Ramadan Fasting in Patients with a Stoma: A Prospective Study of Quality of Life and Nutritional Status

Yunus E. Altuntas, MD; Fazli C. Gezen, MD; Turgut Sahoniz, MD; Metin Kement, MD; Halime Aydin, STN; Fatma Sahin, STN; Nuri Okkabaz, MD; and Mustafa Oncel, MD, FASCRS (Int)

Abstract

Ramadan fasting is an Islamic obligation for healthy Muslims after the age of puberty. Persons with an acute or chronic disease may be excused from this obligation; the degree of the disease is an important parameter for not fasting. Little is known about the effect of fasting on persons with a stoma. A prospective study was conducted among 56 patients with a cancer-related fecal stoma (33 [58.9%] male, mean age 55.9 ± 13.1 years) over two periods of Ramadan to analyze the effect of fasting 15 to 16 hours on nutritional and metabolic status and quality of life. Eligible patients were divided into two groups: fasting (n = 14) and nonfasting (n = 42). Demographic and stoma information, as well as disease and treatment-related variables, were evaluated. Participants completed cancer patient and colorectal cancer patient quality-of-life instruments and rated their religious orientation. Laboratory tests (blood urea nitrogen, creatinin, cholesterol, prealbumin, albumin, and transferrin) were performed 1 to 3 weeks before Ramadan, and questionnaires and tests were repeated 1 to 3 weeks after Ramadan in people who fasted. Demographic parameters, including religious orientation scale scores, were similar between fasting and nonfasting groups. Patients in the fasting group had significantly higher albumin levels (4.6 ± 0.2 versus 4.1 ± 0.4, P = 0.001), prealbumin levels (27.6 ± 7.4 versus 21.3 ± 8.5, P = 0.018), and global health status scores (81.5 ± 16.7 versus 68.3 ± 20.1, P = 0.030) than patients in the nonfasting group. Patients who fasted also had their stoma for a longer period of time than patients in the nonfasting group (average 9 months [range 3–87 months] in the fasting versus 4.5 months [range 3–36 months] in the nonfasting group, P = 0.084), and the proportion of patients with a permanent stoma was higher in the fasting group than in the nonfasting group (P = 0.051). Ramadan fasting had almost no influence on quality of life. Fasting lowered prealbumin levels (27.6 ± 7.4 versus 21.2 ± 4.4; P = 0.046), but did not adversely affect other nutritional or global health status variables. Most patients in the fasting group (13, 92.9%) stated they would feel sad if they were not fasting. The results of this study suggest that although fasting may decrease prealbumin levels, persons with a stoma and good nutritional status may decide for themselves whether to fast.

Keywords: prospective study, surgical stoma, fasting, Islam, nutritional status

Index: *Ostomy Wound Management* 2013;59(5):26–32

Potential Conflicts of Interest: none disclosed

Quality of life in patients living with a temporary or permanent ileostomy or colostomy may be tempered by emotional, physical, and social challenges.[1,2] In a recent review[2] involving 53 patients with a permanent or temporary stoma, 35.9% and 56.6%, respectively, were diagnosed with depression and anxiety. Patients with stomas may face problems adapting to and learning how to manage their new anatomy. A review[1] of psychosocial challenges found such problems and that they may not be generally recognized after surgery. In two additional reviews,[3,4] psychological quality of life, social functioning, and sexual functioning in patients who underwent a colorectal procedure were evaluated according to whether the patient did or did not have a stoma; nonstoma patients who had undergone a colon resection had better recovery than persons with a stoma. In addition, patients with stomas may estrange themselves from society

Dr. Altuntas and Dr. Gezen are general surgeons, Department of General Surgery, Kartal Education and Research Hospital, Istanbul, Turkey. Dr. Sahinoz is a Public Health Specialist, Department of General Surgery, Medipol University Hospital, Istanbul. Dr. Kement is a general surgeon, Department of General Surgery, Kartal Education and Research Hospital. Ms. Aydin and Ms. Sahin are enterostomal therapy nurses, Stomatherapy Unit, and Dr. Okkabaz is a general surgeon, Department of General Surgery, Kartal Education and Research Hospital. Dr. Oncel is a general surgeon, Department of General Surgery, Kartal Education and Research Hospital and Medipol University Hospital; and Stomatherapy Unit, Kartal Education and Research Hospital. Please address correspondence to: Yunus E. Altuntas, MD, Kartal Egitim Arastirma Hastanesi, Genel Cerrahi Klinigi, Semsi Denizer Cad, 34890 Kartal/Istanbul, Turkey; email: yunusemrealtuntas@ymail.com.

and limit sociocultural activities. In a prospective study[5] in which 74 patients completed a 33-item questionnaire, results revealed patients experienced social impairment in addition to increased functional and emotional problems.

Fasting during Ramadan is an Islamic obligation for healthy Muslims after the age of puberty. The philosophy of fasting in the Islamic culture is to teach tolerance, train patience, and feel the sufferings of the poor.[6] Even nonobservant Muslims may insist on fasting, because fulfillment of this commandment ensures great rewards in the hereafter.[7] Although fasting is an obligation for all Muslim people, some exceptions include children, pregnant women, the elderly, travelers, and persons with some other specific conditions.[7] For example, persons with an acute or chronic disease who cannot withstand long-term hunger or thirst may be relieved of this obligation.

The time of observance differs each year because Ramadan follows the lunar calendar. The fasting period runs from dawn to sunset and varies with the geographical site and the season; thus, in the summer months and northern latitudes, fasting can sometimes last up to 18 hours. Fasting forbids drinking, eating, and any kind of sexual activity from before sunrise until after sunset for an entire month. In addition, persons who are fasting must abstain from taking oral medications, smoking, or receiving intravenous fluids and nutrients.[6]

A review of the literature[8] that includes survey, case control and cohort studies, and clinical trials underscores the effects of fasting on a healthy human body are well-studied. In healthy people, changes in serum urea and creatinine are usually insignificant.[8] Although it is presumed that prolonged intermittent abstinence from water and food concomitantly for 12 hours daily for 30 days may stress the kidneys and alter their metabolic and transport functions, serum creatinine, blood urea nitrogen (BUN), and creatinine clearance were only somewhat altered by this dietary pattern, suggesting that normal kidney function remains intact. In addition, recent preclinical study[9,10] revealed rats subjected to Ramadan-type fasting experienced reversible increased liver and intestinal enzymatic activity, including intestinal lactate, isocitrate, succinate and malate dehydrogenases, fructose 1,6-bisphosphatase, glucose-6-phosphatase, alkaline phosphatase, g-glutamyl transpeptidase, and leucine aminopeptidase.

For persons who are not healthy, the degree of their disease is an important parameter for refraining from or stopping fasting; physicians dealing with Muslim patients frequently are asked whether a patient can fast. This includes patients with a stoma. People living with stomas, particularly with ileostomies, need to drink water and eat regularly in order to decrease the risk of stoma-related metabolic complications. Changes in nutritional status in patients with a stoma during Ramadan-type fasting have not been well-studied. A prospective clinical study[11] evaluated quality of life in 28 patients with a stoma using a modified Fecal Incontinence Quality of

Key Points
- Information about the effects of Ramadan fasting on the health of persons with a stoma is largely unknown.
- Of a total of 56 patients with a temporary or permanent fecal stoma who participated in this study, 14 (25.0%) fasted an average of 19 days.
- Patients who chose to fast had their stoma for a longer period of time and were in better overall health than persons who did not fast.
- Prealbumin levels were significantly lower after fasting, but overall health scores did not change significantly.
- The authors conclude that stoma patients who decide to fast can do so, but some nutritional status monitoring may be needed.

Life (FIQL) questionnaire; results showed Ramadan fasting did not disturb the stoma care of 83% of patients, while 17% experienced changes in bowel habits that affected their stoma care. Other prospective analyses[11,12] showed the number of people fasting drops with surgery and creation of stoma from 92% to 54% in patients receiving abdominoperineal resection for rectal cancer, and most experience a decrease in quality of life according to the modified Fecal Incontinence Questionnaire and Short Form-36 Health Survey Scales. In a recent clinical study,[13] the quality of life for patients with a stoma — mostly ileostomies — was assessed using a quality-of-life questionnaire developed specifically for Muslim people and results compared with those obtained from a healthy population. Although quality of life was adversely affected by the creation of a stoma, religious obligations were relatively preserved. Although the effect of fasting on nutritional status is well known, little is known about its effects on patients with a stoma who have specific risks for complication.[8,9] The purpose of this study was to assess the relationship between patient-related and nutritional factors in persons with an ileostomy or colostomy with regard to fasting and to evaluate the effect of fasting on quality of life and nutritional status.

Materials and Methods

Study design and setting. A prospective study was conducted at the Kartal Education and Research Hospital Stomatherapy Unit among colorectal or gynecological cancer patients with a stoma. The participants were asked to answer a questionnaire on an outpatient basis. The Kartal Education and Research Hospital Ethics Board approved the design and content of the study before data collection (reference number: B104ISM4340029/1009/20). All patients were informed about the study, and written informed consent was obtained.

Participants and procedure. All patients treated in the Stomatherapy Unit were invited to participate. All participants had been treated for colorectal or gynecological cancers and had a stoma necessitated either during the resection of the tumor or a cancer-related complication. Patients were excluded if they were incapable of understanding and completing the questionnaire, refused to participate, were not Muslim, had a urostomy, and/or had surgery or received chemotherapy or radiation during the prior 3 months because they might not feel healthy enough to fast. Patients were allocated to the respective study group based on whether they did or did not fast after Ramadan. At the end of the month of Ramadan, information regarding how many days they had fasted was obtained via a telephone call follow-up. If a patient fasted at least 7 days during Ramadan, the patient was considered in fasting group; persons who never fasted or fasted <7 days were allocated to the nonfasting group. Participants in the fasting group returned to the Stomatherapy Unit 1 to 3 weeks after the fasting to repeat the quality-of-life questionnaires and blood tests. Blood tests were not repeated after Ramadan in the nonfasting group. All follow-up questionnaires were completed with face-to-face interviews by one of two stomatherapy nurses in the unit.

Study time frames. The current study involves two periods of Ramadan: August 11 through September 8, 2010 and August 1 through 29, 2011 (the years of 1432 and 1433, respectively, according to lunar calendar). The length of fasting ranged from 15 hours and 12 minutes to 15 hours and 56 minutes in the study region.

Instruments.

Quality of life. Two different questionnaires designed by the European Organization for Research and Treatment of Cancer (EORTC) were used to assess quality of life: Quality of Life Questionnaire-Cancer-30 (QLQ-C30), version 3.0, was used for all patients with cancer and Quality of Life Questionnaire-Colorectal Cancer-29 (QLQ-CR29) for patients with colorectal cancer. The QLQ-C30 questionnaire was designed for use in patients with varying disease stages and treatment modalities and has been used in more than 2,200 studies.[14,15] It is comprised of multi-item scales and single-item measures, including five functional scales, three symptom scales, a global health status, and six single items.[15,16] The QLQ-CR29 was demonstrated internationally to have sufficient validity and reliability in assessing quality of life in patients with colorectal cancer, particularly in those living with stomas[16,17]; it comprises 29 questions assessing colorectal cancer-specific symptom scales (disease symptoms, side effects of treatment) and functional scales (body image, sexuality, and future perspective).[17,18]

One of two investigator nurses who administered the questionnaires with a face-to-face interview and abstracted the information. All scales and single-items measures in both questionnaires were linearly transformed to give a score from 0 to 100 according to the algorithm recommended by developers. Scores were calculated according to EORTC scoring guidelines.[13,14] A high score for a functional scale represents a high level of functioning, a high score for the global health status represents a high life quality, and a high score for a symptom scale represents a high level of symptoms or problems. EORTC scoring guidelines state that if a patient completes at least 75% of the items in the questionnaire, the answers are considered assessable, and the mean is computed for missing items in assessable cases.[13,14]

Patients also completed a religious orientation scale, initially described by Allport and Ross[19] and converted to an applicable form for the Muslim population by Ok[20] to determine the degree of religious identity.[18-20] This scale was originally developed for a Christian community and included 20 questions; the converted version used in the current study included 10 questions. The validity and reliability of the questionnaire have been demonstrated in a population of 82 Muslim people.[20] In the converted version, four possible responses reflect the level of the participant's agreement with the statement in the question; accordingly, a final score was obtained between 10 and 40.

Data collection and analysis. Data were collected using paper/pencil instruments. The questionnaire answers secured during the face-to-face interview were recorded by one of the two investigators the same day they were obtained. Outcomes were compared within the groups in order to ascertain the factors involved in the decision to fast during the month of Ramadan and included demographics, body mass index, civil status (married, divorced/widowed, single), number of children, number of family members living with the participant, religious orientation scale score, education status (literate, elementary school, college/university), living location (rural, urban), working status (retired, housewife, actively working), income status, origin of primary cancer (colorectal, gynecological), stoma type (ileostomy, colostomy) and pattern (temporary, permanent), and the length of time living with the stoma.

Income status was defined according to Turkish economic standards and classified as very low, low, average, and high if the total annual income of the family ranged between 0 to 200, 201 to 1,000, 1,001 to 3,000, and above 3001 Turkish Liras, respectively (1 lira is approximately equal to US $0.50).

Laboratory parameters were measured using blood in order to assess and compare patient nutritional and metabolic condition: albumin (reference range: 3.5–5.5 g/dL), prealbumin (reference range: 20–40 mg/dL), transferrin (reference range: 200–360 mg/dL), BUN (reference range: 6–25 mg/dL), urea (reference range: 10–50 mg/dL), creatinine (reference range: 0.7–1.2 mg/dL), and cholesterol (reference range: 0–200 mg/dL). The results obtained from QLQ-C30 and QLQ-CR29 questionnaires also were compared between the groups.

Finally, in the fasting group, results of questionnaires and laboratory findings before and after the month of Ramadan were compared and patients were asked: 1) whether fasting adversely affected his/her daily life, and 2) whether he/she would feel sad if he/she were not fasting.

Table 1: Patient characteristics by fasting group			
	Fasting group (n=14)	**Nonfasting group (n=42)**	***P***
Demographics			
Age	53.9±12.3	56.5±13.4	0.529
Gender (male)	7 (50.0)	26 (61.9)	0.608
Body mass index	27.3±3.9	25.4±4.7	0.170
Civil status			0.168
Married	14 (100)	33 (78.6)	
Divorced/widowed	0	8 (19.0)	
Single	0	1 (2.4)	
Number of children	3.6±1.8	3.6±1.7	0.964
Number of people you live with	4.1±1.8	4.7±2.7	0.451
Religious orientation scale score	15.9±4.9	16.5±5.0	0.723
Education status			0.513
Literate	2 (14.3)	10 (23.8)	
Elementary school	12 (85.7)	28 (66.7)	
College/university	0	4 (9.5)	
Living location			0.732
Rural	4 (28.6)	10 (23.8)	
Urban	10 (71.4)	32 (76.2)	
Working status			0.276
Retired	4 (28.6)	20 (47.6)	
Housewife	5 (35.7)	13 (31.0)	
Actively working	5 (35.7)	9 (21.4)	
Income status			0.999
Very low	0	2 (4.8)	
Low	10 (71.4)	30 (71.4)	
Average	3 (21.4)	8 (19.0)	
High	1 (7.1)	2 (4.8)	
Primary cancer			0.999
Colorectal	13 (92.9)	40 (95.2)	
Gynecological	1 (7.1)	2 (4.8)	
Stoma type			0.105
Ileostomy	6 (42.9)	30 (71.4)	
Colostomy	8 (57.1)	12 (28.6)	
Stoma pattern			0.051
Temporary	6 (42.9)	31 (73.8)	
Permanent	8 (57.1)	11 (26.2)	
Time living with stoma (months)	9 (3–87)	4.5 (3–36)	0.084

Data analyses. Data were analyzed using SPSS 17.0 for Windows (SPSS, Inc, Chicago, IL). Results were calculated as percentages, mean and standard deviations, or median values. Quantitative and qualitative categorical variables were compared using Student's *t*-test and chi-square (Pearson's or Fischer's Exact) test, respectively. Pearson's or Fishers Exact Test was preferred if the minimum expected value was between 0 to 5 or more than 25, respectively. A paired-sample *t*-test was conducted to compare the differences of the scales/items in QLQ-C30 and QLQ-CR29 before and after fasting. A *P* value <0.05 was considered significant.

Results

A total of 56 patients (33 [58.9%] male, mean age 55.9 ± 13.1 years) participated in the study. The primary diseases were colorectal cancer (53, 94.6%), gynecological cancer causing colonic obstruction (two, 3.6%), and rectovaginal fistula (one, 1.8%). The median (range) time living with the stoma was 6 (range 3–87) months (see Table 1).

Among study patients, 14 (25.0%) persons fasted at least 7 (average 19.9 ± 9.0) days and were allocated to the fasting group. No statistically significant difference was found in evaluated demographic variables between fasting and nonfasting groups. Although fasting was more common in patients with a permanent stoma and persons living with the stoma for a longer time, the differences were not significant (*P* = 0.051). Of the 31 persons with temporary stomas, 27 (87.1%) had an ileostomy and four had a colostomy. None of the patients with temporary colostomy and 21 of 27 patients (77.8%) with a temporary ileostomy did not fast. Religious orientation scores were similar within the fasting and nonfasting groups.

Laboratory findings of nutritional markers showed a statistically significant difference between patients in the fasting and nonfasting group, suggesting patients in the fasting group were significantly healthier (*P* = 0.018 for prealbumin and *P* = 0.001 for albumin levels; see Table 2). Some symptom scales, including fatigue, dyspnea, appetite loss and dry mouth, and quality-of-life variables also suggest that patient global health status was better in the fasting group patients (see Table 3 and Table 4).

When the measurements before and after Ramadan were compared, fasting adversely affected almost all laboratory values; however, only the decrease in prealbumin level (from 27.6 ± 7.4 to 21.2 ± 4.4) reached significance (*P* = 0.046) (see Table 2). Fasting had almost no impact on quality of life, but decreased the level of pain and improved flatulence and fecal incontinence (see Table 3 and Table 4). Among patients in the fasting group, 12 (85.8%) stated fasting did not adversely affect his/her daily life, and 13 (92.9%) stated they would feel sad if he/she were not fasting.

Table 2: Laboratory values by fasting group and following fasting

	Fasting group (before Ramadan) (n=14)	Nonfasting group (before Ramadan) (n=42)	P	Fasting group (after Ramadan) (n=14)	P
Transferrin	305.1 ± 40.5	281.1 ± 74.0	0.256	289.1 ± 39.0	0.147
Prealbumin	27.6 ± 7.4	21.3 ± 8.5	0.018	21.2 ± 4.4	0.046
Albumin	4.6 ± 0.2	4.1 ± 0.4	0.001	4.5 ± 0.3	0.111
BUN	15.6 ± 5.0	16.8 ± 9.8	0.667	16.1± 6.2	0.653
Urea	33.4 ± 10.7	35.6 ± 20.3	0.704	32.3 ± 13.1	0.609
Creatinine	0.8 ± 0.3	0.9 ± 0.5	0.709	0.8 ± 0.2	0.648
Cholesterol	162.4 ± 33.7	172.7 ± 45.9	0.444	172.6 ± 34.0	0.113

Table 3: Quality of life by fasting group (EORTC QLQ-C30 variables)

	Fasting group (before Ramadan) (n=14)	Nonfasting group (before Ramadan) (n=42)	P	Fasting group (after Ramadan) (n=14)	P
Global health status	81.5 ± 16.7	68.3 ± 20.1	0.030	69.6 ± 30.1	0.101
Functional scales					
Physical functioning	88.9 ± 13.4	76.5 ± 21.9	0.052	85.2 ± 25.2	0.427
Emotional functioning	75.6 ± 25.6	83.5 ± 23.9	0.296	77.3 ± 26.8	0.836
Role functioning	83.3 ± 26.1	82.5 ± 25.4	0.920	86.9 ± 27.9	0.583
Cognitive functioning	90.5 ± 15.6	92.1 ± 12.3	0.698	86.9 ± 11.6	0.459
Social functioning	89.3 ± 15.5	81.3 ± 25.0	0.270	83.3 ± 19.6	0.292
Symptom scales					
Pain	16.7 (0–66.7)	16.7 (0–83.3)	0.466	0 (0–50)	0.054
Nausea and vomiting	0 (0–33.3)	0 (0–66.7)	0.785	0 (0–33.3)	0.671
Fatigue	11.1 (0–66.7)	33.3 (0–55.6)	0.015	27.7 (0–44.4)	0.496
Dyspnea	0 (0–33.3)	0 (0–66.7)	0.032	0 (0–33.3)	0.336
Insomnia	0 (0–100)	0 (0–100)	0.669	0 (0–100)	0.671
Appetite loss	0 (0–33.3)	0 (0–100)	0.044	0 (0–33.3)	0.336
Constipation	0 (0-66.7)	0 (0–33.3)	0.507	0 (0–66.7)	0.999
Diarrhea	0 (0–33.3)	0 (0–100)	0.563	16.67 (0–100)	0.111
Financial difficulties	0 (0–66.7)	0 (0–100)	0.927	33.3 (0–33.3)	0.999

Discussion

Muslim patients with a stoma may experience unique challenges and complications related to complete fasting, because drinking and eating restrictions as part of this religious observation may worsen a patient's general health condition. Research to help guide patient care in this area is very limited. The effect of fasting on persons with a stoma has not been studied. The purpose of the current study was to evaluate the health and quality-of-life profile of patients with a stoma who fast during Ramadan and determine the effects of fasting on quality of life and nutritional status.

In a previous study[11,12] of 93 Muslim patients with either an ileostomy or a colostomy who had received an abdominoperineal or low anterior or anterior resection for colorectal cancer, more than 50% of patients with a stoma fasted. The number of patients in this study who fasted was notably less (25%). In this study, no statistically significant difference in patient demographic and social or economic factors was found between the fasting and nonfasting groups.

Patients also completed the questionnaire to determine the degree of their religious identity. According to their scores, patients who do not consider themselves religious were as enthusiastic about fasting as those who had higher points in religious orientation scale. Although the proportion of patients who fasted was higher among patients with a permanent stoma than those with a temporary stoma (57.1% versus 26.2%; $P = 0.051$)

Table 4: Quality of life by fasting group (EORTC QLQ-CR29 variables)					
	Fasting group (before Ramadan) (n=14)	Nonfasting group (before Ramadan) (n=42)	*P*	Fasting group (after Ramadan) (n=14)	*P*
Body image	72.6 ± 31.8	87.8 ± 23.4	0.116	73.0 ± 30.4	0.965
Anxiety	80.9 ± 25.2	69.8 ± 34.4	0.272	69.0 ± 30.6	0.208
Weight	88.1 ± 21.1	80.9 ± 30.5	0.420	78.6 ± 33.6	0.336
Sexual interest (men)	37.0 ± 43.3 (n=9)	64.2 ± 43.3 (n=27)	0.110	51.8 ± 50.3 (n=9)	0.223
Sexual interest (women)	40.0 ± 54.8 (n=5)	35.6 ± 42.7 (n=15)	0.853	66.6 ± 47.1 (n=5)	0.604
Urinary frequency	16.7 (0–100)	25 (0–100)	0.894	16.7 (0–83.3)	0.319
Blood/ mucus in stool	0 (0–33.3)	0 (0–33.3)	0.565	0 (0–16.7)	0.671
Stool frequency	16.7 (0–83.3)	16.67 (0–83.3)	0.086	16.7 (0–66.7)	0.145
Urinary incontinence	0 (0–100)	0 (0–00)	0.840	0 (0–100)	0.189
Dysuria	0 (0–100)	0 (0–66.7)	0.371	0 (0–100)	0.573
Abdominal pain	0 (0–33.3)	0 (0–66.7)	0.890	0 (0–66.7)	0.720
Buttock pain	0 (0–66.7)	0 (0–100)	0.922	33.3 (0–100)	0.267
Bloating	0 (0–66.7)	0 (0–33.3)	0.246	0 (0–66.7)	0.999
Dry mouth	0 (0–66.7)	33.3 (0–100)	0.046	0 (0–66.7)	0.082
Hair loss	0 (0–100)	0 (0–100)	0.851	0 (0–33.3)	0.218
Taste	0 (0–66.7)	0 (0–100)	0.185	0 (0–33.3)	0.336
Flatulence	33.3 (0–100)	33.33 (0–66.7)	0.080	0 (0–66.7)	0.019
Fecal incontinence	33.3 (0–66.7)	33.3 (0–66.7)	0.742	0 (0–33.3)	0.047
Sore skin	0 (0–33.3)	0 (0–100)	0.811	0 (0–33.3)	0.671
Embarrassment	0 (0–100)	0 (0–33.3)	0.321	0 (0–100)	0.999
Stoma care problems	33.3 (0–100)	0 (0–100)	0.123	33.3 (0–100)	0.611
Impotence	66.7 (0–100)	0 (0–100)	0.158	100 (0–100)	0.347
Dyspareunia	0 (0–66.7)	0 (0–66.7)	0.999	66.7 (0–100)	0.178

and those living with stoma for longer period of time, the differences did not reach statistical significance, probably related to the limited size of the study. Similarly, and also statistically insignificant, the percentage of patients living for a longer time with a stoma was higher in the fasting than the nonfasting group (median time living with a stoma was 9 months [range 3–87 months] and 4.5 months [3–36 months] in fasting and nonfasting groups, respectively; *P* = 0.084).

Although the comparison did not reach significance, there was a larger proportion of patients with permanent stomas in the fasting group (*P* = 0.051). Similarly, fasting patients were living with a stoma longer than nonfasting cases. These measures may reflect that time between the operation and evaluation was longer in fasting patients. Albumin and prealbumin levels, which reflect nutritional status, were significantly higher before fasting in patients who fasted, and quality-of-life measures showed that global health status was better in patients who fasted than in persons who did not fast. Finally, fasting patients

were in a better condition than nonfasting group in some symptom scales regarding fatigue (11.1 [0–66.7] versus 33.3 [0–55.6]; *P* = 0.015), dyspnea (0 [0–33.3] versus 0 [0–66.7]; *P* = 0.032), appetite loss (0 [0–33.3] versus 0 [0–100]; *P* = 0.044), and dry mouth (0 [0–66.7] versus 33.3 [0–100]; *P* = 0.046). These findings suggest that in this study healthier patients are more likely to fast and the desire to fast may increase after enough time has passed since stoma creation and patients feel better. In addition, patients who fasted tended to have their stomas for a longer time than persons who did not fast, although the difference was not statistically significant. These findings have not been reported before. No other demographic or disease-related factors, including the degree of religious identity, affected the proportion of patients with a stoma who did or did not fast.

Pre/post fasting results. Albumin, prealbumin, transferrin, and cholesterol levels may reflect the effects of hunger on body functions.[20,21] The current study revealed decreases, some significant, in prealbumin and transferrin levels, respectively,

which showed that fasting adversely affected nutritional status, which is not similar in persons without a stoma.[22,23] However, the authors remain uncertain as to whether these changes noticeably altered patients' daily life or health status. In their opinion, patients with a stoma may be at higher risk for compromised nutritional status, and as such, may require close follow-up and supplementary nutrients when necessary.

Hypohydration also may negatively affect urinary function as reflected in BUN, urea, and creatinine levels. This study did not find any differences between these measures obtained before and after fasting, suggesting renal function was maintained in patients with a stoma who fasted.

With regard to quality of life, no worsening of health measures or symptom scales was observed, and a significant improvement in flatulence and fecal incontinence was noted. In addition, fasting decreased the level of pain. Global health status worsened in these cases, but the difference before and after fasting was not statistically significant.

Finally, the authors also asked participants about the importance of fasting in their lives. Most persons in the study denied that fasting adversely affected their daily life, and they declared they would feel sad if they were not fasting.

Limitations

The current study has some important limitations, mostly related to the small number of patients, which reduced the statistical power of the study. In addition, the group was not heterogeneous, which may affect the external validity of the results vis-à-vis all ileostomy and colostomy patients. In addition, the patients' approach to life and fasting may be affected by the fact they all had cancer. Likewise, suggestions of patients' relatives or doctors, who may recommend the patient to fast or not to fast, were not considered. Another consideration is that patients with a urostomy were not included to the study. Furthermore, the validity and reliability of instruments were not specifically established for patients with ileostomy or colostomy, which may affect quality of life and other variables assessed. Finally, the wide range in stoma history (3 to 87 months) may have affected the results obtained.

Conclusion

In Turkey, fasting is not common among patients with a stoma. In this study, 25% of patients with a stoma fasted for Ramadan. Disease-related and demographic variables, including degree of religious identity, were similar between patients who did and did not fast. However, prealbumin and albumin levels were higher in fasting group before Ramadan, as well as global health status symptom scales including fatigue, dyspnea, appetite loss and dry mouth. Among patients who did fast, only prealbumin levels decreased significantly. Fasting did not affect quality of life but improved flatulence and fecal incontinence scores. Most fasting patients stated they would feel sad if they were not fasting. The results of this study suggest that fasting

should not to be prohibited in patients with a stoma who wish to observe the ritual, but close follow-up of these patients may be necessary. For persons in good nutritional health living with a stoma, the decision for fasting may be left to the patient. ◼

References

1. Yasan A, Unal S, Gedik E, Girgin S. Kalıcı ve gecici ostomi yapılmıs, kisilerde yasam kalitesinde degisim, depresyon ve anksiyete. *Anatolian J Psychiatr*. 2008;9:162–168.
2. Bekkers MJ, van Knippenberg FC, van den Borne HW, Poen H, Bergsma J, vanBergeHenegouwen GP. Psychosocial adaptation to stoma surgery: a review. *J Behav Med*. 1995;18(1):1–31.
3. Sprangers MA, Taal BG, Aaronson NK, te Velde A. Quality of life in colorectal cancer: stoma vs. non-stoma patients. *Dis Colon Rectum*. 1995;38(4):361–369.
4. Camilleri-Brennan J, Steele RJ. Quality of life after treatment for rectal cancer. *Br J Surg*. 1998;85(8):1036–1043.
5. Scarpa M, Barollo M, Polese L, Keighley MR. Quality of life in patients with an ileostomy. *Minerva Chir*. 2004;9(1):23–29
6. Bener A, Galadari S, Gillett M, Osman N, Al-Taneiji H, Al-Kuwaiti MHH, Al-Sabosy MMA. Fasting during the holy month of Ramadan does not change the composition of breast milk. *Nutri Res*. 2001;21(6):859–864.
7. Rispler-Chaim V. Islamic medical ethics in the 20th century. *J Med Ethics*. 1989;15(4):203–208.
8. Azizi F. Islamic fasting and health. *Ann Nutr Metab*. 2010;56(4):273–282.
9. Nomani MZ, Hallack MH, Nomani S, Siddiqui IP. Changes in blood urea and glucose and their association with energy containing nutrients in men on hypocaloric diets during fasting. *Am J Clin Nutr*. 1989;49(6):1141–1145
10. Farooq N, Priyamvada S, Arivarasu NA, Salim S, Khan F, Yusufi AN. Influence of Ramadan type fasting on enzymes of carbohydrate metabolism and brush border membrane in small intestine of rat used as a model. *Br J Nutr*. 2006;96(6):1087–1094.
11. Hussein AM, Fadl SA. Quality of life in Egyptian patients with a stoma. *Egyptian J Surg*. 2001;20:597–607.
12. Celasin H, Karakoyun R, Yılmaz S, Elhan AH, Erkek B, Kuzu MA. Quality of life measures in Islamic rectal carcinoma patients receiving counseling. *Colorectal Dis*. 2011;13(7):170–175.
13. Mumtaz AK, Sahaban J, Rakhshanda R, Nedeem A. Quality of life assessment in patients with stoma in Muslim population. *Ann Pak Inst Med Sci*. 2011;7(4):222–227.
14. Fayers PM, Bjordal K, Groenvold M, Curran C, Bottomley A. *The EORTC QLQ-C30 Scoring Manual*. European Organisation for Research and Treatment of Cancer Brussels, Belgium: Wiley;2001:3.
15. Sprangers MA, te Velde A, Aaronson NK. The construction and testing of the EORTC colorectal cancer-specific quality of life questionnaire module (QLQ-CR38). European Organization for Research and Treatment of Cancer Study Group on Quality of Life. *Eur J Cancer*. 1999;35(2):238–247.
16. Aaronson NK, Ahmedzai S, Bergman B, Bullinger M, Cull A, Duez NJ, et al. The European Organization for Research and Treatment of Cancer QLQ-C30: a quality-of-life instrument for use in international clinical trials in oncology. *J Natl Cancer Inst*. 1993;85(5):365–376.
17. Whistance RN, Conroy T, Chie W, Costantini A, Sezer O, Koller M, et al. Clinical and psychometric validation of the EORTC QLQ-CR29 questionnaire module to assess health-related quality of life in patients with colorectal cancer. *Eur J Cancer*. 2009;45(17):3017–3026
18. Gujral S, Conroy T, Fleissner C, Sezer O, King PM, Avery KN, Sylvester P, et al. Assessing quality of life in patients with colorectal cancer: an update of the EORTC quality of life questionnaire. *Eur J Cancer*. 2007;43(10):1564–1573.
19. Allport GW, Ross JM. Personal religious orientation and prejudice. *J Pers Soc Psychol*. 1967;5:432–443.
20. Ok Ü. Religious attitude scale: scale development and validation. *J Int Human Sci*. 2011;8:529–549 (Article in Turkish with an English abstract).
21. Jacops DO, Scheltinga MRM. Metabolic assessment. In: Rombeau J, Caldwell MD. *Clinical Nutrition Parenteral Nutrition*. Philadelphia, PA: WB Saunders Company;1993:249–250.
22. Chaouachi A, Coutts AJ, Wong del P, Roky R, Mbazaa A, Amri M, et al. Haematological, inflammatory, and immunological responses in elite judo athletes maintaining high training loads during Ramadan. *Appl Physiol Nutr Metab*. 2009;34(5):907–915.
23. Maughan RJ, Leiper JB, Bartagi Z, Zrifi R, Zerguini Y, Dvorak J. Effect of Ramadan fasting on some biochemical and haematological parameters in Tunisian youth soccer players undertaking their usual training and competition schedule. *J Sports Sci*. 2008;26:3946.