

1. Cancer Research Center, Cancer Institute of Iran, Tehran University of Medical Sciences, Tehran, Iran.
2. Cancer Research Center, Mashhad University of Medical Sciences, Mashhad, Iran.
3. Gastrointestinal Cancer Research Center, Imam Khomeini Hospital, Mazandaran University of Medical Sciences, Sari, Iran.
4. Golestan Research Center of Gastroenterology and Hepatology, Golestan University of Medical Sciences, Gorgan, Iran.
5. Department of Public Health, School of Public Health, Bushehr University of Medical Science, Bushehr, Iran.
6. Partoo Radiotherapy Oncology Center, Urmia, Iran.
7. Radiotherapy Research Center, Cancer Institute of Iran, Tehran University of Medical Sciences, Tehran, Iran.
8. Cancer Research Center, Shahid Beheshti University of Medical Sciences, Tehran, Iran.
9. Cancer Biology Research Center, Cancer Institute of Iran, Tehran University of Medical Sciences, Tehran, Iran.

***Corresponding Author:**

Kazem Zendeheel, MD, Ph.D
Cancer Research Center, Cancer Institute of Iran, Tehran University of Medical Sciences, Tehran, I.R. Iran.

Tel: (+98)912 719 3107

Email address: kzendeheel@tums.ac.ir



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Multicenter Survey of Ramadan Fasting among Cancer Patient and Healthcare Professionals in the I.R. Iran

Farzad Maleki¹, Hamideh Rashidian¹, Bahareh Sasanfar¹, Azam Majidi¹, Fatemeh Toorang¹, Azin Nahvijou¹, Fatemeh Homaei Shandiz², Ghasem Janbabaei³, Samaneh Borhani³, Gholamreza Roshandel⁴, Zahra Sedaghat⁵, Maryam Marzban⁵, Ali Ghanbari Motalgh³, Davood Mohammadzadeh⁶, Ali Kazemian⁷, Mohammad Ali Mohagheghi⁸, Kazem Zendeheel^{*.1,9}

A B S T R A C T

Background: Muslim cancer patients and healthcare professionals face several challenges about the necessity of fasting and its possible side effects during the holy month of Ramadan. We aimed to study the prevalence of fasting among cancer patients during Ramadan and opinions of health care professionals about fasting among cancer patients in Iran.

Methods: We conducted a cross-sectional survey during the Ramadan (July-August) in 2013. Participants were 620 cancer patients and, 187 healthcare professionals in several cancer clinics from different provinces of Iran. We used self-administered questionnaires and collected data from patients, and healthcare professionals to collect data. We performed descriptive analysis by using Stata statistical software.

Results: Out of 620 patients who participated in this study, 428 (69%) were women. 76 (13%) of patients had fasted for at least a day during Ramadan and, from which 41 (7%) had fasted whole months because of their religious belief. Among patients who had refrained from fasting, the reasons were lack of sufficient physical strength (403, 65%), excessive thirst (141, 23%). 275 (44%) of participants had consulted with their physician about fasting. We found that more than 50% of physicians advised against fasting for patients following surgery, pre-operation, recent hospitalization, and consumption of oral or intravenous chemotherapy. Most of the healthcare professionals (68%) believed that cancer survivors could not fast even if they have no signs or symptoms or side-effects after the treatment.

Conclusion: Although most of the cancer patients refrain from fasting, some cancer patients practice fasting and face challenges during the holy month of Ramadan in Iran. Most patients consult about fasting in Ramadan with their doctor who has variable opinions about this issue. Development of guidelines for healthcare professional and cancer patients regarding Ramadan fasting is needed.

Keywords: Cancer patients, Behavior, Fasting, Ramadan, Clinician, Opinion, Iran

INTRODUCTION:

Each year, 14.1 million new cases of cancer occur, and 4.2 million patients die of cancer worldwide¹. In Iran, 84,000 new cases of cancer and 53,000 cancer deaths occur yearly². More than 20% of the world population with a total number of 1.6 billion people are Muslims³.

Reduced energy intake is a dietary regimen aiming to limit total calorie intake to 20%-40% of an ordinary diet, without limiting intake of vitamins or micronutrients⁴. This regimen can be achieved by either reducing calorie intake, or by complete fasting⁵. During the Ramadan, Muslims refrain from eating foods, drinking water, use of medications, tobacco use, etc. from dawn until dusk⁶. Fasting is one of the leading methods of reducing energy intake, leading to decrease of growth and increase of apoptosis (programmed cell death) among cancer cells⁷. A more significant decrease in tumor size may occur in patients who combined fasting with chemotherapy, and improvement in response to treatment remains after 300 days. Another positive effect of fasting is a 40% decrease in metastases among cancer patients. Patients also experience fewer side-effects following chemotherapy, especially GI problems and fatigue^{8,9}. Fasting has been shown to decrease the risk of several common side-effects of chemotherapy among cancer patients⁹. Cancer and its treatment methods induce certain side-effects such as appetite loss, nausea, vomiting, diarrhea and oral ulcers among cancer patients which in turn, decrease energy intake. This coincides with a sharp increase in metabolism, mostly as a result of tumor growth, leading to a greater need for energy intake. Increased energy requirement, combined with decreased intake, leading to weight loss in many cancer patients. In fact, weight loss is one of the first symptoms of cancer, and one of the main reasons for decreased quality of life among cancer patients^{10,11}. However, the issue of fasting among cancer patients is complicated, since,

in some circumstances, fasting may harm the patient. For instance, some patients require a certain amount of water and dietary intake to prevent dehydration, malnutrition and kidney damage. Therefore, one needs to be cautious take different aspect of the disease when advising the cancer patients about fasting¹².

With the start of Ramadan, cancer patients have many questions and concerns regarding the necessity of fasting, and its effects on their condition and treatment. Muslim cancer patients may experience guilt or shame if they refrain from fasting. Many patients refer to their oncologists for counseling, and many doctors rely on their judgment or previous experiences when giving patients advice. For instance, some oncologists may themselves feel guilty if they advise patients against fasting, and therefore prefer to give neutral advice. Many Muslims are eager to know about the health effects of fasting on cancer patients^{12,13}.

No study has reported the prevalence of fasting among cancer patients and the behavior of health professional regarding this issue in Iran. We aimed to assess the prevalence of fasting among cancer patients and studied opinion of oncologists and other healthcare professional about fasting among cancer patients.

METHODS:

We carried out a multi-center cross-sectional study during the Ramadan month (July-August 2013), on adult (18 years of age or older), patients diagnosed with cancer at some cancer centers and clinics and general hospitals that admit cancer patients, Tehran, Fars, Khorasan-Razavi, Golestan, Mazandaran, and West Azerbaijan provinces. We recruited the patients from the outpatient and inpatient of the medical oncology, hematology, and radiotherapy departments. Eligible cases at the time of interview were histopathologically confirmed cancers. Patients with severe symptoms and those were in the pre-terminal status and could not complete the questionnaire were excluded.

We interviewed 620 cancer patients and, to assess their fasting status and opinions about fasting, We interviewed the cancer patients by a structured questionnaire and collected information about fasting experience during the diagnosis and treatment. In addition, we collected data from 187 healthcare professionals about their opinion about fasting in cancer patients, using a self-administered questionnaire.

We designed our questionnaires by using literature review and checked content and face validity of the questionnaire in expert opinion meetings. Questionnaire for patients included questions on demographic questions, type of cancer, fasting status of the patients before and after the cancer diagnosis, reasons for fasting considering cancer diagnosis, route of consultation for fasting, perceived benefits of fasting despite the cancer diagno-

sis, convincing route of consultation. The questionnaire of the healthcare professional included 15 items about opinions about fasting at different stages of the disease and, treatment methods.

The Ethics Committee of Tehran University of Medical Sciences approved the study (Ethical code: 92-02-5123014). All participants signed a written informed consent and participated voluntarily. We performed descriptive analysis by Stata Statistical Software (Ver. 13, Stata Corp, College Station, TX).

RESULTS:

Out of 620 patients participants, 428 (69%) were female, and 192 (31%) were male. The mean age (SD) of patients was 51 years (14.29) (**Table 1**). Breast cancer (23%) was the most common cancer in this study (**Table2**).

Table 1. Characteristics of cancer patients in a multicenter survey among cancer patients in Iran in Ramadan 2013.

Variables	Value	Number	Percentage
Gender	Male	192	31
	Female	428	69
Age	<50	269	43
	≥50	351	57
Education	Illiterate	125	20
	Primary School	160	26
	Middle School	89	14
	High School/Diploma	157	25
	Associate/ Bachelor Degree	74	12
	Master Degree/ Doctorate	11	2
Center/ Province	Cancer Institute of Iran/Tehran	214	35
	Partoo Radiotherapy Center/ West Azerbaijan	70	11
	Imam Hossein Hospital/Tehran	31	5
	Namazi Hospital/Fars	72	12
	5 Azar Hospital/Golestan	44	7
	Imam Khomeini Hospital/ Mazandaran	50	8
	Omid Hospital/Khorasan-Razavi	139	23

Most of the patients (86%) reported fasting in the years before their cancer diagnosis. While 76 (12%) of participants patients had fasted for at least one day during the Ramadan, only 2% reported fasting on the day of the interview (**Table 3**). Although 35% of cancer patients believed that fasting would pose problems for their health and 23% believed that fasting would be good for them.

Table 2. Distribution of cancer patients based on cancer type in a multicenter survey among cancer patients in Iran in Ramadan 2013.

Cancer type	Number	Percentage
Breast	135	21
Esophagus	42	7
Stomach	42	7
Colorectal	42	7
Leukemia	22	4
Prostate	31	5
Bladder	21	3
Lymphoma	21	3
Hepatocellular	21	3
Lung	30	5
Ovary	22	4
CNS	22	4
Testis	16	3
Retinoblastoma	16	3
Bone sarcoma	16	3
Other	121	19

We found that 275 (44%) patients had consulted with oncologists about fasting, and only 12 (3%) patients had consulted with a religious expert. Oncologists were the most convincing source (43%) of consultation for patients. We found that 51 (67%) patients mentioned that they fast in Ramadan because it brings mental and inner peace (**Table 4**).

More than 50% of physicians and healthcare staff believed that fasting would harm the cancer patients. They believed that cancer patients should not fast even if patients have been completed their treatment, and have no signs of cancer or accompanying diseases, or side-effects of treatment. Only about 20% of healthcare professional agreed that patients are free to fast a month after completing radiotherapy, and without acute side-effects of treatment (**Table 5**).

DISCUSSION:

We conducted a multi-center cross-sectional survey in Iran among cancer patients and healthcare professionals working in the health centers admitting cancer patients and evaluated fasting status of cancer patients during Ramadan month and assessed opinions of healthcare staff about Ramadan fasting in cancer patients. We found that 12.3% of Iranian cancer patients admitted to health centers during Ramadan reported ever fasting during Ramadan in the current year. We also found that patients mainly follow advice from their clinicians about fasting. On the other hand, clinicians and healthcare staffs who are the primary source of information had a variable opinion on their advice to the patients. In a study conducted in Egypt¹⁴, and Turkey¹⁵, 60% and 15% of cancer patients reported fasting, respectively. In our study, although 86% of patients were fasting in previous years before the diagnosis, only 12.3 tried fasting during Ramadan before hospitalization in the current

Table 3. Prevalence of fasting before and after the cancer diagnosis of cancer in a multicenter survey among cancer patients in Iran in Ramadan 2013.

Question	Yes, N (%)	No, N (%)
Have you ever fasted at in Ramadan this year?	76 (12)	534 (88)
Did you fast in Ramadan of previous years?	466 (86)	76 (14)

Table 4. Opinions of cancer patient about fasting in a multicenter survey among cancer patients in Iran

Question	Patient Responses	N (%)
What were the reasons for fasting this year, considering your cancer diagnosis?	Religious Duty	41 (54)
	Not being bad for their health	14 (19)
	Acquiring mental peace	18 (24)
	Weight Loss	2 (3)
	Other	1(1)
Did you consult with anyone about whether or not to fast?	Specialist Physician	275 (44)
	Nurse	3 (0.005)
	Religious expert	22 (4)
	Family and Friends	34 (6)
	Personal investigation and internet searches	64 (10)
	Other	2 (0.03)
Of those whom you consulted with, whose advice did you find more convincing?	Specialist Physician	265 (43)
	Nurse	3 (0.05)
	Religious expert	15 (2)
	Family and Friends	24 (4)
	Personal investigation and internet searches	50 (8)
	Other	16 (3)
What benefits has fasting had for you?	Acquiring mental peace	51 (67)
	Weight loss	7 (9)
	Feeling better	5 (7)
	Increased disease tolerance	3 (4)
	Increased life expectancy	6 (8)
	Other	4 (5)

Table 5. Opinions of healthcare professional about fasting in cancer patients during the different stages of the disease. (all figures are numbers and percentages).

Question	Fasting does not pose any harm to the patient, and it is their choice	I would not advise a patient to fast	Unable to comment
Patients admitted and awaited surgery	19 (11)	126 (72)	29 (17)
Patients admitted following a surgery	39 (22)	94 (53)	45 (25)
Until a week after surgery	29 (16)	101 (56)	49 (27)
More than a month after surgery without any evident side effect	23 (38.3)	22 (36.7)	15 (25)
Patient with GI cancer has undergone surgery, with an insertion of a stoma bag, more than a month ago.	18 (10)	112 (63)	49 (27)
The patient is receiving a multi-drug chemotherapy regimen and refers to the hospital on a weekly basis	9 (5)	131 (74)	38 (21)
The patient is receiving a single-drug chemotherapy regimen and refers to the hospital on a weekly basis	21 (12)	111 (62)	47 (26)
A patient is under oral chemotherapy regimen	28 (15)	103 (57)	50 (28)
A week has passed since chemotherapy completion, with no acute side-effects	34 (19)	99 (55)	48 (27)
More than a month has passed since completion of chemotherapy, and the patient has no acute side-effects	35 (19)	92 (51)	53 (29)
Patients who are currently undergoing radiotherapy	49 (27)	81 (45)	51 (28)
A week has passed since radiotherapy completion, with no acute side-effects	27 (15)	106 (59)	46 (26)
More than a month has passed since completion of chemotherapy, and the patient has no acute side-effects	39 (22)	100 (56)	41 (23)
Treatment was completed, but the patient is weak or cachectic	15 (8)	135 (75)	31 (17)
Primary treatment has been completed, and the patient shows no signs of illness or side-effects of treatment, and only refers to the clinic for follow-up.	57 (32)	82 (46)	40 (22)

year. These results were similar to a study in Turkey, where 93.1% of patients reported fasting before cancer diagnosis, and it dropped to 15% after diagnosis, and initiation of the treatment¹⁵. Also Based on the laws of Islam, patients are not allowed to fast if suffering from a chronic, severe or terminal disease^{16,17}. Some studies have shown that patients do not take their medication regularly during Ramadan^{18,19}.

In our study, we found that 44% of patients had consulted with a physician about fasting in Ramadan. In similar studies conducted in Turkey and Egypt, 20.8% and 46.2% of patients had consulted with a doctor about fasting, respectively. These variations in statistics may be due to differences in culture, the point of views, traditions, and behaviors. The level of belief on religion plays an essential role in supporting the patient in the treatment process and may affect clinical outcomes¹⁵. Fasting management is very complicated among Muslim cancer patients and requires the involvement of a multidisciplinary team of an oncologist, nutritionist, psychiatrist and, psychologist with proper insights on cultural and religious beliefs in Muslim countries^{20,21}. In this study, more than 50% of physicians and health-care professional disagree with cancer patients fasting. Some studies have shown that dehydration due to fasting may increase the risk of renal failure among patients who undergo chemotherapy^{16,22}. A proper patient-physician relationship may not be available, especially if the doctors do not care religious beliefs and attitudes of the patient for Ramadan fasting²³. Therefore oncologist worries that the patients may taper their drugs or stop using them altogether because of fasting. Ideally, multidisciplinary team of oncologists, psychologists, and religious experts would provide more reliable advice about fasting among cancer patients

during Ramadan. Religious experts can play an essential role in advising cancer patients about fasting by providing sufficient amount of information^{12,24}. Most of the physicians stated that the most crucial barrier in this regard is lack of sufficient scientific evidence to decide whether or not a patient should fast. While the advice of the 43 percent of patients was more convincing for patients, some physicians were unable to comment in the following circumstances. In any case, the answer to the question of whether or not a patient should fast is complicated, since no single guideline exists, primarily related to patients who have completed treatment, and the decision is strongly dependent on the physical strength of patients and their conditions. Cautious advice is needed, especially for patients undergoing chemotherapy and radiotherapy, since they have increased nutritional requirements during treatment, and it is too much essential to replace their body fluids lost¹⁶. However, once treatment is completed, and patients show no signs of concurrent diseases such as diabetes, cardiovascular and gastrointestinal diseases, anemia, hyperlipidemia, and hypertension, based on patient age and physical strength, patients may be allowed to fast if they wish so.

In Islamic countries such as Iran, fasting in cancer patients must be considered a religious issue. In our study, 54% of patients claimed they fast as it is a religious duty, whereas only 4% had consulted with a religious expert on the matter. Based on the opinions of religious experts, the decision whether or not to fast depends on whether they find themselves capable of fasting. Role of the physician is to guide them to reach the best decision. In situations in which the patient is unable to reach a decision, the decision on the physician opinion, and the patient must act on their

advice²⁵. Based on the reasons mentioned above, the importance to devise clinical guidelines on fasting in cancer patients for both patients and physicians alike is warranted.

This study was a multicenter survey. Therefore we had a reasonable sample size, and the results can be generalized throughout the country, and this is one of the strengths of the current study. On the other hand, the study incorporates the opinions of both patients and healthcare personals and sheds light on interactions between physicians and patients in this respect. One of the limitations of this study was that we only collected our data from patients from hospitals during Ramadan. Some patients may wait until the end of Ramadan. In addition, data from patients who were discharged from the hospitals before Ramadan and cancer survivors would provide useful information on the fasting status among cancer patients.

In conclusion, although most of the cancer patients refrain from fasting, some patients reporting being fast and face challenges during the month of Ramadan in the I.R. Iran. They usually consult with physicians who seem to have variable opinions about fasting among cancer patients. Oncologists should provide advice to the patients based on proper assessment and consider the type of cancer, the process of diagnosis and treatment, stage of cancer, evaluation of patients performance, etc. to prevent any possible harmful effects. On the other hand, there appears to be a lack of reliable scientific evidence for physicians -as well as patients and their families about fasting during Ramadan. This study was the first of its kind showed the necessity of compilation of a comprehensive clinical guideline regarding fasting among cancer patients. Further research is needed to study Ramadan fasting and its consequences among Iranian cancer patients.

REFERENCES:

1. Torre LA, Bray F, Siegel RL, Ferlay J, Lortet-Tieulent J, Jemal A. Global cancer statistics, 2012. *CA: a cancer journal for clinicians*. 2015;65(2):87-108.
2. Mohebbi E, Nahvijou A, Hadji M, Rashidian H, Seyyedsalehi MS, Nemati S, et al. Iran Cancer Statistics in 2012 and projection of cancer incidence by 2035. *Basic & Clinical Cancer Research*. 2017;9(3).
3. Grim BJ, Hsu B. Estimating the Global Muslim Population: Size and Distribution of the World's Muslim Population. *Interdisciplinary Journal of Research on Religion*. 2011;7.
4. Hursting SD, Kari FW. The anti-carcinogenic effects of dietary restriction: mechanisms and future directions. *Mutation Research/Genetic Toxicology and Environmental Mutagenesis*. 1999;443(1):235-49.
5. Hursting SD, Lavigne JA, Berrigan D, Perkins SN, Barrett JC. Calorie restriction, aging, and cancer prevention: Mechanisms of action and applicability to humans*. *Annual review of medicine*. 2003;54(1):131-52.
6. Chtourou H, Hammouda O, Chaouachi A, Chamari K, Souissi N. The effect of time-of-day and Ramadan fasting on anaerobic performances. *International journal of sports medicine*. 2012;33(2):142.
7. Safdie F, Brandhorst S, Wei M, Wang W, Lee C, Hwang S, et al. Fasting enhances the response of glioma to chemo-and radiotherapy. *PloS one*. 2012;7(9):e44603.
8. Lee C, Longo V. Fasting vs dietary restriction in cellular protection and cancer treatment: from model organisms to patients. *Oncogene*. 2011;30(30):3305-16.
9. Safdie FM, Dorff T, Quinn D, Fontana L, Wei M, Lee C, et al. Fasting and cancer treatment in humans: A case series report. *Aging (Albany NY)*. 2009;1(12):988-1007.
10. Penna F, Baccino FM, Costelli P. Pathogenesis of cancer cachexia. *Pathogenesis*. 2013:20-33.
11. Wheelwright S, Darlington A-S, Hopkinson JB, Fitzsimmons D, White A, Johnson CD. A systematic review of health-related quality of life instruments in patients with cancer cachexia. *Supportive Care in Cancer*. 2013;21(9):2625-36.
12. Iqbal F. What should doctors do about fasting during Ramadan? 2012.
13. Bragazzi NL, Briki W, Khabbache H, Rammouz I, Chamari K, Demaj T, et al. Ramadan Fasting and Patients with Cancer: State-of-the-Art and Future Prospects. *Frontiers in Oncology*. 2016;6(27).
14. Zeeneldin AA, Tahab FM. Fasting among Muslim cancer patients during the holy month of Ramadan. *Annals of Saudi medicine*. 2012;32(3).
15. Tas F, Karabulut S, Ciftci R, Yildiz I, Keskin S, Kilic L, et

- al. The behavior of Turkish cancer patients in fasting during the holy month of Ramadan. *Japanese journal of clinical oncology*. 2014;44(8):705-10.
16. 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 1. *The Journal of Clinical Endocrinology & Metabolism*. 1997;82(4):1261-73.
 17. Shehab A, Abdulle A, El Issa A, Al Suwaidi J, Nagelkerke N. Favorable changes in lipid profile: the effects of fasting after Ramadan. *PloS one*. 2012;7(10):e47615.
 18. Patel T, Magdum A, Ghura V. Does fasting during Ramadan affect the use of topical dermatological treatment by Muslim patients in the UK? *Clinical and experimental dermatology*. 2012;37(7):718-21.
 19. Yakasai AM, Muhammad H, Babashani M, Jumare J, Abdulmumini M, Habib AG. Once-daily antiretroviral therapy among treatment-experienced Muslim patients fasting for the month of Ramadan. *Tropical doctor*. 2011;41(4):233-5.
 20. Holt-Lunstad J, Steffen PR, Sandberg J, Jensen B. Understanding the connection between spiritual well-being and physical health: an examination of ambulatory blood pressure, inflammation, blood lipids and fasting glucose. *Journal of behavioral medicine*. 2011;34(6):477-88.
 21. Ong KJ, Back MF, Lu JJ, Shakespeare TS, Wynne CJ. Cultural attitudes to cancer management in traditional South-East Asian patients. *Journal of Medical Imaging and Radiation Oncology*. 2002;46(4):370-4.
 22. Sarraf-Zadegan N, Atashi M, Naderi GA, Baghai AM, Asgari S, Fatehifar MR, et al. The effect of fasting in Ramadan on the values and interrelations between biochemical, coagulation and hematological factors. *Annals of Saudi medicine*. 2000;20(5/6):377-81.
 23. Khan Khattak MMA, Abu Bakar I, Yeim L. Does religious fasting increase fat free mass (FFM) and reduce abdominal obesity? *Nutrition & Food Science*. 2012;42(2):87-96.
 24. Panju ZI. Patients who fast in Ramadan need better advice. 2012.
 25. Renard J. *The Handy Islam Answer Book*: Visible Ink Press, <https://books.google.com/books?hl=en&lr=&id=NoqDB-wAAQBAJ&oi=fnd&pg=PP1&ots=wGOfvFUA01&sig=h-FaaPJewhfvhZF-MrGewFNjsg6Q#v=onepage&q&f=false>; 2015.