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Retrospective Analysis of Walking Distance and Use of Medication After Bariatric Surgery

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ABSTRACT

Aim: The objective of this study was to ascertain the drug use and walking distance of individuals after bariatric surgery.

Material and Methods: The sample of the study consisted of 165 individuals. Individuals who underwent bariatric surgery were examined retrospectively after their operations. Data were collected using the Personal Information Form and the Walking Impairment Questionnaire.

Results: The mean age of the individuals included in the study was 40.22±9.63. 52.1% of individuals were female. The body mass index of individuals was 39.63±4.69 before bariatric surgery and 23.94±2.57 in the first year follow-up after bariatric surgery. Forty percent of individuals did not have any chronic illnesses. Among individuals who had been on medication before surgery, 72.4% of those taking psychiatric medications, 57.5% of those taking diabetes medications, and 16% of those taking heart medications discontinued medications after their operations. 81.8% of individuals reported improved sleep quality compared to the period before the operation. The walking distance level of the individuals showed a significant increase in the first year after bariatric surgery compared to the period before the surgery.

Conclusion: The study showed that bariatric surgery is an effective method for weight loss and reduction of comorbidities, as well as leading to a statistically significant reduction in chronic drug use and an increase in sleep quality and walking distance of individuals.

Keywords: *Obese individual, Bariatric surgery, Drug use, Walking distance, Comorbidities associated with obesity*

Obezite Cerrahisi Sonrası İlaç Kullanımı ve Yürüme Mesafesi Retrospektif Analizi

ÖZ

Amaç: Bu araştırma obezite cerrahisi sonrası bireylerin ilaç kullanımının ve yürüme mesafesinin belirlenmesi amacıyla gerçekleştirilmiştir.

Gereç ve Yöntemler: Araştırmanın örneklemini 165 birey oluşturmuştur. Obezite cerrahisi olan bireylerin dosyaları retrospektif olarak cerrahi sonrası değerlendirilmiştir. Veriler Kişisel Bilgi Formu ve Yürüme Mesafesinin Azalması Ölçeği ile elde edilmiştir.

Bulgular: Araştırma kapsamına alınan bireylerin yaş ortalaması 40.22±9.63'dır. Bireylerin %52.1' kadındır. Bireylerin obezite cerrahisi öncesi vücut kütle indeksi 39.63±4.69, obezite cerrahisi sonrası 1.yıl kontrolünde ise 23.94±2.57'dır. Bireylerin %40'nın kronik hastalığı yoktur. Ameliyat öncesi ilaç kullanan bireylerden ise; psikiyatrik ilaç kullananların %72.4'ü, diyabet ilacı kullananların %57.5'i ve kalp ilacı kullananların %16'sı ameliyat sonrası ilaç kullanmayı bırakmıştır. Uyku kalitesi ameliyat öncesine göre daha iyi olan bireylerin oranı %81,8' dir. Bireylerin 1.yıl sonrasında yürüme mesafesi düzeyinin obezite cerrahisi öncesine göre anlamlı düzeyde arttığı saptanmıştır.

Sonuç: Obezite cerrahisinin kilo vermede ve komorbiditelerin azalmasında etkili bir yöntem olduğunun yanısıra, bireylerin kronik ilaç kullanımında azalma ve uyku kalitesinde, yürüme mesafesinde artma olduğu istatistiksel olarak anlamlı çıktığı saptanmıştır.

Anahtar Sözcükler: *Obez birey, Obezite cerrahisi, İlaç kullanımı, Yürüme mesafesi, Obeziteye eşlik eden komorbidite*

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INTRODUCTION

Obesity is a chronic condition that is described as an epidemic public health problem according to data from the World Health Organization (WHO) and is recognized as one of the ten most risky illnesses (1-2). Obesity is among the leading preventable illnesses that cause mortality. According to 2017 data from WHO, there are more than 650 million obese individuals over the age of 18 worldwide. The prevalence of obesity is increasing in Turkey as well as in the world (2). The Obesity and Hypertension Survey in Turkey, which screened approximately 25,000 people, revealed that the prevalence of obesity was 36% in women, 21.5% in men, and 25% in the population (3). Many diseases such as diabetes (DM), hypertension (HT), coronary artery disease, fatty liver disease, sleep apnea, osteoarthritis, and even cancer are comorbidities associated with obesity (4).

Obesity is linked to many chronic illnesses, and its intensifying effect on morbidity and mortality is quite clear (1-3). Excessive weight gain negatively affects the physical functions of obese individuals, such as walking, lifting, carrying, and pushing (5). In addition to physical comorbidities, the incidence of psychiatric disorders is also high in obese individuals (6). Depression is the most common of those. Obesity brings about many psychological problems for individuals. Obese individuals who are dissatisfied with their appearance can become depressed. All these physical and psychosocial circumstances resulting from obesity negatively affect the daily lives, quality of life, and comfort of individuals (7). Additionally, due to the comorbidity of obesity with many physiological and psychiatric illnesses, the need to take multiple medications for individuals become unavoidable (8).

Bariatric surgery is an effective method of inducing and continuing weight loss, maintaining remission, as well as assisting in the treatment and prevention of diseases that occur due to obesity, and reducing the use of medications (6, 9). Therefore, bariatric surgery is an effective and safe option in the treatment of morbid obesity. Consequently, treatment is an essential requirement for improving the quality of life and comfort of obese individual (10).

The aim of this study is to reveal the changes in drug use and walking distance of individuals after bariatric surgery.

MATERIAL and METHODS

Research Design and Sampling

This retrospective study was conducted in the General Surgery Clinic of a hospital in Samsun. The sampling of the study was established as 165 people with a 5% type-I error and 95% confidence interval. In line with the inclusion criteria of the study, individuals who agreed to participate in the study for its duration who were over 18 years old, literate and had no communication problems were included in the study 1 year after their operations. The data of the study were collected between June 2022 and July 2022. Study data were collected by making phone calls to the individuals and asking them the survey questions. Individuals were asked to comment on their status before and after the surgery.

Measurement Tools

The researchers collected the data for the study using the Descriptive Information Form and the Walking Impairment Questionnaire (WIQ), which they had created according to the literature.

Descriptive Information Form

The descriptive information form consists of questions about the age, marital status, height, weight, sleep quality, and history of chronic illness of the participating individuals, as well as the medications they take and medications they discontinued following the surgery.

Walking Impairment Questionnaire (WIQ)

"Walking Impairment Questionnaire" (WIQ) is the most frequently used self-report tool in the clinic and it determines walking distance and capacity (11-13). The first seven questions of the tool constitute the section in which claudication and differential diagnosis are evaluated individually, while the following 14 items constitute the scale section, which is scored from 0 – 4 (unable to do - no difficulty) on the Likert scale and upon which validity and reliability analyses are conducted. The weights of each question in the scale, as well as those in the subscales on walking distance, walking speed, and stair climbing, are evaluated, and total and subscale scores are calculated to reach a score between 0 - 100. The Turkish version of the scale was used in this study (11).

Statistical Analysis

Statistical results of the study were analyzed using the IBM SPSS software. The t-test was used in analyzing the numbers, percentages, mean and standard deviations, and independent groups, while Kruskal-Wallis analysis and Mann-Whitney U test were used for measurements of non-normal distribution. $P<0.05$ was considered significant for all tests.

G-Power 3.1.9.4 software was used for power analysis. 5% margin of error ($p<0.05$) was taken while calculating the power value. In the study carried out, the effect value was calculated as approximately $d=0.459$ within the scope of Mann-Whitney U-test, and the power value of the study was determined as 0.757. The Cronbach's alpha value for

the scale total scores obtained from this study was calculated as 0.953. Whether the data fit the normal distribution was tested with the Shapiro Wilk test.

RESULTS

Results were presented under three headings in this study: the descriptive characteristics of the individuals, the characteristics of the body mass indexes of the individuals from before and after the surgery, and the examination of the Walking Impairment Questionnaire according to different variables from before and after the surgery.

Of the individuals who participated in the study, 52.1% were female and 47.9% were male. 50.9% of the individuals who participated in the study were married. 55.2% of the participants had a bachelor's degree. 40% of the participants had no other chronic illnesses 47.3% of the participants discontinued their medication after surgery. 81.8% of individuals reported improved sleep quality compared to the period before the operation. Prior to the surgery, 52.7% of the participating individuals used psychiatric medication, 57.5% used diabetes medication, and 30.3% used heart medication. 72.4% of those using psychiatric medication, 57.5% of those using diabetes medication, and 16% of those using heart medication discontinued medication use after surgery.

The mean age of the study participants was 40.22 (23-59). The mean body mass index of the participants was 39.63 before surgery and 23.94 after surgery.

The difference between the participants' mean overall WIQ score before surgery (87.97±7.82) and their mean overall WIQ score after surgery (92.11±8.25) was tested with the Wilcoxon signed-rank test for two related samples as the data were not normally distributed. The difference between the means was significant ($p<0.05$). The difference between the mean WIQ score of male and female participants before surgery and the mean WIQ score after surgery was tested with the Wilcoxon signed-rank test for two related samples, as the data were not normally distributed. The difference between the means was significant ($p<0.05$). A comparison of the mean group scale scores of the participants according to the state of having a chronic illness and sleep quality revealed that the data did not show normal distribution according to the state of having a chronic illness in the statistical tests. Therefore, for mean (median) comparisons, the Mann-Whitney U test, one of the non-parametric tests, was used. The difference between the mean WIQ scores before and after the surgeries of the participants with/without chronic illnesses and the participants with better/same sleep quality before the surgery was tested with the Wilcoxon signed-rank test for two related samples, as the data were not normally distributed. The difference between the means was significant ($p<0.05$).

DISCUSSION

Obesity, which develops as a result of the interaction of genes and environmental causes, is one of the most common and serious health problems in the world and in Turkey (14). Comorbidities accompanying obesity increase the individuals' use of medication, limit their mobility, make it difficult for them to walk, impair their quality of life, and shorten their life span (7).

There is a close link between obesity and type 2 diabetes which led to the emergence of the term "diabesity" in the 1970s. One study showed that the fasting insulin, glucose, and triglyceride concentrations of young males, who had no history of diabetes in their families, who overrate for 6 months, and whose body mass index was increased up to 28, were reversibly increased and that their glucose tolerance became impaired (15).

There are studies in the literature that demonstrate many problems, such as systemic hypertension, sleep apnea, respiratory problems, hypoventilation, and cardiac disorders are improved in individuals who lose weight following bariatric surgery (14, 16).

Vilarrasa et al. found in their study that bariatric surgery helped improve diabetes complications in individuals with type 1 diabetes (17). In his study, Buchwald and Oien concluded that type 2 diabetes clinical symptoms showed improvement in individuals who had bariatric surgery (18). Bariatric surgery also reportedly leads to an improvement in hypertension and endocrine disorders (19-20). Our study showed that individuals discontinued 82.1% of their diabetes medications and 16% of their heart medications after surgery.

In a systematic review and meta-analysis study, Kwok concluded that bariatric surgery reduces mortality due to heart attack, stroke, and cardiovascular events in individuals (21).

Studies conducted in Turkey have also shown that psychiatric disorders are common in obese individuals. Eren and Erdi found in their study that 81.3% of obese individuals had major depressive disorder (22). In a study examining the psychiatric medication use of individuals within one year after bariatric surgery, Hawkins et al. found that there was a 36% decrease in the use of psychiatric medications (23). Our study concluded that among the participants who used psychiatric drugs, 72.4% discontinued their medications after surgery (Table 1).

Our study shows that there is an approximately 14% decrease in the body mass index of individuals (Table 2). Even though the goal of bariatric surgery is to ensure and maintain weight loss, the surgery has further positive effects on individuals (24, 25).

Obesity is one of the main reasons that increase the prevalence of sleep apnea. A study found that 81.4% of individuals with sleep apnea were obese (26). In our study, 81.8% of the participants reported that their sleep quality was better than before the surgery (Table 1).

High body mass index in healthy young people and adults makes it difficult to maintain postural balance and negatively affects walking. Bariatric surgery has a positive effect on increasing walking distance via the reduction of comorbidities and improvements to physical health problems (22, 27). Our study found a significant increase in the walking distance of the participants following the surgery (Table 2).

In conclusion, bariatric surgery has significant and sustained effects on weight loss and significantly improves comorbidities that are associated with obesity in most individuals. The results of our study show that there was a decrease in the participants' use of diabetic, cardiac, and psychiatric medications and an increase in their walking distance after bariatric surgery. These results also demonstrate that the participating individuals have reported having better sleep quality in comparison to before the surgery. To ensure that successful results are permanent, it is necessary to adhere the professional advice and provide lifelong follow-ups and individual-focused support.

Table 1. Results Pertaining to the Descriptive Characteristics of the Individuals

Descriptive Characteristics of the Individuals		Findings (n=165)
Gender, n(%)	Female	86(52.1)
	Male	79(47.9)
Marital Status, n(%)	Married	84(50.9)
	Single	81(49.1)
Educational Status, n(%)	Primary school	15(9.1)
	Middle school	9(5.5)
	High school	44(26.7)
	Undergraduate	91(55.2)
	Graduate	6(3.6)
Chronic illness, n(%)	No	66(40.0)
	Yes	99(60.0)
Quality of sleep, n(%)	Same as before surgery	30(18.2)
	Better than before surgery	135(81.8)
Use of medication prior to surgery, n(%)	Psychiatric medication	87(52.7)
	Diabetes medication	95(57.5)
	Heart medication	50(30.3)
Medication discontinued after surgery, n(%)	Psychiatric medication	63(72.4)
	Diabetes medication	78(82.1)
	Heart medication	8(16.0)

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Author Contributions

Kadir Yıldırım and **Kübra Gümüştekin** conducted design of project, ethical and project processes, modelling. **Kadir Yıldırım** and **Yasemin Özyer** conducted statistical analysis, translation and constitution of full text.

Conflicts of Interest

The authors have reported no conflict of interest.

Financial Disclosure

No funding was received for conducting this study.

Ethical Approval

In addition to scientific principles, universal ethical principles were also observed during the performance of the study. The study adhered to the principles stated in the Declaration of Helsinki. Before the study could be conducted, written permissions were obtained from the Istinye University, Protocol No. 22-82.

Table 2: Examination of the Walking Impairment Questionnaire According to Different Variables from Before and After the Surgery

		Before the Surgery		After the Surgery		Test value	p
Walking Impairment Questionnaire According to Variables*		**Median (Min-Max)**	**Mean ± SD**	**Median (Min-Max)**	**Mean ± SD**		
Sex	**Female**	90(70-100)	87.6±9.0	96(13-40)	28.04±8.45	**7.543****	**<0.001****
	Male	90(72-100)	88.4±6.2	93(10-40)	27.71±8.29	**6.968****	**<0.001****
Chronic illnesses	**Yes**	90(15-40)	24,86±6,35	94(11-38)	25.08±9.09	**7.985****	**<0.001****
	No	88(10-38)	20,00±6,41	100(11-39)	25.21±8.89	**6.461****	**<0.001****
Quality of sleep	**Better**	90(10-20)	14,67±2,96	93(6-20)	14.50±3.82	**4.203****	**<0.001****
	Same	93(7-17)	10,71±2,82	100(7-20)	14.67±3.78	**9.369****	**<0.001****

*All variables show with mean ±Standard Deviation (SD), median and minimum-maximum values. **Mann-Whitney U test, ***Wilcoxon T test. **P<0.05, statistically significant.

Peer Review Process

Extremely peer-reviwed.

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