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EVALUATION OF THE EFFECT OF WEIGHT CYCLE ON NUTRITIONAL STATUS AND TYPE 2 DIABETES DEVELOPMENT RISK IN WOMEN

KADINLARDA AĞIRLIK DÖNGÜSÜNÜN BESLENME DURUMU VE TİP 2 DİYABET GELİŞİM RİSKİNE ETKİSİNİN DEĞERLENDİRİLMESİ

Melis TORLUOĞLU KAYALI [1] Gözde ARITICI ÇOLAK [2]

[1] Acıbadem Mehmet Ali Aydınlar University Health Sciences Institute, Nutrition and Dietetics, Istanbul, Turkey
[2] Acıbadem Mehmet Ali Aydınlar University, Nutrition and Dietetics, Istanbul, Turkey

ABSTRACT

Objectives: The aim of this study was to see how weight cycling affected women's nutritional health and their risk of developing Type 2 diabetes (T2DM).

Materials and Methods: Between November 2018 and May 2019, 80 women aged 18 to 65 years old applied to the Nutrition and Diet Department of a Private Medical Center and consented to participate in the study. A questionnaire form was applied to the participants, anthropometric measurements and biochemical blood parameters were evaluated. The Finnish Diabetes Risk Score (FINDRISK) was used to determine the risk of T2DM.

Results: 55 of the 80 women included in the study (68.8%) entered the weight cycle, while 25 (31.2%) did not enter the weight cycle. In terms of body weight, body mass index (BMI), waist circumference, body fat mass, and HOMA-IR values, there was a statistically significant difference between the groups ($p<0.05$). While the amount of total energy, protein, fat, cholesterol, and omega-6 fatty acids in the daily diet of women who entered the weight cycle was higher than those who did not enter the weight cycle, it was observed that the intake of carbohydrates and omega-3 fatty acids were lower ($p>0.05$). There was no significant difference between the groups regarding the FINDRISK score ($p>0.05$).

Conclusion: Weight cycling is particularly frequent among women nowadays, and it is a significant risk factor for chronic illnesses in the coming years. Although this study's duration and sample number are limited, the data obtained emphasizes the effects of weight cycling on health.

Keywords: Finnish Diabetes Risk Score, Type 2 Diabetes Risk, Weight Cycling.

ÖZET

Amaç: Bu çalışmada kadınlarda ağırlık döngüsünün beslenme durumu ve Tip 2 diyabet (T2DM) gelişim riskine etkisinin değerlendirilmesi amaçlanmıştır.

Materyal ve Metot: Araştırma Kasım 2018-Mayıs 2019 tarihleri arasında Özel bir Tıp Merkezinin Beslenme Diyet Bölümü'ne başvuran ve çalışmaya katılmayı kabul eden 18-65 yaş arası 80 kadın ile yürütülmüştür. Katılımcılara anket formu uygulanmış, antropometrik ölçümleri ve biyokimyasal kan parametreleri değerlendirilmiştir. T2DM riskini belirlemek için Fin Diyabet Risk Skoru (FİNDRİSK) kullanılmıştır.

Bulgular: Çalışmaya dâhil edilen 80 kadının 55'i (%68.8) ağırlık döngüsüne girerken, 25'i (%31.2) ağırlık döngüsüne girmemiştir. Gruplar arasında vücut ağırlığı, beden kütle indeksi (BKI), bel çevresi, vücut yağ kütlesi ve HOMA-IR değerleri arasında istatistiksel olarak anlamlı fark saptanmıştır ($p<0.05$). Ağırlık döngüsüne giren kadınların günlük diyetlerinde aldıkları toplam enerji, protein yağ, kolesterol, omega-6 yağ asitleri miktarı ağırlık döngüsüne girmeyenlere göre daha yüksek iken, karbonhidrat ve omega-3 yağ asitleri alımının daha düşük olduğu görülmüştür ($p>0.05$). Gruplar arasında FİNDRİSK skoru açısından anlamlı bir fark saptanamamıştır ($p>0.05$).

Sonuç: Ağırlık döngüsü günümüzde özellikle kadınlar arasında sık görülmektedir ve bu durum ilerleyen yıllarda kişilerin kronik hastalık riskini arttıran önemli bir risk faktörüdür. Bu çalışmanın süresi ve örneklem sayısı sınırlı olmasına karşın, elde edilen veriler ağırlık döngüsünün sağlık üzerindeki etkilerini vurgular niteliktedir.

Anahtar Kelimeler: Ağırlık döngüsü, Fin Diyabet Risk Skoru, Tip 2 diyabet riski.

Sorumlu Yazar / Corresponding Author: Gözde ARITICI ÇOLAK, Acıbadem Mehmet Ali Aydınlar University, Nutrition and Dietetics, Istanbul, Turkey **E-mail:** gozde.aritici@acibadem.edu.tr

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INTRODUCTION

The World Health Organization (WHO) estimates that there are 1.9 billion overweight and 650 million obese people over the age of 18 worldwide (WHO 2021). The most prominent risk factor in the development of Type 2 Diabetes (T2DM) is an increase in body mass index (BMI) (Owen et al., 2015). Type 2 diabetes generally develops after the age of 40, and most patients (80-90%) have excess body weight and visceral adiposity. T2DM is the most common type of diabetes that occurs due to insulin being ineffective due to the resistance of the target organ (muscle, liver, and adipose tissue) to insulin (Hotu et al. 2004).

T2DM constitutes an average of 85% of all diabetics globally and in Turkey. It is reported that there are a total of five million individuals with T2DM, either diagnosed or undiagnosed, in Turkey (Hotu et al., 2004).Diabetes development was 7 times more common in men with BMI >27.9 kg/m^2 than in the group with BMI <27.9 kg/m^2 (Owen et al.,2015). In a study, the relationship between diabetes risk and duration of obesity in patients with a BMI of 25-30 kg/m^2 and above 30 kg/m^2 was examined, and the risk of developing T2DM in both overweight and obese patients was found to increase 14% if the duration of obesity lasted for two years (Hu et al.2014). Obesity causes insulin resistance and increases the risk of diabetes in individuals (Baysal and Bas 2008).

Most obese and overweight individuals (%50-70) seek various solutions for lose weight (WHO 2021). Although weight loss is achieved by trying various methods, overweight and obese people can regain 1/3 or 2/3 of the weight lost on average within 1 year, while almost a large part of them can regain all the weight they lost within 5 years. Long-term studies emphasize that at least 1/3 of people on a weight loss diet gain more weight than they lose (Dulloo et al.2015). The definition of weight cycling was first defined by Kelly D. Brownell in 1985 as losing a certain amount of body weight and then regaining it (Brownell et al., 1986). Although there is no clear definition in the literature, weight cycling is defined as the state of losing and regaining five kilos or more, three or more times or losing and regaining more than five kilos or more, two or more times in the last ten years (Brown et al., 2015).

The incidence of weight cycling was determined as 7%-10%. Weight cycling is thought to be linked to a higher BMI, body fat percentage, waist circumference, abdominal obesity, reduced basal metabolic rate, increased hypertension risk, poorer glucose tolerance, and a greater mortality risk (Brown et al., 2015). In a review study, according to the results of experiments made on experimental animals and retrospective studies, it was concluded that as the number of weight-loss trials increases, weight loss becomes more difficult, and the most important factor that causes this is the deterioration of the thyroid axis and the decrease in the resting metabolic rate of individuals (Mackie et al., 2017). The Iowa Women's Health Survey was conducted with 33,832 women aged 55-69, indicating a higher relative risk for myocardial infarction (MI), stroke, and T2DM in those who frequently cycle (Roybal 2005). In the Nurses' Health Study (NHS), conducted by Field et al., weight cycling was closely associated with body mass index in young and middle-aged women, but not with T2DM (Field et al., 2004).

This study was planned to investigate the effect of weight cycling on nutritional status and the risk of developing Type 2 diabetes in women.

MATERIAL AND METHOD

The individuals participating in the study were divided into two groups according to the weight changes and the frequency of changes in the last 10 years. Individuals who lost 5 kg or more of weight more than twice in the last 10 years and regained weight formed the case group, and those who did not have these characteristics formed the control group.

A questionnaire form was applied to the individuals participating in the research. Questions formed to evaluate their nutritional habits, anthropometric measurements, biochemical parameters, family health history, general health status, and weight cycle, followed by the 3-day food consumption record and the diabetes risk scanning Finnish Diabetes Risk Questionnaire, were applied.

The researcher measured anthropometric measurements such as body mass, body fat percentage, height, and waist circumference. A tape measure and TANITA brand bioelectrical impedance analyzer were used to perform anthropometric measurements. In evaluating biochemical parameters, reference values of Acıbadem Hospital Laboratory were used.

Data Collection Tools

Women aged 18 to 65 years old who applied to a private medical center's Nutrition and Diet Department between November 2018 and April 2019 and consented to participate in the study were included in the study. Consent Form" was read to the participants before the research began, and those who consented to participate were included. Persons who were in the pregnancy and lactation period, filled out the questionnaire incompletely, and did not have biochemical parameters were not included in the study.

For this study, medical ethics committee approval was obtained from T.R. Acıbadem Mehmet Ali Aydınlar University Health Sciences Institute Ethics Committee at the ATADEK Meeting numbered 2018/17 on 08.11.2018 with the decision number 2018-17/19.

Statistical Evaluation

Data from the study was transferred to a computer and analyzed with "SPSS (Statistical Package for Social Sciences) for Windows 22.0 (SPSS Inc, Chicago, IL)." The mean, standard deviation, median (interquartile range), median (minimum-maximum), frequency distribution, and percentage are all descriptive statistics. Categorical variables were analyzed using the Pearson Chi-Square Test and Fisher's Exact Test. Visual (histograms and probability graphs) and analytical (Kolmogorov-Smirnov Test/Shapiro Wilk Test) approaches were used to assess the variables' compliance to the normal distribution. Mann-Whitney For variables that did not match the normal distribution, the U test for statistical significance between two independent groups was utilized, and for variables that did fit the normal distribution, the student's T-Test was used as a statistical approach. $p<0.05$ was used as the statistical significance level.

RESULTS

The distribution of nutritional habits according to the women's previous weight cycle status is shown in Table 1. The percentage of women who had the habit of snacking after dinner among women who entered the weight cycle was found to be significantly higher than those who did not enter the weight cycle (p=0.026). There was no statistically significant difference between the women who entered the weight cycle and those who did not, in terms of the number of main meals consumed per day, the number of snacks, the status of skipping meals, the amount of water consumed daily, and the meal that felt the most hunger during the day (p>0.05).

Table 1. Distribution of nutritional habits

	Weight Cycle		
	Entered (n=55)	**Not Entered (n=25)**	***p***
	n (%)	n (%)	
Number of main meals			
≤3	43 (78.2)	16 (64.0)	*0.181*[a]
>3	12 (21.8)	9 (36.0)	
Number of snacks meals			
≤3	53 (96.4)	22 (88.0)	*0.173*[b]
>3	2 (3.6)	3 (12.0)	
Skipped meal	34 (61.8)	15 (60.0)	*0.877*[a]
Most skipped meal (n=49)			
Breakfast	10 (29.4)	6 (40.0)	*0.747*[a]
Lunch	9 (26.5)	2 (13.3)	
Dinner	5 (14.7)	2 (13.3)	
Snacks	10 (29.4)	5 (33.3)	
Daily water consumpton			
≥2 lt	29 (52.7)	8 (32.0)	*0.085*[a]
<2 lt	26 (47.3)	17 (68.0)	
The most hungry meal of the day			
Breakfast	8 (14.5)	6 (24.0)	*0.490*[a]
Lunch	16 (29.1)	8 (32.0)	
Dinner	31 (56.4)	11 (44.0)	
Night snack	44 (80.0)	14 (56.0)	***0.026***[a]***

n: Number of women; %: Column percentage; [a]Pearson Ki-Kare Test; [b]Fisher's Kesin Test; *p<0.05; **p<0.01

The distribution of anthropometric measurements of women according to their previous weight cycling status is shown in Table 2. There was no statistically significant difference between women who entered the weight cycle and those who did not, in terms of body weight, BMI value, waist circumference, fat mass value, total body water weight, fat percentage value, and fat percentage group (p>0.05). Bodyweight, BMI value, waist circumference value, fat mass, total body water weight, and fat mass of women who entered the weight cycle were significantly higher than women who did not enter the weight cycle. The percentage of obese women and those with high or very high-fat percentages among women who entered the weight cycle were found to be significantly higher than those who did not enter the weight cycle (p<0.05). In terms of risk categories and muscle mass according to waist circumference, no statistically significant difference existed between women who entered the weight cycle and those who did not (p>0.05).

Table 2. Distribution of anthropometric measurements

	Weight Cycle		
	Entered (n=55) Mean±Sd (min-max)	**Not entered (n=25)** Mean±Sd (min-max)	***p***
Weight (kg)	67.3±12.8 (46-109)	59.2±8.7 (43-80)	***0.002[a]****
BKİ (kg/m^2)	25.3±5.2 (15.9-43.7)	21.9±3.0 (16.6-28.3)	***0.002[a]****
Weak/ Normal	31 (56.4)	21 (84.0)	
Overweight	16 (29.1)	4 (16.0)	***0.033[b]****
Obese	8 (14.5)	0	
Waist circumference (cm)	74.7±10.5 (56-103)	68.1±9.0 (56-95)	***0.003[a]****
Normal	38 (69.1)	22 (88.0)	
Risk	10 (18.2)	2 (8.0)	*0.190[b]*
High risk	7 (12.7)	1 (4.0)	
Fat mass (kg)	22.8±9.7 (3.0-48.0)	17.8±9.3 (5.0-50.0)	***0.012[a]****
Muscle mass (kg)	43.3±6.0 (22.0-56.0)	43.6±5.0 (32.0-55.0)	*0.925[a]*
Body water (g)	33.9±6.8 (25.0-58.0)	30.4±7.7 (18.0-62.0)	***0.006[a]****
Fat mass (%)	31.6±7.8 (13.0-48.0)	25.8±6.5 (14.0-40.0)	***0.001[a]****
Low	4 (7.3)	2 (8.0)	
Normal	11 (20.0)	16 (64.0)	***0.001[b]*****
High	16 (29.1)	4 (16.0)	
Very high	24 (43.6)	3 (12.0)	

BKİ: Body mass index; Categorical variables "number (column percentage)", continuous variables "average ±standard deviation(minimum-maximum)"; [a]Mann-Whitney U Test; [b]Pearson Chi- square Test; *p<0.05; **p<0.01

The distribution of some laboratory values according to the women's previous weight cycling status is shown in Table 3. There was a statistically significant difference in the HOMA-IR group between the women who entered the weight cycle and those who did not enter the weight cycle (p<0.05) among the women examined within the scope of the study. The percentage of those with insulin resistance among women who entered the weight cycle was significantly higher than those who did not enter the weight cycle. In terms of fasting blood glucose, fasting insulin, HOMA-IR, HbA1c, total cholesterol, LDL-cholesterol, HDL-cholesterol, triglyceride, ALT, AST, uric acid, and TSH values, there was no statistical difference between women who participated and did not enter weight cycling (p>0.05).

Table 3. Distribution of laboratory values

	Weight Cycle		*p*
	Entered (n=55) Mean±Sd (min-max)	**Not entered (n=25)** Mean±Sd (min-max)	
Fasting blood sugar (mg/dL)	98.5±16.6 (73-146)	91.9±14.1 (72-126)	*0.059*[a]
Fasting insülin (µU/mL)	8.7±4.6 (3.0-26.3)	6.9±3.6 (2.8-18.0)	*0.077*[a]
HOMA-IR	2.2±1.4 (0.6-7.1)	1.6±0.9 (0.6-4.4)	*0.060*[a]
<2.4	36 (65.5)	22 (88.0)	***0.036***[b]***
≥2.4	19 (34.5)	3 (12.0)	
HbA1c (%)	5.4±1.4 (2.6-8.3)	5.1±1.2 (3.0-7.8)	*0.227*[a]
< %6.5	40 (72.7)	21 (84.0)	*0.272*[b]
≥ %6.5	15 (27.3)	4 (16.0)	
Total cholesterol (mg/dL)	205.3±47.5 (124-336)	186.2±43.5 (85-286)	*0.123*[a]
<200 mg/dL	23 (41.8)	12 (48.0)	*0.605*[b]
≥200 mg/dL	32 (58.2)	13 (52.0)	
LDL-C (mg/dL)	114.1±34.3 (55-186)	108.5±28.3 (68-186)	*0.523*[a]
<130 mg/dL	32 (58.2)	17 (68.0)	*0.403*[b]
≥130 mg/dL	23 (41.8)	8 (32.0)	
HDL-C (mg/dL)	52.3±20.8 (20-100)	58.3±21.6 (27-101)	*0.211*[a]
<40 mg/dL	16 (29.1)	4 (16.0)	*0.210*[b]
≥40 mg/dL	39 (70.9)	21 (84.0)	
Trigliserid (mg/dL)	120.8±43.8 (46.234)	118.0±36.8 (64.208)	*0.913*[a]
ALT (U/L)	18.0±8.3 (7-45)	17.1±9.9 (4-45)	*0.485*[a]
AST (U/L)	19.8±8.4 (5-44)	16.2±7.6 (4-35)	*0.077*[a]
Uric Ascit (mg/dL)	4.3±1.8 (1.4-10.0)	3.7±1.2 (1.8-7.0)	*0.268*[a]
TSH (µIU/mL)	1.36±0.54 (0.10-2.60)	1.34±0.47 (0.55-2.40)	*0.879*[c]

[a]Mann-Whitney U Test; [b]Pearson Chi-square Test; [c]Student's T Test; *p<0.05; **p<0.01

The distribution of FINDRISK score and DM risk status according to women's previous weight cycling status is presented in Table 4. There was no statistically significant difference between women who entered the weight cycle and those who did not (p>0.05) in terms of FINDRISK score and type-2 diabetes mellitus risk level.

Table 4. Distribution of FINDRISK score and diabetes risk status

	Weight Cycle		*p*
	Entered (n=55)	**Not entered (n=25)**	
FINDRISK score	8.2±5.5 (0-21)	6.5±4.6 (2-21)	*0.225*[a]
Low risk	25 (45.5)	15 (60.0)	*0.190*[b]
Mild risk	13 (23.6)	7 (28.0)	
Moderate/high/extremly high	17 (30.9)	3 (12.0)	

[a]Mann-Whitney U Test; [b]Pearson Chi-square Test; *p<0.05; **p<0.01

Table 5 shows the distribution of energy and macronutrient consumption by women in their daily diets according to their previous weight cycle life. It was observed that there was no significant difference in the amount of energy and macronutrients taken with the daily diet between women who entered the weight cycle and those who did not. It was found that the consumption of PUFA and Omega-6 taken with the daily diet was significantly higher in women who entered the weight cycle than those who did not (p<0.05).

Table 5. Energy and macronutrient consumption

	Weight Cycle		***p***
	Entered (n=55)	**Girmemiş (n=25)**	
	Mean±Sd (min-max)	Mean±Sd (min-max)	
Energy (kcal)	1386.5±262.7 (795.8-1780.0)	1337.5±279.4 (877.1-1816.1)	*0.450*[b]
Protein (g)	71.1±22.3 (24.5-121.5)	66.3±20.1 (22.8-99.2)	*0.354*[b]
Protein (%)	20.7±5.8 (10-32)	20.4±6.4 (10-36)	*0.842*[b]
Fat (g)	58.8±16.2 (24.1-97.4)	53.7±16.7 (25.3-78.5)	*0.201*[b]
Fat (%)	38.3±8.2 (15-60)	36.6±6.8 (25-52)	*0.355*[b]
CHO (g)	137.0±44.9 (48.8-218.0)	137.5±39.0 (79.7-210.7)	*0.955*[b]
CHO (%)	41.0±9.1 (17-58)	43.0±9.1 (28-62)	*0.359*[b]
Fiber (g)	21.8±8.0 (6.6-40.9)	21.5±9.3 (6.6-44.4)	*0.890*[b]
Cholesterol (mg)	297.2±142.6 (18.0-713.9)	283.4±117.4 (18.0-459.7)	*0.996*[a]
SFA (g)	22.8±8.2 (9.2-42.8)	21.5±8.9 (10.7-47.5)	*0.364*[a]
MUFA (g)	21.5±.78 (8.0-37.6)	19.6±8.2 (7.4-37.6)	*0.322*[b]
PUFA (g)	13.6±5.2 (3.4-30.0)	11.1±4.4 (3.4-17.5)	***0.038***[b]***
Omega-3 (g)	1.8±0.8 (0.7-4.1)	2.1±1.3 (0.6-5.6)	*0.640*[a]
Omega-6 (g)	11.5±5.2 (1.1-27.9)	8.3±3.4 (1.2-13.8)	***0.005***[a]****

[a]Mann-Whitney U Test; [b]Student's T Test; *p<0.05; **p<0.01

DISCUSSION

Obesity has become more common in both industrialized and developing nations in recent years, and it is now recognized by WHO as one of the ten most dangerous disorders. Even though it is an independent risk factor for prevalent diseases including T2DM, coronary heart disease, and some cancers, it also raises the risk of osteoarthritis, gallstones, infertility, and gynecological problems (Oh et al., 2019).

Losing bodyweight contributes to the preservation of health by reducing obesity-related complications and positively affects life expectancy. Every year, millions of people in the world apply various weight control methods in the fight against obesity. Only 20% of these people are successful in weight loss, and 2% of them manage to maintain the weight they lost (Westenhoefer et al., 2004).

In a study conducted on the metabolic effects of weight cycling in women, when the participants' diet status in the last 10 years was questioned, it was found that 70.0% of the participants had a diet history (Dulloo et al., 2015). Similarly, in this study, it was determined that 72.5% of women had voluntarily entered the weight loss process before.

A positive relationship was established between the frequency of episodes of purposeful weight reduction larger than 5 kg and a rise in body mass index in a comprehensive population-based cohort with a 25-year follow-up from infancy to young adulthood (Mackie et al., 2017). Weight cycling was found to be associated with increased body fat percentage and central obesity in 58 percent of studies published since 1994 to determine whether it is a risk factor for obesity and T2DM. However, 50 percent of studies examining the effect of weight cycling on the likelihood of future weight gain found a positive result (Cereda et al., 2011). In a cross-sectional study, 914 people were examined, and it was determined that 13% of the individuals entered the weight cycle, and these individuals had higher BMI, waist circumference, and waist/height ratio (Newman et al., 2005). In this study, there was a statistically significant difference in body weight, BMI value, obesity categorization, waist circumference, fat mass, total body water weight, fat percentage, and fat percentage group ($p<0.05$) between those who joined the weight cycle and those who did not. In addition, the percentage of obese women and the percentage of women who had a high-fat percentage among the women who entered the weight cycle were found to be significantly higher than the women who did not enter the weight cycle ($p<0.05$).

A significant relationship between fasting insulin concentration and weight cycle history (during the previous 30 years) was discovered in a cross-sectional examination of 1932 middle-aged Japanese males with a mean BMI of 22.7 kg/m^2. Independent of BMI, people who had more weight changes had a higher HOMA-IR (Messier et al., 2014). Karschin et al. (Karschin et al., 2015), in a study in which they applied a nutritional intervention with 32 healthy male participants, determined that weight cycling caused changes in insulin sensitivity and insulin secretion. In this study, similar to the results of other studies, a statistically significant difference was found in terms of the HOMA-IR group between women who entered the weight cycle and those who did not, while the percentage of those with insulin resistance

among women who entered the weight cycle was found to be significantly higher than those who did not enter the weight cycle ($p< 0.05$).

One study showed that people under the age of 65 with normal glucose tolerance have a higher risk of diabetes, accompanied by large fluctuations in body weight. These findings emphasize that keeping body weight constant is important for the prevention of diabetes (Kodama et al., 2017). In a meta-analysis study, failure in weight control was significantly associated with the risk of T2DM (Neamat-Allah et al., 2015). Delahanty et al. (Delahanty et al., 2014) evaluated whether weight regains and weight cycling are variables in the onset of diabetes and the development of cardiometabolic risk factors in a research. Individuals entering a weight cycle in the study were defined as losing 2.25 kg or more from their body weight since their last cycle and then gaining 2.25 kg or more from their last cycle weight. During the first six months of the study, each participant's weight cycle was recorded, and it was positively related with diabetes incidence, fasting blood glucose, insulin resistance, and systolic blood pressure. It was concluded that weight cycling is a statistically significant risk factor for the development of diabetes when the initial weights of individuals are ignored (Delahanty et al., 2014). There was no statistically significant change in FINDRISK score or T2DM risk level between the women who entered the weight cycle and those who did not in this trial. The fact that the average age of the participants was lower than other studies suggests that this may have affected the results.

There are few studies on weight cycling and determining the nutritional status of individuals. The specific molecular mechanisms responsible for the effects of PUFA fatty acids on anti-obesity and weight control in humans are largely unknown (Blankson et al., 2000). In a study conducted on weight loss, intake of omega-6 and omega-9 in different amounts was given to obese individuals for 12 weeks, and it was observed that the omega-6 significantly reduced body fat mass (Gaullier et al., 2004). In a double-blind, controlled placebo study applied to 180 people with a body mass index of 25-30 kg/m^2, samples were divided into three groups: 3.6 g/day conjugated linoleic acid (CLA)-free fatty acid, 3.4 g/day CLA-triacylglycerol, placebo olive oil consumption, and examined. Long-term use of CLA-free fatty acids or CLA-triacylglycerol has been shown to lower body fat mass in healthy people (Warodomwichit et al., 2009). In this study, a statistically significant difference was found in terms of PUFA and omega-6 values between those who entered the weight cycle and those who did not ($p<0.05$). Daily PUFA and omega-6 consumption amounts of women who entered the weight cycle were significantly higher than those who did not.

CONCLUSION

As a result, being overweight and regularly decreasing weight is a significant risk factor for chronic illnesses. In order to lose weight, it is critical for people to develop long-term eating and activity routines.

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Conflict of Interest

There is no conflict of interest.

Author Contributions

Plan, design: GAÇ; **Material, methods and data collection:** MTK; **Data analysis and comments:** GAÇ, MTK; **Writing and corrections:** GAÇ.

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