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Aile Hekimliği Ofisleriyle Bağlantılı bir Egzersiz Ortamı Kadınlarda Şişmanlığın Tedavisine Çözüm Olabilir mi?

Exercise Facility Attached to Family Practice Offices as a Solution to Female Obesity

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Özet

Amaç: Şişman hastalarımıza egzersiz yapabilecekleri bir ortam sağlanması ve glisemik endekse dayalı basitleştitilmiş bir diyet verilmesinin şişmanlığın tedavisinde bir yarar sağlayıp sağlamadığını araştırdık.

Yöntem: Araştırmamıza 146 şişman kadın dahil edildi (Vücut Kitle Endeksi VKİ ≥ 30). Hastalar verilen tedaviye göre dört gruba randomize edildi: "basit egzersiz önerisi + diyetisyen konsültasyonu" (Gr 1), "basit egzersiz önerisi + aile hekimi tarafından modifiye glisemik bir diyet verilmesi" (Gr 2), "egzersiz merkezinde gözlem altında egzersiz + diyetisyen konsültasyonu" (Gr 3) ve "egzersiz merkezinde gözlem altında egzersiz + aile hekimi tarafından modifiye glisemik bir diyet verilmesi" (Gr 4). Hastalar altı ay boyunca takip edildi. İstatistiksel analizde ikili hipotez testleri ve lineer regresyon analizi kullanıldı. Ana sonuç ölçütü olarak altıncı ayın sonundaki VKİ değişimi alındı.

Bulgular: Altıncı ayın sonunda tüm gruplarda anlamlı derecede VKİ azalması gözlendi ($p<0.05$). En fazla azalma grup 3'te idi (ort 1,88 kg/m^2). İkili karşılaştırmalarda egzersiz çeşidi ve kilo verme motivasyonunun VKİ azalmasını anlamlı derecede etkilediği bulundu. Bununla birlikte lineer regresyon analizinde tek anlamlı değişkenin egzersiz türü olduğu görüldü.

Sonuç: Gözlem altında egzerzi ve diyetisyen konsültasyonu kombinasyonunun kadınlarda kilo vermede en etkili yöntem olduğu bulundu. Şişman kadınlara egzersiz yapabilecekleri ortamların sağlanması ve aile hekimliği ofisinde bir diyetisyenin bulunması şişman kadınlarda tedavi başarısını artıracaktır.

Anahtar Kelimeler: Şişmanlık; Glisemik indeks; Egzersiz Tedavisi; Aile hekimliği

Abstract

Purpose: We checked whether the hypothesis of providing our patients a facility to exercise and giving a simplified diet based on glycemic index could cause any benefit to the management of obese female patients.

Method: 146 female obese patients (BMI ≥ 30) were enrolled into the study. Patients were randomized into four groups according to the therapy they received: "simple exercise prescription + dietician consultation" (Gr 1), "simple exercise prescription + modified glycemic diet provided by the family physician" (Gr 2), "observed exercise in the fitness center + dietician consultation" (Gr 3), and "observed exercise in the fitness center + modified glycemic diet provided by the family physician" (Gr 4). Patients were followed up for six months. Bivariate comparisons and linear regression were used for statistical analysis. The main outcome measured was change in the BMI at the end of six months.

Results: All groups had significant decreases ($p<0.05$) in BMI at the end of study, Gr 3 having the highest decrease (mean 1.88 kg/m^2). Bivariate comparisons showed a significant difference in the BMI changes with regard to the exercise group and motivation to lose weight. In the linear regression analysis however, only exercise was significantly associated with weight loss.

Conclusion: A combination of exercise under supervision and dietician consultation proved to be most effective in weight loss. Providing fitness opportunities to obese patients and inclusion of a dietician in the family practice team will be beneficial in the management of female obesity.

Key words: Obesity; Glycemic Index; Exercise Therapy; Family Practice

Introduction

Obesity has reached epidemic proportions globally, with more than 1 billion adults overweight - at least 300 million of them clinically obese - and is a major contributor to the global burden of chronic disease and disability [1]. It is a major risk for chronic diseases, including type 2 diabetes mellitus, cardiovascular disease, hypertension and stroke, and certain forms of cancer.

In the United States, nearly 1/3 of adults are obese (27.6% of men and 33.2% of women) and one in six children and adolescents is overweight [2]. Increased prevalence of excessive weight is noted among all age, gender and racial/ethnic groups. Its prevalence is steadily increasing, reaching 10% in West African countries [3] and 30-60% in the Mediterranean region [4]. In Turkey, the overall prevalence of obesity in adults was 18.6% and 21.9% in the years 1990 and 2000 respectively [5].

Especially effective in changing the coronary risk factors, weight loss has beneficial effects on all obesity-related health problems [6]. However, the effectiveness of different approaches in the prevention and treatment of obesity is not so clear. The American Academy of Family Physicians recommends that family physicians screen all adult patients for obesity and offer intensive counseling and behavioral interventions [7].

Two major approaches in the fight against obesity are exercise and healthy diet. Although family physicians have advantages of having first contact with the patient, establishing a trusted relationship and long term follow up [8], they are disadvantaged from the point of resources. Although some communities have facilities to implement these approaches, some others, especially developing countries do not. Even if there are facilities, they may not be affordable for some patients or there might be cultural barriers, especially for women from conservative communities.

In a search for a solution for our obese female patients to lose weight, we decided to test the hypothesis whether establishing exercise facilities within the family practice combined with two different types of dietary approaches could be useful.

Methods

Setting: Trakya University Family Medicine Department provides general outpatient services to an urban population of around 10.000 inhabitants in Edirne, a Turkish city at the Greek border.

Study type: In order to answer the question "Can a combination of alternative diet and exercise compared with classical obesity management program decrease body mass index in female obese patients?" we decided to test two different types of exercise and dietary approaches in our cohort of obese patients registered to the family practice clinic. A two-factorial study was designed. The patients were randomized into four groups and followed up for six months.

Sample size: Sample size calculations were done with the MiniTab® software (http://www.minitab.com/) Power and Sample Size Calculation module. Previously BMI δ levels were reported to be between 1.8 and 2.3 kg/m^2 [9]. In a two level factorial design, $\delta = 2.3$, effect of interest = 1.5 kg/m^2, and replicates = 27 will give a power of 92%.

Patients: Out of 1874 registered patients to the clinic in May 2007, 385 (15.2%) had a Body Mass Index (BMI) of 30 and above. From the database of obese patients, 150 were randomly enrolled into the study. None of the subjects had diabetes mellitus and none reported a history of cardiovascular disease or was taking agents that could lead to obesity. Patients were contacted by telephone and invited to come for the enrollment visit. Four patients refused to participate. All provided written

consent, and the study was approved by the local Ethics Committee at the Trakya University Hospital.

Patients were randomly assigned into four groups according to the type of diet and exercise they received:

- G1: exercise prescription (E1) + dietician consultation (D1)
- G2: exercise prescription (E1) + modified glycemic diet (D2)
- G3: observed exercise (E2) + dietician consultation (D1)
- G4: observed exercise (E2) + modified glycemic diet (D2)

Interventions: the different types of interventions are described below:

- Exercise prescription (E1): all participants enrolled to this exercise type were advised to jog three times per week, each time for 45 minutes. Maximum Predicted Heart Rate (MPHR) was calculated from the formula MPHR = 220 – age. During the enrollment examination the participants were asked to walk on the treadmill until they reached 60 to 90 % of their MPHR. Then the participants were advised to do their regular exercise in this tempo. These participants were not supervised during their exercise activities. They were asked to keep an exercise log and come to the family practice center at one month intervals to discuss the progress.
- Observed exercise (E2): participants enrolled to this exercise type were asked to come to the exercise room established within the FP center (Figure 1). Exercise appointments were given for walking on the treadmill three times per week, each time for 45 minutes. Maximum Predicted Heart Rate (MPHR) was calculated from the formula MPHR = 220 – age. The exercise sessions were observed by the health staff and ensured that the participants reached

60 to 90 % of their MPHR. Exercise sessions were conducted on an individual basis. However, there were more than one patients exercising in the same session usually.

- Dietician consultation (D1): a dietician from the university hospital was consulted for patients in this diet group. Patients were asked to follow the guidance of the dietician. The dietician was not informed about the study groups.

- Modified glycemic diet (D2): Glycemic Index (GI) is a scale which ranks foods by how much they raise blood glucose levels compared to glucose [10]. Originally developed as a tool for the dietary management of diabetes, the GI has been promoted as a dietary tool for weight loss. Patients assigned to this diet were asked to keep a diet log for 2 days. Using this log, the family physician conducted a counseling session with the participant. Patients were educated on the glycemic principles and asked to remove nutrients with high glycemic index from their diets. The patients were seen with monthly intervals to discuss problems with the diet and promote adherence.

After randomization, all four groups were similar with respect to age, BMI, fasting blood glucose, and blood pressures (Table 1).

All participants were re-evaluated at one-month intervals.

Outcome: the main outcome measure was Body Mass Index (BMI). Additionally, information about age, BMI, fasting blood glucose, systolic blood pressure, and diastolic blood pressure was collected. Height and weight measurements were done on a standard metric scale. Blood pressure measurements were done with a mercury sphygmomanometer from the right arm while sitting. Plasma glucose concentration was measured by the hexokinase method.

Statistical analysis: Analyses were done using SPSS 15 (SPSS Software, Chicago, IL). There was approximately 20% drop out (n=31) during the study (Figure 2). Group characteristics were compared by analysis of variance with Bonferroni adjustments and paired samples t test. Associations were examined by simple linear regression method. General linear modeling was used to assess the main and interactive effects of the interventions.

Results

The pretreatment characteristics of the obese subjects randomly assigned to the 4 treatment groups are shown in Table 1. On average, they were middle-aged, class II obese, and normotensive. Most of the participants were primary school graduates (44.8%; n=51). 14 participants (12.3%) had graduated from secondary school, 35 (30.7%) from high school and 14 (12.3%) from a college. 60 of the participants (52.2%) had given 2 births. The average number of births was 2.1 ± 0.9. Sixty six of the participants (57.4%) had previous attempts of dieting in order to lose weight. Of the participants, 26 (20.9%) were current smokers, 19 (16.5%) ex smokers and 72 (62.6) never smokers. The desire to lose wight was graded as "not sure", "moderate" and "high" with 3 (2.6%), 63 (54.8%) and 49 (42.6%) participants in each group respectively. No significant group differences were observed with regard to the measured variables at the beginning of the study.

Univariate comparisons showed a significant difference in the BMI changes with regard to the exercise group and motivation to lose weight. In the linear regression analysis however, only exercise was significantly associated with weight loss.

There was a significant decrease in the BMI levels in all groups (paired samples *t*-test *t* and *p* 2.961 vs. 0.006, 2.308 vs. 0.03, 4.413 vs. <0.001, and 6.495 vs. <0.001 for groups 1, 2, 3, and 4 respectively). Goup 3 had the highest decrease in BMI levels (mean difference 1.9 kg/m^2) followed by Group 4 (mean difference 1.3 kg/m^2). However, differences in the systolic blood pressures were

significant only for groups 3 and 4. On the other hand, diastolic blood pressure differences before and after the intervention were not significant for any group (Table 2).

We found significant differences between the individual groups with regard to BMI differences (F=5,9; p=0,001), group 4 having the highest decrease in BMI after the intervention. Mean BMI decreases in the groups were 0.53, 0.47, 1.89, and 1.30 for groups 1 through 4 respectively.

The effects of interventions on BMI and blood pressure changes are shown in Table 2. Main effects were calculated. In the factorial analysis, a significant main effect was observed for observed exercise in decreasing BMI and diastolic blood pressure (Figure 3). No significant interactions were observed between glycemic diet applications for any of the variables.

In a linear regression model with the independent variables of treatment group, age, educational status, number of births, dieting history, smoking status, and desire to lose weight, treatment group (p=0.001) and number of births (p=0.027) showed to be statistically significant.

Discussion

The problem addressed in this study was to find a convenient, effective, and applicable method to help obese patients in family practice losing weight. Exercise prescription was compared with providing an exercise facility within the family practice. Classical dietician consultation on the other hand was tested against a simplified modified glycemic diet approach, which was expected to be cheaper and more convenient for the patients.

Although establishing an exercise facility within the practice proved to be effective, contrary to our hypothesis, the glycemic diet approach was inferior compared to dietician consultation.

Although there are well known benefits of exercise, there is still debate on the medical approach to help patients adopting an effective exercise program. There is evidence that exercise on prescription can increase physical activity and improve some variables of quality of life [11]. Kinmonth and colleagues on the other hand claim that a facilitated theory-based behavioural intervention is no more effective than an advice leaflet for promotion of physical activity [12]. Since the built environment can be held partially responsible from the current exercise status of our patients, one logical suggestion is to start changing the environment as suggested by Wakefield [13]. Family physicians can contribute to the change in patient environment by offering their patients to attend exercise centers attached to the practice. These exercise units can be established by the municipalities, NGOs dealing with health promotion, private corporations, or other organizations such as the universities as in our example.

The classical approach in obesity is preventive strategies plus exercise and calorie restriction diets. However, the long-term treatment of obesity has generally disappointing results [14]. Glycemic index (GI) was introduced as a solution for lifelong behavioral change [15, 16]. However, some authors concluded that GI has little application in clinical practice, as a useful tool to reduce the prevalence of obesity [17, 18]. Although suggested to be beneficial as part of the team[19], dieticians are rarely available in the primary care team. Hence, there is a constant search for alternatives. The modified glycemic diet approach tested in this study could be a good alternative from the points of easy application and being independent of external resources. However, our results support the view that the GI issue needs to be studied more before any solid suggestions can be made to apply it in family practice.

Strengths and limitations

This is a study comparing two important factors in obesity management. It is strong in the sense that it addresses an important and insufficiently evaluated aspect of obesity management.

On the other hand, it could be further improved by calculating the total energy expenditure and total calorie intake of the participants.

Conclusions

Physical fitness levels are declining, while the incidence of obesity is increasing all over the world. GPs, with their team, are in a unique position to be able to discuss the health benefits of regular physical activity with their patients during the consultation and offer, if appropriate, a prescription for a course of physical activity. A combination of exercise under supervision and dietician consultation proves to be an effective approach in weight loss. Providing fitness opportunities to obese patients and inclusion of a dietician in the family practice team will be beneficial in the management of obese women.

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Group	Age (year)	BMI_1 (kg/m^2)	FBG (mg/dl)	SBP_1 (mmHg)	DBP_1 (mmHg)
1	46.6±10.2	35.8 ± 4.1	90.5 ± 15.9	134.6 ± 27.3	82.4 ± 15.0
2	43.1 ± 8.2	35.7 ± 4.0	91.9 ± 13.0	127.8 ± 16.0	84.3 ± 10.3
3	40.8 ± 8.8	36.9 ± 4.9	92.6 ± 22.8	135.2 ± 15.8	86.9 ± 12.1
4	41.5 ± 9.7	38.5 ± 7.2	92.6 ± 14.6	138.2 ± 25.2	88.4 ± 14.6
Total	42.9 ± 9.5	36.9 ± 5.5	92.0 ± 16.7	134.6 ± 22.3	85.8 ± 13.4
F, p	*2.199; 0.092*	*1.827; 0.146*	*0.091; 0.965*	*1.048; 0.374*	*1.182; 0.320*

BMI_1= Baseline Body Mass Index, FBG = Fasting Blood glucose, SBP_1= Baseline Systolic blood pressure, DBP_1= Baseline Diastolic blood pressure. (Values are mean ± Standard Deviation).
Groups: 1 - exercise prescription + dietician consultation; 2 - exercise prescription + modified glycemic diet; 3 - observed exercise + dietician consultation; 4 - observed exercise + modified glycemic diet

Table 1: Baseline characteristics of the participants.

					Main effects ($\bar{X}$ ±SEM *(p)*)	
	G1 ($\bar{X}$ ±SD)	**G2** ($\bar{X}$ ±SD)	**G3** ($\bar{X}$ ±SD)	**G4** ($\bar{X}$ ±SD)	Observed exercise	Glycemic diet
BMI						
(kg/m^2)	35.8±41	35.7±4.0	36.9±4.9	38.5±7.2		
Baseline	35.2±4.1	35.2±4.2	35.0±4.7	37.2±7.3	1.1±0.3 *(0.001)*	-0.3 ±0.3 *(0,231)*
Month 6						
t; p	*2.961;*	*2.308;*	*4.413;*	*6.495;*		
	0.006	*0,030*	*0.001*	*0.001*		
SBP (mmHg)						
Baseline	134.6±27.3	127.8±16.0	135.2±15.8	138.2 ±25.2		
Month 6	130.2±16.9	126.7±16.9	127.0 ±14.6	131.5±16.9	4.7±3.0 *(0.116)*	-2.4±3.0 *(0,423)*
t; p	*1.237;*	*1.226;*	*3.114;*	*2.223;*		
	0.227	*0.233*	*0.004*	*0,033*		
DBP (mmHg)						
Baseline	82.4±15.0	84.3±10.3	86.9±12.1	88.4±14.6		
Month 6	83.7±12.9	84.2±10.9	83.9±10.2	85.0±12.7	3.7±1.8 *(0.039)*	0.9±1.8 *(0.598)*
t; p	*-0.69;*	*0.336;*	*1.632;*	*1.632;*		
	0.960	*0.740*	*0.115*	*0.115*		

Table 2: Body Mass Index (BMI), Systolic Blood Pressure (SBP), and Diastolic Blood Pressure (DBP) in the subjects at baseline and month 6.

Figure 1: Exercise room within the family practice center with treadmills.

Figure 2: The study profile with patient progress.

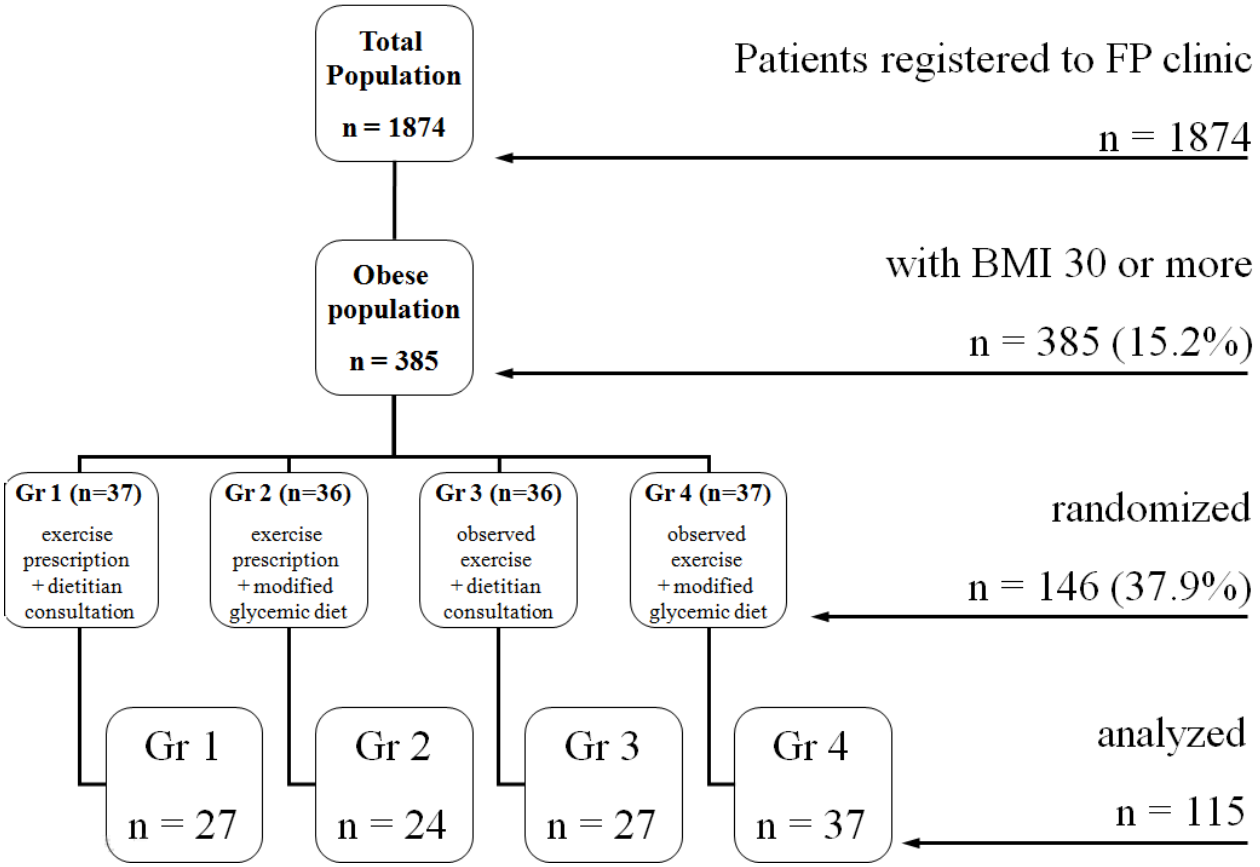

Figure 3: Estimated marginal means of differences between first vs. last BMI measurements.