic factors and family history didn't show any significant effect on weight loss. The regain of weight in treatment group was less than that of control group. Intensive Physical Exercise was associated with less weight gain among obese women on very low calorei deit.

Conclusion:Intensive physical exercise with very low calorie diet associated with less weight regain.

Key word: obesity, weight regain, physical exercise, Baghdad, Iraq.

Introduction:

According to World Health Organization, in 2010 there were 400 million adults who were obese.1 Prevalence of obesity in women in Arab countries in 2008 were: Kuwait 49.8%; Egypt 44.5%; UAE 39.9%; Saudi Arabia 39.1%;Qatar 38.1%; Bahrain 38%; Jordan 36.4%; Syria 33.5%;Iraq33.4%; Lebanon 29.0%; Oman 23.8%.2

Obesity is a major risk factor for diabetes, cardiovascular disease, musculoskeletal disorders, obstructive sleep apnea, and cancers (prostate, colorectal, endometrial, and breast 3. The main treatment of obesity is dieting, augmented by physical exercise and supported by cognitive behavioral therapy4.

diet with total dietary calorie intake of 800 – 1500, while very low calorie diet has less than 800 calories daily6. There is a general perception that almost no one succeeds in maintaining of weight loss 7. However, researches had shown that ~20% of overweight individuals are successful at long term weight loss when defined as losing at least 10% of initial body weight and maintaining that loss for at least one year8 . The 10% criterion was suggested because weight losses of this magnitude can produce substantial improvements in risk factors for diabetes and heart diseases. Although 10% weight loss may not return an obese to a non-obese state, the health impact of 10% weight loss is well documented9.

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Methodology:

A randomized controlled study was conducted during the period from the first January to the first July, 2016. 84 obese women of those visiting the Obesity Research and Therapy Unit in AL-Kindy hospital, Baghdad, Iraq, who succeed in get loss of weight after a VLCD program for 12weeks(out of 100 women who did not make it either due to loss to follow or could not get loss of weight) their body weight measurement were done every month to be sure of their successful weight loss , then the women were divided blindly into a intervention group(walking exercise + VLCD) and control group on VLCD only for another 12weeks with the same regime of follow up each month visit with body weight measurement (Both groups received similar dietary program).

Vigorous-intensity physical activity requires a large amount of efforts and cause rapid breathing and a substantial increase in heart rate examples: Running, Walking/Climbing briskly up a hill, Fast cycling, Aerobics, Fast swimming, Competitive sports and games (e.g.Traditional Games, Football, Volleyball, Hockey, Basketball), carrying/ moving heavy loads(>20 kg**10 .**

Weight Maintenance after weight reduction is difficult, but increased physical activity may help. By adding exercise to diet counseling may decrease the regain of weight gain after program of very low calorie diet (VLCD) for 12 weeks. The study aims to evaluate the effect of Intensive Physical Exercise adding to VLCD on weight loss maintenance after an initial VLCD program in obese women

VLCD is a diet with very or extremely low daily food energy consumption and it is defined as a diet of 800 kcal(3,300kj)/day or less. VLCDs also contain the recommended

daily requirement for vitamins, minerals, trace elements, fatty acids and protein
11.Carbohydrate may be entirely absent, or substituted for a portion of proteins this choice has important metabolic effect12

Results:

The current study included 84 obese women, with average age (33.3 ± 7.7) years and ranged from 20 – 44 years. The most frequent age group was ≥40 years as it was represented by 28.6% of the joining women, while the least frequent age group was 25 - <30 years) which was represented by only 15.5%. Out of the 84 included women, 68 (81%) were married. Three fourths (75%) of the women in the current study were from urban areas. Housewives consisted 72.6% of the studied sample while 20.2% were clerks and 7.1% were students. Concerning the educational level of the joining women, 27 (32.1%) of them hold a college degrees being the most frequent level, while the least frequent level was primary school among 15 women (17.9%). Table 1

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Table 1: Distribution of the included females, according to their socio-demographic characteristics

Variables	Number	Percent
Age group		
20 - <25 years	15	17.9%
25 - <30 years	13	15.5%
30 - <35 years	18	21.4%
35 - <40 years	14	16.7%
≥40 years	24	28.6%
Total	**84**	**100%**
Mean ± Standard deviation (Range)	33.3 ± 7.7 (20 – 44) years	
Marital status		
Single	14	16.7%
Married	68	81%
Divorced	2	2.4%
Total	**84**	**100%**
Residence		
Urban	63	75%
Rural	21	25%
Total	**84**	**100%**
Occupation		
Housewife	61	72.6%
Clerk	17	20.2%
Student	6	7.1%
Total	**84**	**100%**
Education		
Primary school	15	17.9%
High school	26	31%
Diploma degree	16	19%
College degree	27	32.1%
Total	**84**	**100%**

Regarding the family history of the studied 84 women, 60 (71.4%) gave family history of obesity. Family history of diabetes mellitus was reported by 35 women (41.7%). Hypertension and ischemic heart diseases were reported as family history by 31 (36.9%) and 18 (21.4%) of the women respectively.

On the other hand, 23 (27.4%) of the included women gave histories of previous surgeries (Figure 1).

Figures 2 and 3 illustrate the subsequent monthly changes in the mean weight and body mass indices of the joining women.

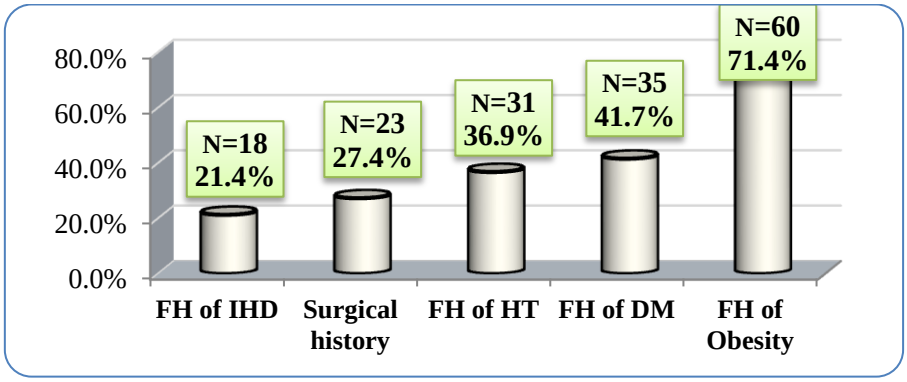

Figure 1: Distribution of included females, according to surgical and family histories, N=84

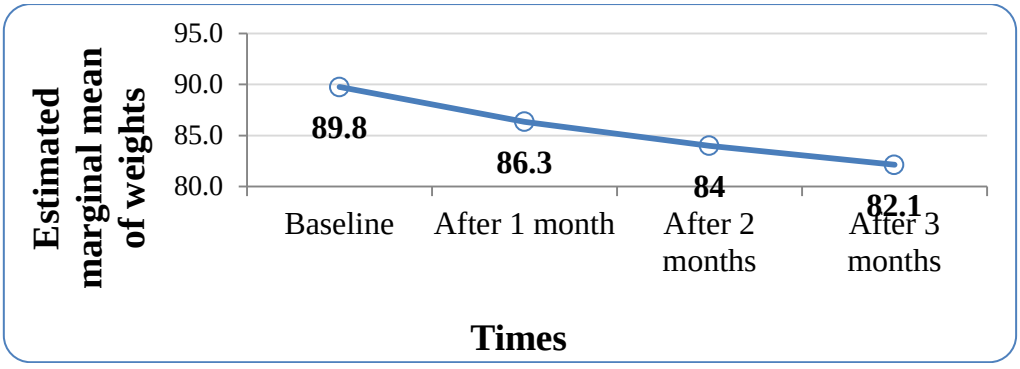

Figure 2 showing changes in weight due to VLCD across the course time

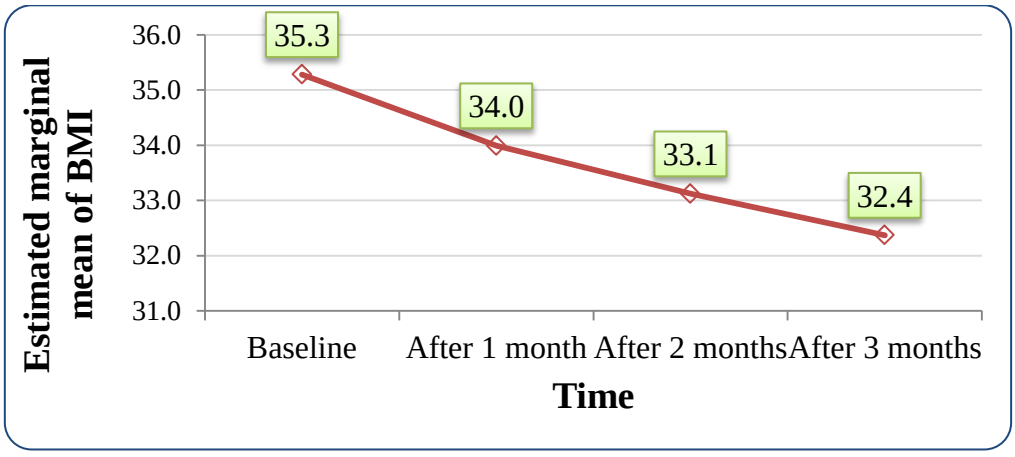

Figure 3 showing changes in BMI due to VLCD across the course time

The weight of the participants was clearly and steadily declines with the time month after month without any interruptions even in the different subclasses of the included sample as shown in tables 2 & 3 below.

Table 2: changes in weight due to VLCD, according to socio-demography of the included females

Variables	Weight changes with time Mean ± SD			
	Baseline	**After 1 month**	**After 2 months**	**After 3 months**
Age group				
20 - <25	93±10.8	89.4±11	87 ±11.1	85.4±11.4
25 - <30	88.1±11	84.3±10.8	82±10.9	80.1±10.9
30 - <35	89.2±9.1	85.9±9.4	83.5±9.5	81.57±9.4
35 - <40	90.7±11.6	87.1±11.4	84.7±11.2	82.7±11.2
≥40	88.5±9.1	85.4±9	83.2±8.9	81.3±8.9
Marital status				
Single	92.6±9.8	88.8±9.9	86.3±9.8	84.6±9.9
Married	89.1±10.1	85.7±10.1	83.4±10.1	81.5±10.1
Divorced	93.8±12.4	90.7±11.1	88.4±11	87.3±10.9
Residence				
Urban	90.7±9.9	87.3±10	84.9±10	83.1±10.1
Rural	86.9±10.1	83.5±9.9	81.2±9.8	79.3±9.7
Occupation				
Housewife	89.4±10.3	86.1±10.3	83.9±10.3	82 ±10.3
Clerk	88.5±8.6	85 ±8.4	82.5±8.5	80.5±8.4
Student	96.6±10.8	92.4±11.5	89.8±11.5	88.1±11.4
Education				
Primary school	92.1±9.8	88.9±9.7	86.6±9.8	84.7±9.9
High school	90.9±11.3	87.3±11.3	85±11.3	83.2±11.4
Diploma degree	85.5±8.4	82.2±8.3	79.8±8.2	77.9±8
College degree	89.9±9.6	86.4±9.7	84.1±9.7	82.1±9.6
Overall	**89.8±10.1**	**86.3±10.1**	**84±10**	**82.1±10.1**

Table 3: changes in weight due to VLCD, according to medical histories of the included females

Histories	Weight changes with time Mean ± SD			
	Baseline	**After 1 month**	**After 2 months**	**After 3 months**
Surgical history				
Positive	91.2±10.5	87.7±10.5	85.4±10.4	83.4±10.6
Negative	89.2±9.9	85.8±9.9	83.5±9.9	81.6±9.9
Family history of Obesity				
Positive	88.3±10	84.9±10.1	82.6±10	80.74±10.1
Negative	93.4±9.4	89.8±9.4	87.5±9.4	85.59±9.4
Family history of DM				
Positive	89.4±8.9	85.9±8.8	83.6±8.8	81.7±8.8
Negative	90±10.9	86.7±11	84.3±10.9	82.4±11
Family history of HT				
Positive	89.3±8.5	86±8.3	83.6±8.3	81.7±8.3
Negative	90±10.9	86.6±11	84.2±11	82.4±11
Family history of IHD				
Positive	91.7±6.9	88.3±6.9	86±6.8	84±6.8
Negative	89.2±10.8	85.8±10.8	83.5±10.7	81.6±10.8

The weight of participants declined significantly (F=472.099, P<0.001*). The estimated effect of the diet on weight decline was 0.937 that considered very high as it was responsible about 93.7% of the body weight decline. The mean weight loss after 12week of VLCD was 7.6±1.3 kg.

After randomization, mean weight and BMI increment was significantly high (P<0.001) in the control group (VLCD) in comparison to that in the intervention group (VLCD+ IPE). In control group, mean weight change was 1.07±0.12 while intervention group, mean weight change was 0.28±0.08. Mean BMI change in control group was 0.43± 0.07 while in intervention group was 0.11± 0.04.

Other factors as age, marital status, residence, occupation, education level and all family history didn't show a significant effect on the changes in weight.

Table 4: Comparison of mean weight changes for the participant females before and after randomized exercise courses

Groups	N	Weight (kg) Mean ± SD		Weight Differ. Mean±SD	df	Paired t-test	p-value
		Before randomization	3 month after randomization				
VLCD	42	81.3±10.8	82.4±10.7	1.07±0.12	41	-59.831	<0.001*
VLCD + Exercise	42	83±9.3	83.2±9.3	0.28±0.08	41	-23.087	<0.001*
*Significant at 0.05 by paired t-test (2 tails)							

Table 5: Comparison of mean BMI changes for the participant females before and after randomized excercise courses

Groups	N	Body mass index (kg/m2) Mean ± SD		BMI Differ. Mean±SD	df	Paired t-test	p-value
		Before randomization	3 month after randomization				
VLCD	42	32.2±3.5	32.6±3.5	0.43±0.07	41	-37.433	<0.001*
VLCD + Exercise	42	32.6±3.4	32.7±3.4	0.11±0.04	41	-17.745	<0.001*
*Significant at 0.05 by paired t-test (2 tails)							

Discussion

The results after a program of VLCD for 12 weeks, the mean weight reduction was 7.6± 1.3kg comparable to figure reported in studies in US12, Sweden13, and China14 which were 7.2±1.4 kg, 8±1.1 kg, 8.7±0.6 kg respectively in which thy were higher than figure reported by current study Also randomized controlled trial in Taiwan to investigate the efficacy and safety of two different VLCDs (450 or 800 kcal/d) in obese Taiwanese conclude that both VLCDs can effectively and safely reduce body weight and improve nonalcoholic fatty liver disease in 12 weeks in obese Taiwanese11.

Study in Spanish to evaluate the efficacy and safety of VLCDs in a group of overweight and obese Chilean women revealed that: short term use of VLCDs is safe and effective to induce rapid weight loss in Chilean women16 Clinical trial in Denmark to evaluate the effect of VLCD on weight, body fat distribution, glucose, insulin and lipid metabolism, androgen levels in obese young women. Showed that: a VLCDs is an effective weight loss treatment, which results in an immediate

improvement in several metabolic parameters13.

But our findings differed from study in Sweden18, this diverse may be attributed to the compliance of participants to diet program, the initial VLCD resulted in a successful weight reduction and the good compliance may be attributed to recruiting by advertisement selecting highly motivated participants, as weight loss comparable with that in studies in different contexts 12,13,14, the results from VLCD might be generalized, at least to countries with similar health care organizations.

The results of this study could encourage personal in obesity clinic to use VLCD and lifestyle advice for weight reduction because of it's time frame.

In this study, there is no effect of other demographic characteristics and family histories on weight reduction like that in previous studies in US12, Sweden13,18, China14**3Intensive Physical Exercise and**

Weight loss maintenance:

Maintenance of weight loss is a complex undertaking, and long term data on weight loss maintenance are still lacking. Overtime, it becomes increasingly difficult for persons to continue to follow the weight management strategies learned during the course of weight loss treatment.

In the current study, adherence to 150 min/week of IPE (resistance training Treadmill) resulted in regain of (0.28± 0.08 kg) for intervention group versus (1.07± 0.12 kg) for the control group and there is a slight increase in weight loss when exercise intervention is added to dietary restriction.

This results of present study agreed with study in US12, in which 80 min/week physical exercise after weight loss resulted in regain of 3.1 kg/12 month, whereas the diet(VLCD) regain of >6.2kg/12 month, also it show that the significant time effect indicated that weight and BMI increased significantly during follow up period. Also RCT on 208 healthy premenopausal women, in North America were randomly assigned to three different weight loss groups: diet and aerobic exercise, diet and resistance exercise, and diet only. In conclusion, as little as 80 min/week aerobic or resistance training had modest positive effects on preventing weight regain following a diet induced 13

Another study in University of Pittsburgh School of Nursing 20 3 studies that included use of a VLCD during maintenance after a VLCD induced weight loss indicated that weight regain was similar among the randomized groups when their weight exceed the end of weight loss treatment weight by 3kg(after 24 month).

Study in United Kingdom 21, suggested that it is possible to reduce weight regain through behavioral and pharmacological means. Lifestyle interventions targeting both dietary intake and physical activity were moderately effective in reducing weight regain after initial weight loss in obese adults within 12 months of weight loss.

It is important to point out that the smaller weight regain was achieved with 150 min/week (30 min/day for 5day/week) of intensive physical exercise, since other studies had reported that much longer training duration of more than 60 min/day were necessary to prevent regain of weight15.

The important role of physical activity in weight maintenance had been well documented with particular emphasis placed on the value of long term adherence to physical activity22. It is not too surprising that weight regain was not totally prevented in this study may be due to inadequate adherence to the physical exercise protocol may be a key reason why randomized trial frequently fail to find a relationship between physical activity and weight maintenance.

Conclusions:

The weight declined significantly, the effect of VLCD on weight loss was very high, the regain of weight in intervention group was less than that of control group. So the Intensive Physical Exercise was associated with less weight gain among obese women having VLCD.

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