

Effects of Ramadan Fasting on Dyspepsia Symptoms

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ABSTRACT

Background:

A few studies have shown that during Ramadan, gastrin, pepsin, and acid secretion are increased and some changes in nutrition of fasting people may deteriorate dyspepsia symptoms. On the other hand stopping smoking and alcohol use and probable psychosocial factors may improve dyspepsia symptoms.

Materials and Methods:

The patients with uninvestigated dyspepsia were enrolled in the study during one month before Ramadan and were followed up during and after Ramadan month. The dyspepsia questionnaires including "The Leeds Dyspepsia Questionnaire (LDQ)" were filled by the patients in three consecutive months. After collecting data they were divided to two groups of fasting and non-fasting and compared using SPSS software.

Results:

71 patients finished all three follow up visits (31 fasting and 40 non-fasting). The decreases in LDQ score have been less from before Ramadan to Ramadan and more from Ramadan to after Ramadan in fasting compared with non-fasting groups, but these changes were not significant ($p > 0.05$). Comparing fasting and non-fasting patients, there were not significant differences in score change from before Ramadan to Ramadan or Ramadan to after Ramadan months regarding general satisfaction and various dyspepsia symptoms ($p > 0.05$) except for epigastric discomfort after meal that was more in fasting group from before Ramadan to Ramadan ($p = 0.004$).

Conclusion:

Ramadan fasting has no effects on various dyspepsia symptoms except for epigastric discomfort after meal, which is aggravated. We recommend that patients with dyspepsia can fast during Ramadan but they are advised not to consume large-volume meals in Iftar and Suhur.

Keywords: Ramadan, Fasting, Dyspepsia

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INTRODUCTION

It is estimated that there are 1.1 - 1.5 billion Muslims worldwide, comprising 18-25% of the world population. About 62% of the world's Muslim population reside in Asia⁽¹⁾. Muslims fast from dawn to sunset in Ramadan month (the ninth lunar month in Hegira calendar) during which they must not consume any foods, fluids, and alcohol and smoke. This period of abstinence varies between 12 and 16 hours depending on the seasons. Fasting people consume a meal before dawn (Suhur) followed by another one in sunset (Iftar). As an Islamic

rule it is obligatory for all healthy adult Moslems to fast. Over 50% of Muslims fast every day or some days of Ramadan(2). Some people cannot fast due to medical problems. Among this big population there are many people who have dyspepsia asking about the effects of Ramadan fasting on their disease.

Dyspepsia is a term that points multiple symptoms on the epigastrium including pain, burning, fullness, flatulence, or any discomfort. According to the Rome III criteria, dyspepsia is defined as one or more of the following symptoms(3):

1. Postprandial fullness (classified as postprandial distress syndrome)
2. Early satiety (inability to finish a normal size meal, also classified as postprandial distress syndrome)
3. Epigastric pain or burning (classified as epigastric pain syndrome)

The prevalence of dyspepsia is about 20-40% in the community(4,5). The reported prevalence of dyspepsia in Iran ranged from 2.2% to 29.9% and most studies have reported the prevalence of dyspepsia to be higher in women(6). In a study in the general population aged over 20 in western Iran the prevalence of dyspepsia has been 54.6%(7). The etiology of dyspepsia is heterogeneous, which can range from peptic ulcer and gastric cancer to benign functional dyspepsia, but up to 75% of the patients have functional dyspepsia(8). Most patients do not seek medical care and evaluation for the exact etiology. They may fast during Ramadan. It is important for patients to know if Ramadan fasting may deteriorate their disease.

Patients with dyspepsia have impaired gastric motility and compliance and gastric acidity(9,10). It is believed that functional dyspepsia is the result of complex interaction of physiological and psychosocial factors such as generalized anxiety disorder, somatization, and mood disorders(11,12). Based on these risk factors, some nutritional and behavioral attitude of fasting people in Ramadan can affect dyspepsia. Fasting people eat nothing during daytime but many of them may consume large-volume meals in sunset and before dawn. A few studies have shown that during Ramadan, gastrin, pepsin, and acid secretion are increased at day 10 and returned to pre-Ramadan level one month after Ramadan(13-15). Other factors that may be associated with dyspepsia during

fasting include increased irritability and decreased drug compliance(16). On the other hand stopping smoking and alcohol use and probable psycho-socio-economico-spiritual factors may affect dyspepsia symptoms.

Very limited studies have done in this area. In a study it has been shown that healthy individuals might experience minor gastrointestinal (GI) symptoms such as belching, bloating, and fullness sensation (the three symptoms had an overall prevalence of 19.9%), mouth dryness and bitter taste in the mouth (18.7%), epigastric pain and discomfort (11.7%), early starvation (10.5%), early satiety (9.9%), loss of appetite (8.8%), heartburn (5.3%), abdominal pain, flank pain and periumbilical pain (5.3%), constipation (5.3%), and nausea and vomiting (4%), but no serious complications have been reported(17). This study had no case and control groups. In another study in Iran on patients with acute upper GI bleeding, fasting group had more dyspeptic symptoms in general (38%) than non-fasting group (18.9%)(18). We decided to investigate the effects of Ramadan fasting on severity of dyspepsia symptoms.

MATERIALS AND METHODS

This study was done from 19 May 2015 to 14 August 2015, which is equivalent to 3 consecutive months of Hegira calendar: Shaban, Ramadan, and Shaval, year 1436. We selected the patients with uninvestigated dyspepsia diagnosed by a gastroenterologist, who were referred to our clinic during one month before Ramadan. The validated and self-administered questionnaire "The Leeds Dyspepsia Questionnaire (LDQ)" was used for measuring the presence and severity of dyspepsia(19). The LDQ gives a range of scores from 0 to 40 and contains questions about epigastric pain, retrosternal pain, regurgitation, nausea, vomiting, belching, early satiety, and dysphagia. Scoring of each question is from 0 (no symptom) to a 5-point Likert scale (score 1-5) based on the severity of scores from very mild to very severe. In our clinical experience nine symptoms other than the symptoms in LDQ are important in patients with dyspepsia especially in Iranian patients: epigastric burning, heaviness and bloating, hematemesia, epigastric discomfort after meal or at the time of hunger, awaking or prohibition

Table 1: Baseline data of patients and matching of fasting and non-fasting groups

Variable	Fasting group	Non-fasting group	Matching (<i>p</i> value)
Number (percent)	31 (43.7)	40 (56.3)	-
Age (mean year)	35.77 ± 9.42	36.89 ± 12.24	0.66
Sex			0.594
M (number/percent)	10 (67.7)	13 (32.5)	
F (number/percent)	21 (32.3)	27 (67.5)	
Education			0.108
Under high school diploma (number/percent)	5 (17)*	11 (29)*	
High school diploma and higher (number/percent)	24 (83)	27 (71)	
Smoking			0.014#
Yes (number/percent)	0 (0)	7 (17.5)	
No (number/percent)	31 (100)	33 (82.5)	
Other diseases			0.538
Yes (number/percent)	10 (67.7)	22 (55)	
No (number/percent)	21 (32.3)	18 (45)	

*Two patients had missing data

#significant

Table 2: comparing LDQ scores of fasting and non-fasting groups

Variable	Fasting group (score)	Non-fasting group (score)	<i>p</i> value
Before Ramadan	9.87	12.00	0.134
During Ramadan	9.00	9.79	0.601
After Ramadan	5.10	7.82	0.029#
Score change from before Ramadan to Ramadan	-0.87	-2.21	0.435
Score change from Ramadan to after Ramadan	-3.90	-1.97	0.243

#significant

of sleep due to epigastric pain, and epigastric pain after stress. We also evaluated the general satisfaction in a Visual Analogue Scale (VAS) axis. After referring the patients to project executives and explaining the process of study and obtaining written consent, the questionnaires were filled by the patients for three times: during one month before Ramadan, in Ramadan, and in one month after Ramadan.

After collecting the data the patients were divided into two groups: fasting patients who had fasted more than 10 days during Ramadan and non-fasting patients. The data were entered to SPSS software version 22 and descriptive and analytical analyses were done using *t* test, NPar and Mann-Whitney tests. The LDQ score and each question and score changes during follow ups were compared separately between fasting and

non-fasting groups before, during, and after Ramadan. The level of significance was set at $p < 0.05$.

RESULT

71 patients finished all the three follow-up visits. Of them 31 patients had fasted at least 10 days during Ramadan (fasting group) and 40 had not (non-fasting group). The fasting group had fasted 11.67 days averagely. The baseline data of both groups are presented in table 1.

The patients were matched regarding age, sex, education, and other diseases ($p > 0.05$), but not for smoking. Fasting group had more smokers ($p = 0.014$).

Comparing the LDQ scores of fasting and non-fasting groups are presented in table 2.

No significant differences were seen between fasting

and non-fasting groups before and during Ramadan regarding LDQ scores ($p > 0.05$), but after Ramadan non-fasting group had more LDQ scores ($p = 0.029$), which means that they have been more symptomatic. LDQ scores decreased from before Ramadan to Ramadan, and Ramadan to after Ramadan months in each fasting and non-fasting groups. The decrease in LDQ scores has been less from before Ramadan to Ramadan, and more from Ramadan to after Ramadan in fasting compared with non-fasting groups, but these changes were not significant ($p > 0.05$).

Comparing each question of the questionnaire between fasting and non-fasting groups was done using the Mean Ranking in the analysis, but presented in the mean score value in table 3 for better understanding.

Comparing fasting and non-fasting patients, there were no significant differences in score change from before Ramadan to Ramadan or from Ramadan to after Ramadan regarding epigastric pain, burning, heaviness and bloating, early satiety, retrosternal pain, nausea, vomiting, hematemesis, belching, regurgitation, dysphagia, epigastric discomfort at the time of hunger, prohibition and awaking of sleep due to epigastric pain, and epigastric pain after stress ($p > 0.05$). Also comparing two groups in the three follow-ups, the changes in general satisfaction were not significant ($p > 0.05$).

Regarding epigastric discomfort after meal, the change in score was positive and significant from before Ramadan to Ramadan in fasting compared with non-fasting patients who had decrease in the score ($p = 0.004$). Regarding this symptom, the scores decreased in each group from Ramadan to after Ramadan and although the decrease in score was more in fasting compared with non-fasting group, but no significant difference was seen ($p = 0.33$).

DISCUSSION

Fortunately our case and control patients were matched regarding age, sex, education, and underlying diseases. As we expected, fasting group had no smokers, because as an Islamic rule they obliged not to smoke during fasting. Although there are some controversy about the effects of smoking on functional dyspepsia, based upon the etiology of dyspepsia it may deteriorate dyspepsia symptoms 20-22 and avoiding smoking in fasting people may contribute in improving dyspepsia

symptoms. However up to 75% of patients with uninvestigated dyspepsia have functional dyspepsia(8).

The LDQ is a valid tool for assessing the presence and severity of dyspepsia(19). it contains dyspepsia symptoms including epigastric pain, retrosternal pain, regurgitation, nausea, vomiting, belching, early satiety, and dysphagia. Fasting and non-fasting patients had no significant difference before and during Ramadan regarding these symptoms and even after Ramadan, fasting group had less symptoms. Both fasting and non-fasting patients had decreases in these symptoms during the 3 months of follow up and although the decreases have been less from before Ramadan to Ramadan, and more from Ramadan to after Ramadan in fasting compared with non-fasting groups, these changes were not significant. The decrease in these symptoms may be due to usual conservative medical treatment in our patients for moral reasons.

Also Ramadan fasting had no effects on other symptoms such as epigastric pain, burning, heaviness and bloating, early satiety, retrosternal pain, nausea, vomiting, hematemesis, belching, dysphagia, epigastric discomfort at the time of hunger, prohibition and awaking of sleep due to epigastric pain, and epigastric pain after stress. Ramadan fasting had no effects on general satisfaction of patients concerning about their health.

Our study showed that generally Ramadan fasting had no obvious effects on dyspepsia symptoms. Although a few studies have shown that during Ramadan gastrin, pepsin, and acid secretion are increased 22-59% at day 10 and return to pre-Ramadan level one month after Ramadan(13-15). and gastric acidity is an aggravating factor for dyspepsia symptoms(10), gastric acidity is only one factor in dyspepsia symptoms. It is believed that functional dyspepsia is due to complex interaction of physiological and psychosocial factors such as generalized anxiety disorder, somatization, and mood disorders(11,12). Fasting people feel calm during Ramadan due to praying, and attention to God. They have good feeling of doing their duty and spiritual rewards. In our study fasting group during Ramadan had more decrease in epigastric pain after stress compared with non-fasting group; however this change was not significant. On the other hand stopping smoking and alcohol use in fasting group

Table 3: Comparing each question of the questionnaire between fasting and non-fasting groups

Variable	Fasting group	Non-fasting group	p value
Epigastric pain			
BR-R SC*	-0.13	-0.52	0.544
R-AR SC*	-0.42	-0.56	0.731
Epigastric burning			
BR-R SC	-0.22	-0.26	0.737
R-AR SC	-0.26	-0.79	0.204
Epigastric heaviness			
BR-R SC	-0.32	-0.72	0.369
R-AR SC	-0.55	-0.51	0.723
Epigastric bloating			
BR-R SC	-0.32	-0.53	0.488
R-AR SC	-0.19	0.05	0.339
Early satiety			
BR-R SC	-0.06	-0.26	0.386
R-AR SC	-0.77	-0.23	0.218
Retrosternal pain			
BR-R SC	-0.39	-0.18	0.470
R-AR SC	-0.29	-0.46	0.691
Nausea			
BR-R SC	0.26	-0.33	0.216
R-AR SC	-0.91	-0.38	0.431
Vomiting			
BR-R SC	0.13	-0.18	0.346
R-AR SC	-0.49	-0.23	0.483
Hematemesis			
BR-R SC	-0.11	0.07	0.151
R-AR SC	0.00	-0.10	0.204
Belching			
BR-R SC	-0.61	-0.36	0.682
R-AR SC	-0.35	-0.18	0.850
Regurgitation			
BR-R SC	0.10	-0.12	0.246
R-AR SC	-0.21	-0.18	0.463
Dysphagia			
BR-R SC	-0.20	-0.39	0.758
R-AR SC	-0.68	0.08	0.118
Epigastric discomfort after meal			
BR-R SC	0.01	-0.97	0.004#
R-AR SC	-0.87	-0.44	0.330
Epigastric discomfort at the time of hunger			
BR-R SC	-0.39	-0.41	0.670
R-AR SC	-0.03	-0.12	0.440

Variable	Fasting group	Non-fasting group	p value
Prohibition of sleep due to epigastric pain			
BR-R SC	0.15	-0.59	0.147
R-AR SC	-0.59	-0.28	0.589
Awaking due to epigastric pain			
BR-R SC	-0.14	-0.51	0.253
R-AR SC	-0.32	-0.21	0.841
Epigastric pain after stress			
BR-R SC	-0.29	-0.15	0.902
R-AR SC	-0.01	-0.44	0.547
General satisfaction			
BR-R percent change	2.42	8.33	0.196
R-AR percent change	3.39	-0.26	0.420

* BR-R SC: before Ramadan to Ramadan mean score change, R-AR SC: Ramadan to after Ramadan mean score change
#significant

improve dyspepsia symptoms(20-23).

In a study in Iran on patients with acute upper GI bleeding, fasting group had more dyspepsia symptoms in general (38%) than non-fasting group (18.9%)(18). Patients with acute upper GI bleeding have more severe disease and more probable dyspepsia symptoms, but our patients were outpatients and more stable.

Another suspicious factor that may affect dyspepsia symptoms during fasting is taking large volume of meals in sunset and before dawn. Impaired gastric motility and compliance have been reported in patients with dyspepsia(9). Our study was in concordance with this physiopathology of dyspepsia in that epigastric discomfort after meal was more during Ramadan compared with before and after Ramadan. Fasting people eat nothing during daytime but many of them may consume large volume of meals in sunset and before dawn. Thus we recommend fasting people specially patients with dyspepsia not to consume large volume of meals in sunset (Iftar) and before dawn (Suhur). They can eat a snack 2 or more hours after sunset meal (Iftar).

In a trial a significant decrease in symptom severity of dyspepsia was seen in fasting patients with the use of omeprazole twice daily compared with placebo(24). So patients with dyspepsia can fast during Ramadan after consulting with their physicians for routine evaluation and conservative treatment to minimize their dyspepsia symptoms.

This study was performed for the first time with

exact methodology and more studies for confirmation of the results are needed.

CONCLUSION

Ramadan fasting has no effects on various dyspepsia symptoms except for epigastric discomfort after meal, which is aggravated. We recommend patients with dyspepsia that they can fast during Ramadan after consulting with their physicians for routine evaluation and conservative treatment to minimize their dyspepsia symptoms. The patients are also recommended not to consume large-volume meals in Iftar and Suhur.

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CONFLICT OF INTEREST

The authors declare no conflict of interests related to this work.

REFERENCES

1. Meo SA, Hassan A. Physiological changes during fasting in Ramadan. *J Pak Med Assoc* 2015;65:S6-S14.
2. Oztec Z, Bagci T. Effects of fasting Ramadan on compliance with medical treatment. *Ann Saudi Med* 1998;18:479-81.
3. Tack J, Talley NJ, Camilleri M, Holtmann G, Hu P,

- Malagelada JR, et al. Functional gastroduodenal disorders. *Gastroenterology* 2006;130:1466-79.
4. Bytzer P, Talley NJ. Dyspepsia. *Ann Intern Med* 2001;134:815-22.
 5. Malagelada JR. Functional dyspepsia. Insights on mechanisms and management strategies. *Gastroenterol Clin North Am* 1996;25:103-12.
 6. Amini E, Keshteli AH, Jazi MS, Jahangiri P, Adibi P. Dyspepsia in Iran: SEPAHAN Systematic Review No. 3. *Int J Prev Med* 2012;3:S18-25.
 7. Yazdanpanah K, Moghimi N, Yousefinejad V, Ghaderi E, Azizi A, Nazem SF. Dyspepsia prevalence in general population aged over 20 in the west part of Iran. *J Pak Med Assoc* 2012;62:672-6.
 8. Talley NJ, Silverstein MD, Agréus L, Nyrén O, Sonnenberg A, Holtmann G. *Gastroenterology* 1998;114:582-95.
 9. Karamanolis G, Caenepeel P, Arts J, Tack J. Association of the predominant symptom with clinical characteristics and pathophysiological mechanisms in functional dyspepsia. *Gastroenterology* 2006;130:296-303.
 10. Samsom M, Verhagen MA, vanBerge Henegouwen GP, Smout AJ. Abnormal clearance of exogenous acid and increased acid sensitivity of the proximal duodenum in dyspeptic patients. *Gastroenterology* 1999;116:515-20.
 11. Drossman DA, Creed FH, Olden KW, Svedlund J, Toner BB, Whitehead WE. Psychosocial aspects of the functional gastrointestinal disorders. *Gut* 1999;45 Suppl 2:II25-30.
 12. Goodwin RD, Cowles RA, Galea S, Jacobi F. Gastritis and mental disorders. *J Psychiatr Res* 2013;47:128-32.
 13. Hakkou F, Tazi A, Iraqui L, Celice-Pingaud C, Vatié J. The observance of Ramadan and its repercussion on gastric secretion. *Gastroenterol Clin Biol* 1994;18:190-4.
 14. Iraki L, Bogdan A, Hakkou F, Amrani N, Abkari A, Touitou Y. Ramadan diet restrictions modify the circadian time structure in humans. A study on plasma gastrin, insulin, glucose, and calcium and on gastric pH. *J Clin Endocrinol Metab* 1997;82:1261-73.
 15. Iraki L, Abkari A, Vallot T, Amrani N, Khelifa RH, Jellouli K, et al. Effect of Ramadan fasting on intragastric pH recorded during 24 hours in healthy subjects. *Gastroenterol Clin Biol* 1997;21:813-9.
 16. Kadri N, Tilane A, El Batal M, Taltit Y, Tahiri SM, Moussaoui D. Irritability during the month of Ramadan. *Psychosom Med* 2000;62:280-5.
 17. Darvish Moghadam S. Relative frequency of minor digestive symptoms in healthy fasting Muslims and their relation to dietary pattern. *Med J Mashhad Univ Med Sci* 2002;45:56-66.
 18. Emami M, Rahimi H. Effects of Ramadan fasting on acute upper gastrointestinal bleeding due to peptic ulcer. *J Res Med Sci* 2006;11:170-5.
 19. Moayyedi P, Duffett S, Braunholtz D, Mason S, Richards ID, Dowell AC, et al. The Leeds Dyspepsia Questionnaire: a valid tool for measuring the presence and severity of dyspepsia. *Aliment Pharmacol Ther* 1998;12: 1257-62.
 20. Massarrat S. Smoking and gut. *Arch Iran Med* 2008;11:293-305.
 21. Wildner-Christensen M, Hansen JM, De Muckadell OB. Risk factors for dyspepsia in a general population: non-steroidal anti-inflammatory drugs, cigarette smoking and unemployment are more important than Helicobacter pylori infection. *Scand J Gastroenterol* 2006;412:149-54.
 22. Talley NJ, Weaver AL, Zinsmeister AR. Smoking, alcohol, and nonsteroidal anti-inflammatory drugs in outpatients with functional dyspepsia and among dyspepsia subgroups. *Am J Gastroenterol* 1994;89:524-8.
 23. Halder SL, Locke GR 3rd, Schleck CD, Zinsmeister AR, Talley NJ. Influence of alcohol consumption on IBS and dyspepsia. *Neurogastroenterol Motil* 2006;18:1001-8.
 24. Chandra E, Ndraha S. Effect of Omeprazole to Dyspeptic Symptom on Ramadan Fasting Patient based on Dyspepsia Symptoms Severity Index Scores. *Indonesian J Gastroenterol Hepatol Dig Endosc* 2013;14:69.