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Nutritional Behaviors of Patients Undergoing Bariatric Surgery in Ramadan

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ABSTRACT

Aim: There are significant changes in the lifestyle, diet, and quality of the food taken during the fasting process in the month of Ramadan. This study aims to determine the nutritional behaviors of patients undergoing bariatric surgery during Ramadan and to reveal its psychosocial effects.

Material and Methods: The study was conducted with 44 patients who agreed to participate in the study among 110 patients who underwent bariatric surgery (sleeve gastrectomy) between January 01, 2019, and December 31, 2020. The data were collected using a 49-question questionnaire prepared in accordance with the literature and the Patient Health Questionnaire (PHQ-9).

Results: The mean age of the study participants was 38.89±9.48 (min:22; max:55), and the majority were women (67.2%). 43.2% of the participants were smokers, and 15.9% had a chronic disease. It was determined that 45.5% of the patients fasted for the second time after bariatric surgery. However, 84.1% did not consult a health professional before starting the fast, and 70.5% did not have any health screening. It was determined that most of the fasting patients (61.36%) had dyspeptic problems such as heartburn (27.3%), indigestion (22.7%), and additional constipation (52.3%) during Ramadan. It was found that 56.8% of the patients experienced a weight change during the month of Ramadan, with the change ranging from 2 to 5 kilograms. The study determined that 18.2% of the patients had variable waking times after iftar or sahur. At the same time, the mean PHQ-9 score of the patients was 10.61±6.25 (min:0-max:24). Accordingly, it was determined that the patients experienced moderate depression during Ramadan.

Conclusion: As a result of the research, it is seen that patients undergoing bariatric surgery face significant problems during fasting. For this reason, it is again noticed how important it is for health professionals to inform and guide the individual about possible difficulties and precautions that may develop while fasting. This study is the first study conducted during the month of Ramadan on the subject in Turkish society in line with the literature reviewed, and the results of this study will guide future studies.

Keywords Bariatric surgery; fasting; obesity; Ramadan.

Bariatrik Cerrahi Geçiren Hastaların Ramazan Ayında Beslenme Davranışları

ÖZ

Amaç: Ramazan ayında oruç tutma sürecinde yaşam tarzında, beslenme alışkanlıklarında ve alınan gıdanın kalitesinde önemli değişiklikler meydana gelmektedir. Bu çalışma, bariatrik cerrahi geçirmiş hastaların Ramazan ayındaki beslenme davranışlarını belirlemeyi ve bunun psikososyal etkilerini ortaya koymayı amaçlamaktadır.

Gereç ve Yöntemler: Çalışma, 01 Ocak 2019 - 31 Aralık 2020 tarihleri arasında sleeve gastrektomi ameliyatı geçiren 110 hastadan çalışmaya katılmayı kabul eden 44 hasta ile yürütülmüştür. Veriler, literatüre uygun olarak hazırlanmış 49 soruluk bir anket formu ve Hasta Sağlık Anketi (PHQ-9) kullanılarak toplanmıştır.

Bulgular: Çalışmaya katılanların yaş ortalaması 39±9,48 (min: 22; maks: 55) olup, çoğunluğu kadınlardan (%67,2) oluşmaktaydı. Katılımcıların %43,2'si sigara içmekte olup, %15,9'unun ise kronik hastalığı vardı. Hastaların %45,5'inin bariatrik cerrahiden sonra ikinci kez oruç tuttuğu belirlendi. Ancak, katılımcıların %84,1'i oruca başlamadan önce bir sağlık profesyoneline danışmamış ve %70,5'i herhangi bir sağlık taramasından geçmemişti. Oruç tutan hastaların büyük çoğunluğunun (%61,36) Ramazan ayında mide yanması (%27,3), hazımsızlık (%22,7) ve buna ek olarak kabızlık (%52,3) gibi dispeptik sorunlar yaşadığı saptandı. Ramazan ayında hastaların %56,8'inin kilosunda değişim olduğu ve bu değişimin 2 ile 5-kilogram arasında olduğu bulundu. Ayrıca, hastaların %18,2'sinin iftar veya sahurdan sonra uykuya

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dalma saatlerinde değişkenlik olduğu belirlendi. Aynı zamanda hastaların PHQ-9 puan ortalaması 10,61±6,25 (min: 0 - maks: 24) olup, buna göre hastaların Ramazan ayında orta düzeyde depresyon yaşadığı tespit edildi.
Sonuç: Araştırma sonucunda, bariatrik cerrahi geçiren hastaların oruç tutarken önemli sorunlarla karşılaştıkları görülmüştür. Bu nedenle, sağlık profesyonellerinin oruç süresince ortaya çıkabilecek olası zorluklar ve alınması gereken önlemler konusunda bireyleri bilgilendirmesinin ve yönlendirmesinin ne kadar önemli olduğu bir kez daha ortaya çıkmıştır. Literatür taraması doğrultusunda, bu çalışma Türk toplumunda konuya ilişkin Ramazan ayında yapılmış ilk çalışma olma özelliğini taşımakta olup, elde edilen sonuçlar gelecekte yapılacak araştırmalara yol gösterici niteliktedir.
Anahtar Kelimeler: Bariatrik cerrahi; oruç; obezite; Ramazan.

INTRODUCTION

Fasting during Ramadan for religious or lifestyle reasons may pose a challenge for people who have undergone metabolic/obesity surgery (1,2). Complete fasting (avoiding all kinds of food, including liquids) on long summer days can put patients at risk of dehydration and low-calorie and nutrient-deficient intake (1). Although people believe that fasting provides significant benefits to the soul and body, there is a lack of information about when and how patients who have undergone obesity surgery can fast (3).

For this reason, health professionals must be aware of metabolic/obesity after surgery by identifying these information deficiencies in patients and providing appropriate guidance to the decision-making process of patients who wish to fast after surgery (2). Sleeve gastrectomy is the most performed procedure that restricts patients' food intake. This study was designed to determine the nutritional behavior of patients who underwent sleeve gastrectomy A restrictive procedure to treat morbid obesity during Ramadan and to evaluate the psychosocial effects of this situation.

MATERIAL AND METHODS

Study Type

Approval from the Sakarya University Clinical Research Ethics Committee was obtained for this survey study (application no. 80 dated 17.03.2022). After receiving approval, the records of patients hospitalized with the diagnosis of morbid obesity in the Gastroenterology Surgery clinic between January 2019 and December 2020 were reviewed retrospectively. Between the specified dates, 110 patients who underwent sleeve gastrectomy were identified. In addition, patients older than 18 years of age, two years after surgery, fasting during Ramadan, voluntarily agreeing to participate in the study, and comfortable communication were included. The study group consisted of 44 patients who met these criteria.

Collection of Research Data

Data from patients were obtained through a telephone interview. In these interviews, a questionnaire form prepared in line with the literature, and the Patient Health Questionnaire (PHQ-9) was used. In addition, scores were made from 0 to 10 to determine the degree of hunger, satiety, and desire to consume certain foods during Ramadan. All interviews were held in the second half of Ramadan.

Patient Information Form: The researchers scanned the relevant literature, which consisted of a 49-question form that included demographic information such as age, gender, weight, height (cm) of the patients, as well as their nutritional status and nutritional behaviors while fasting (1,4,5).

Patient Health Questionnaire (PHQ-9): The Patient Health Questionnaire (PHQ-9), for which the Turkish validity and reliability study was conducted by Sari et al. in 2016, assesses nine symptoms of depression according to DSM-IV criteria. Each of the nine questions in the

questionnaire is scored between 0-3 (Ranging from "never" to " almost every day). Points are added for each question and graded as 1-4 “minimal”, 5-9 “mild”, 10-14 “moderate”, 15-19 “moderately severe,” and 20-27 “severe depression” (6).

Statistical Analysis

The IBM SPSS 20 package program was used for statistical analysis. To evaluate the data, frequency distributions (number, percentage) for categorical variables and descriptive statistics (mean, standard deviation) for numerical variables were used. The Kolmogorov-Smirnov test was used to test the normality assumption. Parametric tests were used in the comparison analyses after the normality analyses. Independent Samples t-test was used if there was a difference between the two groups, and the One-Way ANOVA test was used for more than two groups. Pearson Correlation Analysis was used to determine the relationship between numerical variables. The statistical significance level was accepted as $p < 0.05$.

RESULTS

Telephone interviews with patients were completed in an average of 15 minutes. The mean age of the patients participating in the study was 38.89±9.48 (min:22; max:55), and the proportion of women was higher (68.2%; n:30 female, 31.8%; n:14 male). Seven patients (15.9%; n:7) had a chronic disease (Diabetes, hypertension, hypercholesterolemia, etc.), and eight patients (17.2%) were using regular medication. In addition, 59.1% (n:26) of the patients had a history of previous surgery. There were 19 patients (43.2%) who smoked. Of the patients, 84.1%; n:37 were married, 38.6%; n:17 were university graduates, and 90.9%; n:40 had social security. It was determined that more than half of the participants (56.8%; n:25) were working, and 70.5 %; n:31 of them had a monthly "balance of income and expenditure" (Table 1).

DISCUSSION

This study evaluated the effect of technology use on the neck and upper extremity musculoskeletal pain and discomfort, and its relationship with the perceived pain and fatigue level. The current study demonstrated that neck (74%) and shoulder pain (60.8%) were the most common musculoskeletal problems in university students. The wrist-hand pain was the least common problem with a rate of 16%. Although the results obtained were similar to those in other studies, the frequency of neck and shoulder problems was higher compared to the results of earlier studies (23-27).

Studies in the literature were generally conducted with fewer cases and mostly evaluated the effect of only computer use. In this study, students using mobile devices were also evaluated. The fact that mobile device use requires prolonged neck flexion and proximal muscle stabilization may explain the high rate of neck and shoulder pain detected in students. In addition, the pain rates detected in students in the last 7 days in this study were lower and closer to the examples in the literature.

Table 1. Sociodemographic characteristics

		n (%)
Sociodemographic Characteristics		
Gender	Female	30(68.2)
	Male	14(31.8)
Body Mass İndex (kg/m^2)	18.5-24.9 (ideal weight)	7(15.9)
	25-29.9 (overweight)	15(34.1)
	30-34.9 (Class I obese)	22 (%50)
Marital Status	Single	7(15.9)
	Married	37(84.1)
Education Level	Primary School	7(15.9)
	Middle School	5(11.4)
	High School	15(34.1)
	Universıty	17(38.6)
Social Security Presence	Yes	40(90.9)
	No	4(9.1)
Working Status	Yes	25(56.8)
	No	19 (43.2)
Your Income	Income is less than expenses	6(13.6)
	Income equals expense	31(70.5)
	Income more than expenses	7(15.9)
General Health Conditions		
Smoking	Yes	19(43.2)
	No	25(56.8)
Alcohol	Yes	1(2.3)
	No	43(97.7)
Presence of chronic disease	Yes	7(15.9)
	No	37(84.1)
Continuous Medication Status	Yes	8(18.2)
	No	36(81.8)
Previous Surgery	Yes	26(59.1)
	No	18(40.9)
Reason for Bariatric Surgery	Excess Weight	35 (79.5)
	Comorbid Disease	9 (20.5)

Percentage out of 44 people was given.

General Health Conditions in Ramadan

It was determined that 45.5% of the patients within the scope of the study fasted for the second time after bariatric surgery. However, 84.1% did not consult a health professional before starting the fast, and 70.5% did not have any health screening. It was determined that more than half of those who fasted (61.36%) had some health problems during the month of Ramadan, and among these problems, they mostly complained of heartburn (27.3%) and indigestion (22.7%). In addition, 52.3% of the patients reported that they experienced constipation during the fasting period. Only one of the eight patients, determined to use drugs continuously, stated that they had to change their medication use due to the month of Ramadan (Table 2).

Nutritional Behaviors in Ramadan

It was stated that 25 patients (56.8%) experienced a weight change during the month of Ramadan (Table 2), with the change being in the direction of a decrease of approximately 2-5 kilograms. It was determined that 38.6% of the participants made a change in their diet during Ramadan, with the majority of this change being a decrease in the number of meals. However, almost all patients (97.7%) did not follow any particular diet. More than half of them stated they did not consume solid and liquid foods together during iftar. On the other hand, the tendency to consume sweet/sweet/pastries/fried foods/carbonated-sweetened beverages were relatively high, and the frequency was more than five times a week in some individuals (Table 2).

Changes in Sleeping and Eating Patterns

More than half of the participants (61.4%) stated that they had a meal between iftar and sahur, and 38.6% indicated that they consumed 0.5 liters of liquid in the same period. While most subjects (84.1%) did not use any nutritional supplements, only seven (15.9%) were taking vitamin-based supplements. Examining the iftar and sahur patterns of the individuals, it was determined that most of them completed their meals (iftar and sahur) within periods not exceeding 15 minutes. However, one out of every three people did not have regular sahur. Most participants' time between iftar and bedtime was four hours or more. On the other hand, in 16 (36.4%) individuals, the time between sahur and sleep time was only 30 minutes (Table 3).

No statistically significant correlation was found in the correlation analysis between the mean values of the nutrition data presented in Table 4 and the Patient Health Questionnaire-9 scale scores of the patients ($p>0.05$). In addition, there was no statistically significant difference between the sexes in terms of hunger, satiety, and the degree of desire to consume certain foods, according to the frequency of consuming sweets/sweets/pastry/fried foods/carbonated sugary drinks/whether there is a change in weight/body mass index/presence of chronic disease ($p>0.05$).

There was a statistically significant difference in the degree of desire and desire to consume food according to were consumed together solid and liquid foods were consumed together ($p<0.05$). Accordingly, the degree of desire and desire to consume food was higher in those who consumed liquid and solid foods together.

Results of the Patient Health Questionnaire (PHQ-9)

The mean score of the patients on the Patient Health Questionnaire-9 scale was 10.61±6.25 (min:0-max:24). Accordingly, it was determined that 36 people (81.8) stated that the patients experienced moderate depression during the month of Ramadan and that this situation did not cause any difficulties in their daily lives, seven people (15.9) said that it caused a lot of problems, and one (2.3) people said that it caused a lot of difficulties.

In the analysis performed to determine whether there was a statistically significant difference between the scale mean scores and the dual groups, it was seen that there was no statistically significant difference between variables such as gender, marital status, and smoking, but only a statistically significant difference between the continuous drug use status and the scale score averages ($p<0.031$). Accordingly, it was found that those who used drugs

Table 2. Characteristics of daily life/nutrition and general health status in Ramadan

Variable Category	Category	n (*%)
Conditions of Consulting Any Health Professional Before Starting Fasting	Yes	7(15.9)
	No	37(84.1)
Any Health Screening Before Starting Fasting	Yes	13(29.5)
	No	31(70.5)
How Many Times He Fasted After Bariatric Surgery	1	17(38.6)
	2	20(45.5)
	3	7(15.9)
Status of Experiencing Weight Change (in decreasing direction)	Yes	25(56.8)
	No	19(43.2)
Having Any Problems During Ramadan	Yes	27 (61.36)
	No	17 (38.63)
Problems Experienced During the Month of Ramadan*	Heartburn	12(27.3)
	Indigestion	10(22.7)
	Vomiting	9(20.5)
	Nausea	6(13.6)
	Headache	6(13.6)
	Weakness	4(9.1)
Do not have to take a break from fasting due to any problem during the month of Ramadan	Yes	5(11.36)
	No	39(88.6)
Having to See a Physician for Any Problem	Yes	3(6.81)
	No	41(93.18)
Status of Experiencing Changes in Diet	Yes	17(38.6)
	No	27(61.4)
Change in Diet**	Reduction in Meal Amount	10(58.8)
	Change in Meal Times	3(17.6)
	Increase in Meal Amount	2(11.8)
	Reduction in the number of meals	2(11.8)
A Special Dietary Presence	Yes	1(2.3)
	No	43(97.7)
Consuming Solid and Liquid Foods Together in Meals	Yes	16(36.4)
	No	28(63.6)
Consumption of Sweets/Sweets/Pastry/Fried Foods/Fizzy-Sweet Drinks in Meals	Yes	27(61.4)
	No	17(38.6)
Frequency of Consumption of Sweet/Sweet/Pastry/Fried Foods/Fizzy-Sweet Drinks/per week**	≤2	16(59.3)
	≤3-5	3(11.1)
	>5	8(29.6)

*More than one option can be marked

**Calculated on participants who experienced a change in their diet

constantly had higher mean scores on the scale and felt moderately depressed.

In the One-Way ANOVA test, which was performed to determine whether there was a significant difference between the scale mean scores and groups of three or more, there was no statistically significant difference between the independent variables and mean scale scores ($p>0.05$).

DISCUSSION

Nutritional Behaviors and Problems Experienced in Ramadan

Ramadan fasting is a restricted diet (7). It causes significant changes in individuals' lifestyles, diets, and food quality (8). Furthermore, we know that the success of bariatric surgery may vary depending on diet and behavioral changes (9). Therefore, adopting new eating habits, modifying daily routines, and fasting during the post-surgical period may lead to undesirable problems. Thus, the decision about fasting should be made in coordination between the interdisciplinary bariatric team which consists of a surgeon, nutritionist, etc., and the patient (2,10). On the other hand, it was determined that most of our patients did not consult any health professional and did not have a health screening. This suggests that patients May have a low awareness of potential problems that could develop. For this reason, the training to be given by health professionals after bariatric surgery should include fasting situations and points that should be considered if there is no harm in fasting.

Specific meal composition and portion sizes for Muslims during Ramadan vary from daily life (7). With iftar, the daily fast opens and represents the highest calorie intake of the day for many. Cultural practices during iftar vary, and overeating may occur due to frequent consumption of fried/oily/sugar-rich, high-calorie meals (11). The results of our research support these data. The tendency of patients to consume sweet/sweet/pastry/fried foods/carbonated-sweetened beverages during Ramadan is relatively high, and the frequency is more than five times a week in some people. Prolonged fasting leads to a strong desire to eat larger meals quickly, consuming high- calorie ingredients such as sweet/fried/fizzy-sugar foods. However, generally accepted recommendations are to start the iftar meal with hot liquids, avoid high sugar, salt, and

fat content, and aim for a daily protein intake of 60-80 g (10).

In addition, another recommendation after bariatric surgery is that the daily fluid consumption of patients should be at least two liters, and fluid intake should be terminated at least 30 minutes before meals and started 30 minutes after meals (10).

Table 3. Changes in sleeping and eating patterns during Ramadan

Variable	Category	n (*%)
Number of Meals During the Period After Iftar Until Sahur	0	7(15.9)
	1	27(61.4)
	2	7(15.9)
	3	1(2.3)
	5	2(4.5)
The Amount of Liquid Consumed During the Period After Iftar Until Sahur	0.5 litre	17(38.6)
	1 litre	12(27.3)
	1.5 litre	7(15.9)
	2 litre	6(13.6)
	2.5 litre	2(4.5)
Use of Nutritional Supplements	Yes	7(15.9)
	No	37(84.1)
Average Iftar Time/min	15 min	32(72.7)
	30 min	10(22.7)
	45 min	1(2.3)
	60 min	1(2.3)
Average Time/hour Between Iftar and Sleep Time	1	0
	2	2(4.5)
	3	6(13.6)
	4	15(34.1)
	5	13(29.5)
	>5 saat	8(18.2)
Regular Sahur Situation	Yes	29(65.9)
	No	15(34.1)
Average Sahur Time/min	15 min	36(81.8)
	30 min	6(13.6)
	45 min	1(2.3)
	60 min	1(2.3)
The Time Between the End of Sahur and the Adhan	<15 min	6(13.6)
	15 min	20(45.5)
	30 min	8(18.2)
	45 min	5(11.4)
	60 min	5(11.4)
Average Time Between Sahur and Bedtime	<15 min	1(2.3)
	15 min	7(15.9)
	30 min	16(36.4)
	45 min	5(11.4)
	60 min	7(15.9)
	>60 min	8(18.2)
Experiencing Any Changes in Bowel Habits	Yes, I have diarrhea	3(6.8)
	Yes, I'm constipated	23(52.3)
	No	18(40.9)

Table 4. Degree of hunger, fullness, and desire to consume certain foods during Ramadan

	Mean±SS (min-max)*
Your Degree of Hunger	5.02±2.79 (0-10)
Your Degree of Satiety	6.57±2.57(1-10)
Your Degree of Physical Satisfaction	6.57±2.32(1-10)
Your Degree of Desire and Desire to Consume Food	5.80±2.80(0-10)
Your Desire to Eat Sweet Foods	5.39±3.23(0-10)
Your Desire to Eat Salty Foods	5.20±2.51(0-10)
Your Desire to Consume Spicy Foods	4.25±3.21(0-10)
Your Desire to Consume Fatty Foods	2.84±2.82(0-10)

*Mean±Standard Deviation (Minimum-Maximum)

According to our findings, more than one-third of the patients (36.7%) did not comply with the eating recommendations during the postoperative period and consumed solid and liquid foods together. In addition, in our study, it was determined that more than one-third (38.6%) of the patients made changes to their diet during Ramadan, With the most significant change being a decrease in the amount of food consumed at meals.

The effects of Ramadan fasting on dietary habits and, thus, on body mass show heterogeneous results. While some studies show a decrease in body mass, some reveal no change, and some indicate that people experience weight gain (7). In our study, all patients who reported experiencing a weight change reported weight loss. It is thought that studies aimed at being cautious in food intake due to the patient's concerns about regaining weight are effective in this situation.

Although fasting in healthy individuals does not have significant adverse effects, fasting, especially on long summer days, may cause dehydration in patients after bariatric surgery. Long-term fasts can cause people to want to eat larger amounts of food more quickly when breaking the fast (1). It was reported that consuming meals quickly, without chewing well, and in large bites may cause complaints such as pressure or pain in the upper abdomen or chest, nausea, and vomiting in patients (11). It can be predicted that this risk will be higher, especially after restrictive procedures such as sleeve gastrectomy. As a matter of fact, in our study, it was determined that the patients most frequently experienced complaints such as heartburn, indigestion, and vomiting, respectively, during Ramadan. This situation may cause both patient comfort and risk of malnutrition and dehydration. Patients are advised to eat smaller and more frequent meals, by increasing dietary protein, rather than one large meal, after prolonged fasting (2). On the other hand, it was observed that a significant portion of our patients completed iftar and sahur in less than half an hour with higher-calorie foods. In addition, on days when Ramadan coincides with the hot summer months, it is crucial to stay hydrated by consuming enough fluids to prevent dehydration. Therefore, drinking sufficient fluids between iftar and sahur (2,10,13). Our study observed that the number of meals between iftar and sahur varied between 0-5, and the

Table 5. Comparison of patient health questionnaire-9 mean scores in terms of descriptive characteristics

Demographic features	Category	n	Mean	±SD	t	p[a]
Gender	Woman	30	11.80	5.98	1.896	0.065
	Male	14	8.07	6.26		
Marital status	Married	37	10.24	6.55	-0.901	0.373
	Single	7	12.57	4.19		
Status of Experiencing Weight Change in Ramadan	Yes	25	10.84	6.32	0.272	0.787
	No	19	10.31	6.31		
Social security	Yes	40	10.45	6.29	-0.544	0.589
	No	4	12.25	6.50		
Smoking	Yes	19	8.94	4.49	-1.664	0.104
	No	25	11.88	7.14		
Chronic disease	Yes	7	9.14	6.66	-0.674	0.504
	No	37	10.89	6.23		
Continuous medication use	Yes	8	14.87	6.31	2.226	**0.031***
	No	36	9.66	5.91		
Prior surgery status	Yes	26	9.69	6.92	-1.180	0.245
	No	18	11.94	5.02		
Working status	Yes	25	9.32	5.54	-1.602	0.117
	No	19	12.31	6.86		
Consulting a Health Professional Before Fasting	Yes	7	8.14	6.28	-1.144	0.259
	No	37	11.08	6.22		
Health Check Before Fasting	Yes	13	9.23	7.11	-0.949	0.348
	No	31	11.19	5.88		
Reason for Bariatric Surgery	Overweight	35	10.45	6.15	-0.324	0.748
	Comorbid diseases	9	11.22	6.97		
Nausea in Ramadan	Yes	6	11.66	4.80	0.440	0.663
	No	38	10.44	6.49		
Vomiting in Ramadan	Yes	9	12.55	5.02	1.045	0.302
	No	35	10.11	6.50		
Ramadan headache	Yes	6	11.66	8.23	0.440	0.663
	No	38	10.44	6.00		
Heartburn in Ramadan	Yes	12	12.66	3.62	1.759	0.087
	No	32	9.84	6.88		
İndigestion in Ramadan	Yes	10	12.50	5.58	1.087	0.283
	No	34	10.05	6.40		

a:Independent-Samples T test*: $p<0.05$

fluid consumption was below 2 liters in four out of five patients. It was determined that one out of every three patients did not have regular sahur, and the fasting period was prolonged. Patients' need for multivitamin supplements may increase during fasting. Therefore, vitamin and mineral supplements should be taken at doses recommended by the doctor (2,10). However, it is observed that the vast majority of patients (84.1%) fail to notice it. To prevent possible negative consequences, informing patients about these issues in more detail in the early postoperative period seems necessary.

It is reported that patients who fast during Ramadan complain of exacerbation of new or existing gastrointestinal problems, most commonly indigestion and heartburn (12). In particular, it was found that Ramadan fasting changes the circadian rhythm and causes an increase in daytime stomach acidity (13). Proton pump inhibitors are used empirically in fasting patients, as such patients have reported that their symptoms are well controlled with these drugs (12). However, no patient in our study stated that they used a proton pump inhibitor. Four patients indicated they had to take a break from fasting due to their complaints. All patients who take a break from fasting are those who fast for the first time. Only one patient applied to a dietitian and followed a special diet during Ramadan. These data suggest that the lack of knowledge and experience in individuals fasting for the first time causes the fear of experiencing health problems again and makes people worry about the process. It is stated that most of the upper gastrointestinal symptoms are related to dietary components such as carbohydrate, fat, and protein intake (14). However, many patients may develop similar gastrointestinal symptoms after bariatric surgery (15,16). This risk increases with the changing eating habits during Ramadan. It is observed that patients often experience constipation problems as well as symptoms such as heartburn, indigestion, nausea and vomiting, headache, and weakness. At this point, it is essential to make changes in the patients' dietary components and refer them to a specialist.

Although different sleep patterns are observed during Ramadan, it is known that sleep duration is reduced, and sleep is fragmented in most individuals (17). Our study determined that approximately one in every five patients (18.2%) experienced variable waking times after iftar or sahur (Table 3). Furthermore, it is known that body temperature drops at the onset of sleep, and increases in body temperature increase wakefulness. In this context, eating late at night can cause an increase in body temperature and prolong the time it takes to fall asleep (18). On the contrary, one out of every six patients sleep within 15 minutes after sahur. In addition, sleeping with a

full stomach negatively affects sleep quality by causing gastroesophageal reflux and decreased diet-induced thermogenesis (18).

It is stated that fasting has a positive effect on the mental health of individuals, and the psychological well-being of those who fast increases (19, 20). However, the effects of bariatric surgery on depression and anxiety are unclear. While some studies report a decrease in depression and anxiety symptoms in the postoperative period (21), others report an increase in postoperative major depression (22). Our study determined that the patients had a moderate level of depression, and almost one out of every five patients stated that this condition significantly affected their daily life. Changes in eating and sleeping patterns may explain this situation. For this reason, it is crucial to provide counseling before fasting to identify and correctly guide patients who may be at risk.

CONCLUSION

In conclusion, this study showed that patients experienced some gastrointestinal and psychosocial problems during Ramadan fasting after sleeve gastrectomy, which is a restrictive procedure. It is observed that the majority of these problems stem from the patients' inadequate eating habits. For this reason, getting support from relevant health professionals, at least before the month of Ramadan, is essential in solving this problem. The lack of guidelines or clear recommendations regarding Ramadan fasting after metabolic/bariatric surgery is a critical shortcoming for clinicians. This is the first study conducted during the month of Ramadan on the subject in Turkish society and may guide future studies in terms of drawing attention to the problem and its potential solutions.

Conflict of Interest

The authors declared that there is no conflict of interest.

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Authors' Contributions

Idea/Concept: H.C.A., A.G.; Design: H.C.A., A.G., Ö.Y.; Data Collection and/or Processing: H.C.A., A.G., Ö.Y.; Analysis and/or Interpretation: H.C.A., A.G., Ö.Y., D.A., A.Y., K.K.; Literature Review: H.C.A., A.G., Ö.Y.; Writing the Article: H.C.A., A.G., Ö.Y., D.A., A.Y., K.K.; Critical Review: H.C.A., A.G., Ö.Y., D.A., A.Y., K.K.

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