

Compliance to Walking Type Exercise Among Obese Women Without Comorbidities

Yandaş Hastalığı Olmayan Obez Kadınların Yürüme Tipi Egzersize Uyumları

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ABSTRACT Objective: Regular physical exercise has been shown to be substantial for health. For this purpose, walking on most days of the week is considered an appropriate choice. This study was designed to determine the rate of compliance to walking type exercise among healthy obese women and the results of 12-week exercise. **Material and Methods:** Six hundred and forty-eight healthy women aged 18-55 years with a body mass index (BMI) between 30-35 kg/m² and with adequate SF-36 scores for continuing physical activity were randomly assigned into a walking group (gr-I), a treadmill group (gr-II), a treadmill group supported by a visual apparatus (gr-III) and finally a fitness center group (gr-IV). The compliance of the subjects to walking was determined for a 12-week period. Body weight of the cases were measured once at the beginning of the study and once at the end whereas the follow up was performed monthly. **Results:** The compliance from highest to lowest was in gr-I, followed by gr-III, gr-II and gr-IV and showed a significant fall during the three-month period for all groups. The weight loss was highest in gr-I and lowest in gr-III. Subgroup analysis showed that advanced age was associated with low compliance as well as low body weight loss. **Conclusion:** Exercise prescription is needed to be established with respect to the compliance pattern of the obese, which may be related to safety, environmental and time-related factors. It should be kept in mind that age and rational use of time are important determinants of exercise compliance.

Key Words: Compliance; obesity; exercise; walking

ÖZET Amaç: Sağlıklı bir yaşam için düzenli fizik egzersizin önemi ortaya konmuştur. Bu amaçla haftanın çoğu günleri yapılan yürüyüş tipindeki egzersizin uygun bir seçenek olduğu belirtilmektedir. Bu çalışma, sağlıklı obez kadınların 12 hafta boyunca yürüyüş tipi egzersize uyumlarını ve bu egzersizin sonuçlarını değerlendirmek üzere yapılmıştır. **Gereç ve Yöntemler:** Bilinen herhangi bir tıbbi rahatsızlığı olmayan, yaşları 18-55 arasında ve beden kitle endeksi 30-35 kg/m² arasında değişen SF-36 puanı düzenli fiziksel aktivite için yeterli olan 648 sağlıklı kadın, yürüme grubu (gr-I), koşu bandı grubu (gr-II), görsel desteği olan koşu bandı grubu (gr-III) ve son olarak da spor merkezi grubu (gr-IV) şeklinde randomize edildi. Oniki haftalık bir süre boyunca grupların yürüyüş tipi egzersize uyumu tespit edildi. Vakaların vücut ağırlıkları bir kez çalışma başında ve bir kez de sonunda olmak üzere iki kez ölçüldü; takipler ise aylık olarak yapıldı. **Bulgular:** Egzersize uyumun en yüksekten en düşüğe sırası ile I., III, II. ve IV. gruplarda olduğu saptandı. Kilo kaybının ise en çok gr-I'de, ardından da sırası ile gr-II, IV ve gr-III gruplarında olduğu belirlendi. Alt grup analizlerinde yaş arttıkça benzer egzersizle elde edilen kilo kaybının azaldığı ve uyumun düştüğü tespit edildi. **Sonuç:** Obez vakalar için egzersiz önerisi, bu grubun ön planda tuttuğu görülen güvenlik, konfor ve zamanın akılcı kullanılması gibi faktörler göz önüne alınarak yapılmalı, yaşın ve zamanın uyum üzerinde önemli bir etkileyici olduğu hatırlanmalıdır.

Anahtar Kelimeler: Uyum; obezite; egzersiz; yürüme

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Obesity, defined as the over normal body fat content is the most common nutritional disorder in industrialized nations. It is a significant cause of preventable deaths, morbidity, and adverse health condi-

tions. Physicians are challenged by a number of different medical conditions associated with obesity.^{1,2} Besides physicians must be alert for childhood and adolescent obesity, because persistence of childhood obesity into adulthood is common.³

Impact of obesity on economy has also been studied. In a paper published in 1998 the direct costs attributed to obesity in 1995 in the US was reported to be 5.7% of the national health budget.⁴ A study including 15 European Community nations showed that the costs incurred by obesity reached 32.800 million €. Nearly 30% of this amount was for subsidizing products for healthy nutrition to prevent obesity.⁵

Economical analyses show that obesity creates considerable productivity losses as well as direct and indirect expenditure. Another study in 2010 predicted the lifelong earnings of millennial obese women and men to be 956 billion dollars and 43 billion dollars less than their normal weight counterparts consecutively.⁶

Obesity causes people to run after expensive solutions. The spendings of obese people reach astonishing amounts. In 2002, US citizens were reported to spend 16 billion dollars only for walking shoes.

Regular physical exercise is still the most important instrument for prevention and treatment of obesity. Nevertheless the obese delay to start exercising or have difficulty in keeping up with it. Even the patients who are prescribed home exercise cannot continue with the given programs.⁷

Regular physical exercise has protective and improving effects on all cause mortality, atherosclerotic diseases, cancers, diabetes, hypertension, dyslipidemias, osteoporosis and mental disorders.⁸ It can protect pregnant women from hypertensive disorders and can also be protective for postmenopausal breast cancer.⁹ Aerobic exercise has been shown to be an important intervention for substance addicts.¹⁰

Physical exercise programs also contribute to economy. In various studies, benefit per cost ratios for physical exercise programs vary from 0.76 to 3.43 with most ending up with a positive benefit per cost ratio.^{11,12}

A standart recommended exercise regimen consists of a moderate intensity program in most days of a week for thirty to forty-five minutes per day. In the long term, all adults need to plan to follow a moderate intensity exercise program for thirty minutes a day, preferably for all days of the week. Walking seems to be the most appropriate of many regimens. Being easy, cheap, safe, and social, it can be considered the first choice for a long term exercise program.¹³ An exercise program must be continued for years in order to preserve the achieved body weight and fat loss, but keeping up with it is a universal problem.^{14,15} Changing a behaviour is difficult than adding a new one, and that explains why physicians need to add regular exercise into lives of people instead of forcing them to follow low calorie diets. It will still be a challenge because even the patients who are prescribed home exercise cannot continue the given programs, let alone following one for years.

When walking is considered the basic exercise modality, physicians of some branches like Physical Therapy and Rehabilitation and Family Medicine may face the inevitable questions "How can obese keep up with walking?" and "Which instruments may help comply?"

In our study we aimed to determine the compliance of healthy obese women to four basic types of walking for 12 weeks. Our modalities were simple walking, walking at home on a treadmill, walking at home on a treadmill with a visual support like a VCD or a TV player to see if that increases compliance (on the market treadmills with internal TV or VCD monitors are available) and finally attending to a sports center.¹⁶

MATERIAL AND METHODS

Seven hundred and fourteen healthy obese women aged between 18-55 years presenting to the Başkent University Adana Hospital outpatient clinic of Family Medicine between May 2007 and April 2010 were included in the study. The inclusion criteria were as follows:

- Body Mass Index (BMI) between 30 and 35 kg/m²

- A baseline level of education of at least 8 years
- No known chronic disease (Comorbidities were excluded through patient history, physical examination and laboratory confirmation)
- No history of anti-obesity drug use
- No self report of limitation in moderate activities according to SF-36 questionnaire. SF-36 (Short form with 36 questions) health survey questionnaire consists of eight scaled scores one of which is physical functioning.

STATISTICAL ANALYSIS

Statistical analysis was performed using the statistical package SPSS v 17.0. For each continuous variable, normality was checked by Kolmogorov Smirnov and Shapiro-Wilk tests and by histograms. Comparisons between groups were done with the one-way ANOVA test for normally distributed data and Kruskal Wallis test was used for data distributed abnormally. When analysis of variance was significant, comparisons were done with the Post Hoc test and Mann-Whitney U test. First-second-third months and other pre-post measures data were analyzed with Repeated Measure Analyses. Values of $p < 0.05$ were considered statistically significant. Correlations between compliance of the groups were tested by Pearson's correlation test. Pearson's correlation coefficients were interpreted as excellent $r > 0.91$, good $0.90 < r < 0.71$, fair $0.70 < r < 0.51$, weak $0.50 < r < 0.31$ and little or no $r < 0.3$ (ref) relationship.

RANDOMIZATION

After inclusion and obtaining the informed consent, the subjects were allocated into four groups as the simple walking group (gr-I), treadmill group (gr-II), treadmill group with visual support (gr-III) and the sports center group (gr-IV). Each group had 162 subjects. Randomization was arranged to have no difference regarding to age, initial weight and BMI between groups (Table 1). Finally all patients were given a standart diet for their ideal weight according to their height.

After randomization the cases were asked to keep up with a walking style exercise program which had to be at least 4 times a week, for 40 to 60

minutes. They were given a 4-week scale to record any time they exercised. They were seen regularly each month, but were not weighed considering motivational issues. At the end of 12 weeks, cases completed the study with a single weight measurement. Twenty-two cases were excluded because of their low physical functioning self report in SF-36 questionnaire. As the study progressed 3 cases were excluded due to pregnancy, and 41 for personal reasons.

RESULTS

Among four groups the highest compliance rate with 48 episodes of exercise within 12 weeks was in gr-I followed by gr-III, gr-II and gr-IV (Table 2).

There was a positive correlation between BMI and compliance only in gr-I ($r=0.67$).

A strong negative correlation between age and compliance was present in gr-I ($r=-0.71$), gr-III ($r=-0.45$) and gr-IV ($r=-0.45$).

A positive correlation between body weight loss and compliance was detected in gr-I, gr-II and gr-IV ($r=0.36$) but not in gr-III (Table 3).

All groups had a positive correlation between BMI and weight loss ($r=0.42$).

When the correlation between age and weight loss was assessed a negative correlation was detected in gr-I ($r=-0.45$), gr-II ($r=-0.31$) and gr-IV ($r=-0.38$).

Compliance between groups and weight loss between groups were also statistically significant for each month.

| Group | N | Age | Initial Body Weight | BMI |
|--------|-----|-----------|---------------------|----------|
| | | Mean±SD | Mean±SD | Mean±SD |
| Group | 162 | 38.2±10.6 | 81.1±4.8 | 31.7±1.2 |
| gr-I | 162 | 38.2±10.6 | 80.4±4.4 | 31.8±1.2 |
| gr-III | 162 | 38.3±10.6 | 81.1±5.1 | 31.8±1.1 |
| gr-II | 162 | 38.3±10.6 | 80.7±4.1 | 31.8±1.2 |
| gr-IV | 162 | 38.2±10.6 | 80.8±4.6 | 31.8±1.2 |
| p | | 0.999 | 0.715 | 0.906 |

BMI: Body mass index.

DISCUSSION

The number of studies on exercise compliance is limited and the available ones are generally on a group of cases with comorbid conditions, so this study is original for its nature of assessing the behavioral features of healthy obese subjects with discrimination between walking type of exercises and assessment of periodic results.

In adulthood, the importance of exercising for health is recognized; however, the rate of exercise is low due to compliance issues. In two recent studies, compliance to a walking type of exercise for breast cancer patients in treatment free days was found to be 74%; the rate was 36% for patients receiving palliative chemotherapy.^{17,18}

Another study on women showed a compliance of 85–96% to a moderate intensity exercise program to intervene for smoking cessation.¹⁹ A study on pregnant women has shown an inverse association between obesity and compliance.²⁰ For patients with claudicatio compliance was 34.2% and for substance addicts the compliance to treatment oriented exercise was 52%.^{21,22}

In Brasil, compliance was found to be 29% for intense physical exercise with obese cases where women exhibited marked failure.²³ Another study

| Group | N | First Month | Second Month | Third Month |
|----------------------------|-----|---------------|---------------|---------------|
| | | Med (Min-Max) | Med (Min-Max) | Med (Min-Max) |
| gr-I | 162 | 13 (9-16) | 12 (9-16) | 12 (8-15) |
| gr-III | 162 | 12 (9-15) | 11 (8-13) | 11 (8-14) |
| gr-II | 162 | 11 (9-14) | 10 (8-13) | 10 (7-13) |
| gr-IV | 162 | 10 (7-14) | 9 (7-14) | 9 (6-14) |
| Total | 162 | 12 (7-16) | 10 (7-16) | 10 (6-15) |
| p* | | 0.0001 | 0.0001 | 0.0001 |
| pgr-I & gr-III | | 0.0001 | 0.0001 | 0.0001 |
| pgr-I & gr-II | | 0.0001 | 0.0001 | 0.0001 |
| pgr-I & gr-IV | | 0.0001 | 0.0001 | 0.0001 |
| pgr-III & gr-II | | 0.0001 | 0.0001 | 0.0001 |
| pgr-III & gr-IV | | 0.0001 | 0.0001 | 0.0001 |
| p gr-II & gr-IV | | 0.0001 | 0.0001 | 0.0001 |

p*: Kruscal Wallis Test; p: Mann-Whitney U.

TABLE 3: The association between compliance and weight percent change between groups.

| Group | N | Total | Body weight percent change |
|----------------------------|-----|----------|----------------------------|
| | | Mean±SD | Med (Min-Max) |
| gr-I | 162 | 36.8±3.7 | 0.090 (0.06-0.15) |
| gr-III | 162 | 33.2±2.3 | 0.083 (0.04-0.14) |
| gr-II | 162 | 30.7±2.1 | 0.086 (0.06-0.13) |
| gr-IV | 162 | 29.0±4.0 | 0.083 (0.06-0.15) |
| Total | 162 | 32.4±4.3 | 0.086 (0.04-0.15) |
| p* | | 0.0001 | 0.0001 |
| pgr-I & gr-III | | 0.0001 | 0.0001 |
| pgr-I & gr-II | | 0.0001 | 0.004 |
| pgr-I & Gr-IV | | 0.0001 | 0.0001 |
| pgr-III & gr-II | | 0.0001 | 0.050 |
| pgr-III & gr-IV | | 0.0001 | 0.530 |
| pgr-II & gr-IV | | 0.0001 | 0.247 |

p*: total for analyzing One Way Anova; Body weight percent change for Kruscal Wallis Test.

p: Post-Hoc Tukey test for total; Mann-Whitney U for body weight loss.

from Brasil on randomly selected cases showed a compliance rate of 52% for regular physical activity.²⁴ In USA the rate of compliance was 38% for dialysis patients.²⁵

In our study gr-I showed the best compliance followed by gr-III, gr-II and gr-IV. This suggests that an easy and a safe way of exercising has a high rate of compliance among obese cases. Pattern of behavior of the obese population seems to favor such features. Treadmills are now available at homes of many people and attaching a TV or a VCD to the tool increases the frequency of exercising. The behavior pattern seems to seek comfort and safety.

It may be surprising to see gr-IV taking the last place for exercise compliance. In addition to the assumed advantages of a sports center, cases in gr-IV had paid in advance and nevertheless their compliance was the poorest. Modus operandi of the obese does not seem to tolerate difficulties like transportation, the strict time tables of sports centers, and possible lack of privacy for selfcare after exercise.

The summary of the above data might be that obese people can comply on and continue activities in their own environment and household that keep them somehow independent and safe. How-

ever compliance reduced in the course of time in all groups in accordance with data in other studies suggesting that obese cases loose their compliance for physical activities in time.^{26,27}

Gr-I exhibited an inverse correlation between BMI and compliance, which also was confirmed in other reports.²⁴

A negative correlation was found between age and compliance in all groups. Younger cases had greater determination and motivation for compliance. Besides, compliance may be declining due to the decreasing physical capacity at advanced ages. A Finnish study on 4437 subjects showed age to be inversely associated with physical activity.²⁸

When groups were examined for weight loss, gr-I with highest compliance also had the highest amount of weight loss. The lowest amount was in gr-III, which had the second highest compliance rate. This may look surprising but maybe the cases exercising in front of a TV screen could not reach the desired intensity due to concentration problems. There was a statistically significant association between BMI and weight loss in all four groups. Cases with higher BMI seemed to obtain greater benefit from similar activity.

An inverse association was found between age and weight loss in gr-I, gr-II and gr-IV but not in gr-III, which had a higher compliance rate compared to gr-II and gr-IV. The higher activity rate of the three groups may have induced the body weight loss and the insufficient loss in gr-III may be due to light activity as discussed above.

CONCLUSION

Antiobesity drugs, strict diets and bariatric surgery for obesity has important drawbacks so exercise is an extremely important tool for the obese.²⁹ Any type of physical activity provides a certain weight loss and contributes to the well-being of the patients. In our study, the rate of compliance was 67.55%, which provided 7.07% weight loss overall. This may look sufficient but the failure to continue physical activity in our study even for a relatively short period of time, points out the real challenge of integrating exercise into daily life. People need to show the determination to make small lasting changes, which is the real secret to weight loss.

This is a pilot study for assessing the degree of compliance of healthy obese cases to various exercise modalities in which walking is suggested as the basic regimen. Types of exercises where people can use different tools may be attractive but compliance still remains an important issue. The limitation of this study was the lack of determining the level and duration of activity for each case. Besides, our compliance rates may even be overestimated because it was conducted as a formal clinical trial, but the rates are expected to drop off in a 'real world' setting.

We believe our findings will help enlighten the modus operandi of the obese. The field is open for different patient groups and exercise modalities with different motivational suggestions. We hope to offer different points of view for primary care and physical therapy specialists before they suggest walking type of exercise to their patients.

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