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Original Research

The Attitude of Muslim Cancer Patients Toward Fasting During Ramadan: A Cross-Sectional Study in A Single Iraqi Cancer Center

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Introduction: Fasting of adults during the holy month of Ramadan is an important issue for Muslims as it is one of the five pillars of Islam. Muslim cancer patients usually face perplexities concerning fasting during Ramadan, as it can be exempted because of the cancer disease itself or the complications of its treatment. This issue has received limited attention in the literature and needs more interest and study.

Materials and Methods: This study was conducted on adult Muslim cancer patients who visited the Anbar Cancer Center in Anbar province, Iraq, to receive their treatment cycles during and after Ramadan of the Hijri year 1445 (the period from 11 March 2024 until 7 May 2024). All the consecutively selected patients were interviewed to assess their behaviors during Ramadan and whether they experienced treatment complications. A structured questionnaire was used during the interview, and the severity of treatment-related gastrointestinal side effects was graded using the National Cancer Institute – Common Terminology Criteria for Adverse Events (NCI–CTCAE, version 5.0).

Results: A total of 88 patients participated in this study. Sixty-four (72.7%) were females, and 24 (27.3%) were males. The median age of the participants was 49 years. Breast cancer was the most common cancer, occurring in 39 (44.3%) patients. Fifty-six (63.6%) sought advice regarding fasting from either an oncologist (54.5%) or an Imam (9.1%). Only 37 (42%) patients managed to fast during Ramadan (excluding treatment days), while 51 (58%) could not, mainly due to allowances in Islam (21, 41.2%) or fatigue (16, 31.4%).

Conclusion: Cancer patients who did not fast were more than those who could fast during Ramadan. More than half of the patients sought advice regarding fasting, and most of them discussed this issue with their oncologists. There were no significant changes observed in the treatment-related gastrointestinal toxicities among fasting patients when comparing the fasting period to the post-Ramadan period. Together with related works, the findings of this study may guide physicians, especially oncologists, in mapping a path for cancer patients during Ramadan.

Introduction

The holy month of Ramadan is the ninth month in the Islamic calendar (often called the Hijri calendar based on the important event in Islamic history, the Hijrah or migration of the Prophet

Muhammad from Mecca to Medina in 622 AD, and it follows a lunar system determined by the Moon's monthly phases) [1], and the fasting of Ramadan (sawm in Arabic) is one of the five pillars of Islam. Islamic fasting means refraining from eating, drinking, and sexual intercourse. This abstinence lasts from dawn (Fajr in Arabic) to sunset (Maghreb in Arabic) of each day of Ramadan. Fasting is obligatory for all adult Muslims except those who have excuses, which are determined and listed in the Islamic rules, like acute or chronic severe illness, traveling, menstruating, or others [2-5]. The duration of fasting is from sunrise to sunset, and it differs between different countries and the place of Ramadan in the Gregorian calendar (it can be longer in the summer compared to winter).

During Ramadan, Muslim cancer patients think differently regarding fasting; some of them have a fear of fasting because they believe that fasting may affect their health, aggravate treatment complications, or prevent them from receiving anticancer therapy. Others may feel guilty if they do not fast, although some have an excuse to cancel fasting during the period of acute or chronic severe illness, as stipulated in Islamic rules. The Qur'anic verse (Surah Al-Baqarah 2:185) states: "So whoever is present this month, let them fast. But whoever is ill or on a journey, then let them fast an equal number of days after Ramadan. Allah intends ease for you, not hardship." [6]. The specific Qur'anic foundation and the Islamic jurisprudence (Fiqh) distinguish between temporary illness (requiring make-up missed fasting days later/Qada) and chronic/permanent inability, where there is no hope of recovery (permitting Fidya feeding a poor person for each missed fast) [7, 8]. Islamic law generally seeks to bring benefit and ward off harm, and avoiding actions that cause significant health risks or extreme hardship is an essential objective of the Islamic religion. A Hadith (Prophetic tradition) explicitly states: "Harm should neither be inflicted nor reciprocated" (la darar wa la dirar), which is a major legal maxim in Islamic jurisprudence and a basis for many rulings, including fasting exemptions [9-11].

For Muslims, not fasting may be accompanied by psychological distress like feelings of guilt and/ or shame, social and cultural pressure, and spiritual disconnection [12-15]. Contrary, fasting can result in positive psychosomatic effects like spiritual satisfaction, enhanced self-esteem and control, improved mood and mental well-being, decreased anxiety and depression, emotional resilience, and improved social relationships [14, 16-19]. Hence, fasting can influence the quality of life. For these reasons, cancer patients usually face confusion regarding fasting during Ramadan. So, they need to get advice from healthcare professionals and community religious leaders (Imams) on safe fasting.

Fasting of cancer patients during Ramadan is a substantial issue. It needs extensive studies because of the large number of Muslims around the world, which exceeds 2 billion (nearly a quarter of the total global population) [20], and they share a significantly high number of new cancer cases annually. Our objectives in this study are to assess the behavior of adult Muslim cancer patients regarding fasting during Ramadan in our locality and also to compare the gastrointestinal (GI) side effects of anticancer therapy in fasting patients (a within-subject comparison) during and after Ramadan, as the rationale for studying GI side effects is the mechanistic relationship with fasting.

Materials and Methods

This cross-sectional study was conducted at the Anbar Cancer Center in Anbar province of Iraq. During the month of Ramadan of the Hijri year 1445 (the period from 11 March 2024 until 9 April 2024) and the following month, adult (16 years or older) Muslim cancer patients who came to receive anticancer therapy cycles (intravenous ± oral) were selected for interview. Patients who were severely ill, patients ˂ 16 years, cachectic (defined according to the international consensus definition [21] as weight loss>5% over the past 6 months in the absence of starvation and/or BMI < 20 kg/m^2 with >2% ongoing weight loss), those who were on hormonal therapy alone (as it carries low toxicity and thus will not negatively affect fasting patients), patients who came for follow-up checks, and those who refused the interview were excluded from this study. By the end of the

determined study period, 88 patients were eligible for the study, and the method of sample collection was consecutive. A formal a priori sample size calculation was not performed; the final sample reflected all eligible cases presenting during the study period.

A structured questionnaire based on validated surveys of relevant published studies in the literature was designed and used during patient interviews [2-5]. This questionnaire consisted of 3 sections: the first included general information about the patient (e.g., date of birth, gender, educational level, occupation, associated comorbidities, cancer type and stage, current oncologic treatment, and performance status). The second section included information about the fasting status of the patients (e.g., if they sought advice for fasting from either the oncologist or the Imam and what their opinions were, if patients did fasting during this Ramadan or not, what was the reason they couldn't fast, and what they felt regarding fasting or non-fasting states). The final section included questions to evaluate the GI side effects of anticancer therapy among the fasting patients when they received the therapies during Ramadan and the following month. The performance status of patients was evaluated using the Eastern Cooperative Oncology Group (ECOG) scale, which is classified by the World Health Organization (WHO) [22]. We used the National Cancer Institute – Common Terminology Criteria for Adverse Events (NCI–CTCAE, version 5.0) to grade the anticancer- treatment-related GI side effects [23]. We focused on GI side effects, as this is the primary system that is usually affected by fasting. Also, a comparison was made between the treatment-related GI side effects in fasting patients during and after Ramadan (the schedules of treatment, antiemetic prophylaxis, and hydration were the same in the treatment cycles during and after Ramadan).

The survey questions were in English. To avoid patients' misunderstanding of the questions, the first two authors, who are physicians and fluent in English, interviewed the patients and asked them questions in Arabic, and then the questionnaires were filled out. To minimize the interviewer and social desirability bias, all interviewers used a standardized script with neutral, non-leading phrasing. Also, physicians received brief training on consistent administration techniques and were instructed to avoid providing verbal or nonverbal cues that could influence responses. Participation in this study was optional, and consents (verbal & written) were obtained from patients before data collection began. Ethical approval was obtained from the health department's ethical committee (No. 20240011, on 7/3/2024), and the principles of the Helsinki Declaration were followed.

The collected data were entered and analyzed using the Statistical Package for the Social Sciences software program (SPSS version 21.0). Nominal and ordinal data were described as frequencies and percentages. The differences among percentages were calculated using the Chi-square test at a significance level of $P \leq 0.05$.

Results

A total of 88 patients were interviewed during the study period. Table 1 shows the characteristics of fasting and non-fasting patients, with a comparison between the variables.

Variables	Fasting	Non-fasting	P value
	No. (%)	No. (%)	
No. of patients (Total = 88) (Median = 49)	37 (42)	51 (58)	P>0.05
Age in years			
˂ 60	31 (83.8)	36 (70.6)	P>0.05
> 60	6 (16.2)	15 (29.4)	P<0.05
Gender			
Male	12 (32.4)	12 (23.5)	1
Female	25 (67.6)	39 (76.5)	P>0.05

Educational level			
Literate	32 (86.5)	42 (82.4%)	P>0.05
Illiterate	5 (13.5)	9 (17.6%)	P>0.05
Occupation			
Employed	12 (32.4)	10 (19.6)	P>0.05
Non-employed	25 (67.6)	41 (80.4)	P<0.05
Associated comorbidities			
Nil	27 (73)	29 (56.8)	P>0.05
Single comorbidity	8 (21.6)	16 (31.4)	P>0.05
Multiple comorbidities	2 (5.4)	6 (11.8)	P>0.05
Type of cancer			
Breast cancer	15 (40.5)	24 (47)	P>0.05
Gastrointestinal cancers	5 (13.5)	12 (23.5)	P>0.05
Genitourinary cancers	7 (19)	3 (5.9)	P>0.05
Sarcomas	2 (5.4)	4 (7.8)	P>0.05
Head and neck cancers	1 (2.7)	3 (5.9)	P>0.05
Skin cancer	1 (2.7)	1 (2)	1
Neuroendocrine tumors	1 (2.7)	1 (2)	1
Hematological malignancies	5 (13.5)	3 (5.9)	P>0.05
Cancer stage			
Non-metastatic	22 (59.5)	31 (60.8)	P>0.05
Metastatic	15 (40.5)	20 (39.2)	P>0.05
Current Oncologic Treatment			
Single-agent	11 (29.7)	12 (23.5)	P>0.05
Multiple agents	26 (70.3)	39 (76.5)	P>0.05
ECOG Performance Status			
0	27 (73)	29 (56.8)	P>0.05
1	4 (10.8)	5 (9.8)	P>0.05
2	4 (10.8)	6 (11.8)	P>0.05
3	2 (5.4)	10 (19.6)	P<0.05
4	0 (0)	1 (2)	1

Table 1. Characteristics of Fasting and Non-fasting Patients.

Sixty-four (72.7%) were females, and 24 (27.3%) were males. The median age of the participants was 49 years, ranging between 16 and 81 years. Patients above the age of 60 years were common in the non-fasting group (P<0.05). Most studied patients (84%) were literate, while 16% had no education. Non-employed patients were common in the non-fasting group (P<0.05). Regarding associated chronic diseases, 24 (27.3%) patients had a single comorbidity, and only 8 (9%) had multiple comorbidities. Breast cancer was the most common cancer among the patients (44.3%), followed by GI cancers (19.3%), then genitourinary cancers (11.4%). Fifty-three (60%) of the cases had non-metastatic cancers, while 35 (40%) were diagnosed with metastatic diseases. Most participants (73.9%) received treatment protocols with multiple anticancer therapy drugs. In general, the health condition of most of the patients was very good, with 63.6% being at grade 0 on the ECOG performance status scale. Grade 3 performance status was significantly common in the non-fasting group (P<0.05).

The attitude of the studied patients regarding fasting during Ramadan is displayed in Table 2.

Variable	Frequency	Percentage	P value
	(Total No. = 88)		
Are you fasting in this Ramadan?			

Yes	37	42	P>0.05
No	51	58	
Oncologist’s advice regarding fasting when consulted:			
Discourage fasting	38		
Encourage fasting	5	43.20	
Equivocal (As you want)	5	5.70	
The Imam’s advice regarding fasting when consulted:		5.70	
Discourage fasting	4	4.50	
Encourage fasting	1	1.10	P<0.001
Equivocal (As you want)	3	3.40	
No consultation was taken regarding fasting	32	36.40	
If fasting, how do you feel?			
Satisfied & happy	32	36.40	
Worried & stressed	0	0	
No effect	5	5.70	
If you did not fast, how do you feel?			
Guilty & sad	19	21.60	P<0.001
At peace	18	20.40	
No effect	14	15.90	
Reasons for non-fasting (Total No. = 51):			
Allowed in Islam	21	41.20	
Nausea/vomiting/diarrhea	4	7.80	
Fatigue	16	31.40	P<0.001
According to the oncologist's advice	7	13.70	
Surgery was done during Ramadan	3	5.90	

Table 2. Attitude of Patients Regarding Fasting During Ramadan.

Only 37 (42%) of patients were able to fast during Ramadan (except the days of receiving treatment cycles), while 51 (58%) of them couldn’t fast. They attributed the non-fasting state mainly to allowance in Islam (41.2%), which has a very significant difference from other reasons (P<0.001). Allowance in Islam, as one of the reasons for non-fasting, reflected the patients’ own interpretation of Islamic law in decision- making concerning the fasting state. Fifty-six (63.6%) of patients looked for advice regarding fasting either from an oncologist (48 patients) or an Imam (8 patients), while 32 (36.4) of them did not consult. Discouraging fasting was mainly the oncologist’s advice when consulted by the patients, and it was a very significant difference from others (P<0.001). Most of the fasting patients (36.4%) were satisfied and happy regarding their fasting, and this showed a very significant difference from other patients’ feelings (P<0.001). Non-fasting patients were nearly equal in their feelings regarding the non-fasting state between guilty and sad (21.6%), at peace (20.4%), and no effect (15.6%).

Regarding treatment-related GI side effects in fasting patients during and after Ramadan, most did not experience side effects (see Table 3).

Variables	During Ramadan	After Ramadan	P value
	No. (%)	No. (%)	
Oral Mucositis			
0	32 (86.5)	30 (81.1)	P>0.05

1	4 (10.8)	4 (10.8)	1
2	1 (2.7)	3 (8.1)	P>0.05
3	0 (0)	0 (0)	1
4	0 (0)	0 (0)	1
Dysgeusia			
0	21 (56.8)	16 (43.2)	P>0.05
1	15 (40.5)	20 (54.1)	P>0.05
2	1 (2.7)	1 (2.7)	1
Nausea			
0	23 (62.2)	18 (48.7)	P>0.05
1	8 (21.6)	13 (35.1)	P>0.05
2	5 (13.5)	6 (16.2)	1
3	1 (2.7)	0 (0)	1
Vomiting			
0	35 (94.6)	33 (89.2)	P>0.05
1	0 (0)	3 (8.1)	1
2	2 (5.4)	1 (2.7)	P>0.05
3	0 (0)	0 (0)	1
4	0 (0)	0 (0)	1
Abdominal pain			
0	20 (54.1)	21 (56.8)	P>0.05
1	13 (35.1)	11 (29.7)	P>0.05
2	4 (10.8)	5 (13.5)	P>0.05
3	0 (0)	0 (0)	1
Diarrhea			
0	28 (75.7)	27 (73)	P>0.05
1	7 (18.9)	4 (10.8)	P>0.05
2	2 (5.4)	5 (13.5)	P>0.05
3	0 (0)	1 (2.7)	1
4	0 (0)	0 (0)	1
Constipation			
0	26 (70.3)	29 (78.4)	P>0.05
1	11 (29.7)	8 (21.6)	P>0.05
2	0 (0)	0 (0)	1
3	0 (0)	0 (0)	1
4	0 (0)	0 (0)	1

Table 3. Assessment of Fasting Patients Regarding Gastrointestinal Side Effects of Treatment During and after Ramadan (Total = 37 patients).

Grade 1 treatment toxicity was the main grade that the patients faced during and after Ramadan, then grade 2, while grades 3 and 4 rarely happened. There were no significant differences in any GI toxicity category during versus after Ramadan, with p-values ranging from 0.05 to 1.00 across all assessed toxicities.

Discussion

Although Iraq is a Muslim country, more than half of our studied patients did not fast during Ramadan.

Islam permits omitting Ramadan fasting in different situations, like patients with critical diseases

such as cancer, especially those under toxic treatments or with advanced disease stages, as it could lead to complications. Therefore, allowance in Islam, as reported by most of the non-fasting patients, was the main reason behind the non-fasting state in this study. Similar findings regarding a non-fasting state were seen in similar studies in other Muslim countries like Turkey, Pakistan, and Iran [3, 5, 24]. Still, other studies showed that most cancer patients could fast wholly or partially during Ramadan [2, 4, 25].

This study found that non-fasting patients above 60 with a performance status of 3 were significantly higher than fasting patients ($P<0.05$). These factors could be predictors of the non-fasting state among cancer patients. This finding is in agreement with that reported by Zeeneldin et al. [2], Tas et al. [3], Alghamdi et al. [4], and Rasheed et al. [5].

Fasting is essential for Muslims due to its spiritual values [26, 27]. Although many Muslim patients have the excuse to omit fasting according to Islamic rules, most of our Muslim cancer patients usually wish to fast during Ramadan. This was seen in this study through two significant findings: first was that most patients took the advice of either the treating oncologist or the Imam regarding the possibility of fasting, and second was the satisfaction and happiness of most patients when fasting. Beyond the physical aspects of fasting, our findings highlight a notable psychological burden among patients who were unable to fast, many of whom reported feelings of guilt or sadness. Religious practices such as fasting can serve as powerful coping mechanisms for Muslim cancer patients, and the inability to participate may contribute to emotional distress and diminished spiritual well-being. This underscores the need for proactive psycho-oncology support to help patients navigate feelings of guilt, conflict, or spiritual disconnection when medical circumstances prevent fasting. Integrating culturally sensitive psychological & social supports within oncology care may therefore play an important role in addressing these concerns, particularly in Muslim-majority contexts where religious identity is central to coping and meaning-making.

In this study, we noticed good patient-oncologist communication, reflected by the finding that 54.5% of the patients consulted their oncologists regarding fasting during Ramadan. The proportion of patients consulting oncologists in our study (54.5%) was higher than that reported in Egypt (46%) [2], Iran (44%) [24], Turkey (20.8%) [3], and Pakistan (18.8%) [5]. These variations could be attributed to differences in socioeconomic status, levels of religious belief, behaviors, and various traditions [3, 24]. Moreover, the patient’s trust in the treating physician and the occasional limited availability of knowledgeable religious scholars are vital in this issue. Most of the consulted oncologists in this study (79.1%) discouraged their patients from fasting, consistent with similar studies [2-4]. The discouraging decision of the oncologists can be explained by their belief in the probable fasting risk to cancer patients, whereby fasting can sometimes aggravate the potential risk of the cancer disease or its treatment on the vital body organs like the renal system, especially if fasting occurs on hot days. Furthermore, fasting requires more rest periods, which may delay treatment cycles and, consequently, affect disease control and response [2, 3, 28].

Fasting is good for the GI system because it directly enhances the gut’s microbial component, function, and interactions with the host. This impact leads to a homeostatic balance, which boosts immunity [29]. Moreover, fasting promotes better digestion by reducing intestinal inflammation and alleviating gastric reflux, which allows the digestive system to rest, repair, and regenerate [18]. This can interpret our finding in this study that there were no serious GI complications of anticancer therapy during fasting. The results of two studies with small sample sizes agreed with ours, and they showed no detrimental chemotherapy side effects related to fasting and suggested that fasting during the period of chemotherapy is safe and feasible [30, 31].

Another important finding of this study was that there were no significant changes regarding the anticancer- related GI side effects between the cycles received by the fasting patients during fasting and non-fasting states. The same finding was also reported by a Saudi study [4] that found no alterations regarding chemotherapy-related or biological therapy-related side effects in

comparison to side effects in the same individuals in fasting and non-fasting states during Ramadan. Two other studies concluded that mouth sores, nausea, vomiting, and diarrhea were virtually absent from the patients in the fasting cycles when they used intermittent fasting [30, 32]. A recent review article concluded that fasting may serve as a beneficial adjunct to cancer therapy, particularly in mitigating chemotherapy- induced side effects and enhancing treatment efficacy [33]. This can be explained by the preservative effect of fasting on normal tissues against the chemotherapy-related side effects by using a process called “differential stress response” [32, 34, 35]. Another explanation is the anti-Warburg effect of fasting, which may positively impact the pharmacokinetics of chemotherapy and could minimize its side effects [36]. However, it is important to acknowledge that most supporting evidence of these explanations comes from preclinical models or from controlled intermittent fasting or fasting-mimicking diet protocols. These regimens differ markedly from Ramadan fasting, which involves daily fasting of variable duration, unrestricted caloric intake during non-fasting hours, and wide cultural differences in meal composition. Therefore, extrapolating mechanistic insights from laboratory or structured fasting studies to Ramadan fasting in cancer patients should be done with caution. For the importance of Ramadan fasting in improving physical and spiritual health [11, 14, 16, 17], Muslim cancer patients can be given the chance to try fasting during Ramadan if they wish. However, this should be under the supervision of the treating oncologist.

Although there are not enough strong scientific evidences (e.g. randomized controlled trials and long- term outcomes) regarding fasting in cancer patients, it is essential for cancer patients, especially those who are under treatment, to share this health-critical issue with a faithful oncologist and a knowledgeable Imam for the sake of safe-state fasting and to avoid unexpected or negligent harms of fasting during the period of therapy or active disease.

This study did not include a predefined sample size calculation, which may limit the statistical power, particularly for subgroup comparisons. As a result, the possibility of Type II error cannot be excluded, and some clinically relevant differences may not have reached statistical significance.

Another limitation of this study is that, although the questionnaire was developed based on validated instruments from previously published studies, no formal psychometric validation (including reliability or construct validity testing) was performed for this specific population. Cross-cultural adaptation procedures were not conducted, and therefore, the questionnaire’s performance in capturing culturally sensitive aspects may be limited.

This study involved multiple subgroup and variable comparisons, which increases the risk of Type I error.

Although individual p-values are reported, no formal adjustment for multiple testing such as Bonferroni correction was applied. As a result, some statistically significant findings, particularly those with marginal p-values, should be interpreted with caution as they may represent chance associations.

According to our knowledge and after extensive research, this is the first study conducted in Iraq to evaluate and highlight the attitude of cancer patients regarding fasting during Ramadan. Although this study is single-center-based research, a good sample size was taken. Comparison of the treatment-related side effects in the same patients during fasting and non-fasting states is a strong point for this study. Further studies in other Iraqi provinces, including more patients, are required to give a broader picture of the behavior of our Muslim patients regarding fasting during Ramadan and how to deal with such an important issue.

In conclusion, our Muslim cancer patients who could fast during Ramadan were fewer than those who did not fast. Patients younger than 60 years with an ECOG performance status <3 were more likely to fast. More than half of the patients looked for advice regarding fasting, and the majority discussed this issue with the treating oncologists.

Because both oncologists and Imams play an essential role in advising cancer patients about fasting, addressing mutual knowledge gaps such as oncologists' limited familiarity with Islamic jurisprudence and Imams' limited understanding of cancer treatment effects is essential. Strengthening interdisciplinary collaboration through targeted education and structured communication is recommended to ensure consistent, well-informed guidance for patients. The pros and cons of fasting should be discussed with patients who want to fast.

The psychological impact of fasting decisions including satisfaction among those who fasted and guilt among some who did not underscores the need for psycho- oncology support integrated with cultural and religious considerations.

There was no significant increase in the anticancer therapy-related GI side effects with fasting.

This study provides preliminary evidence regarding attitudes toward Ramadan fasting among Iraqi cancer patients and identifies the need for clinical guidelines for this important and less-studied topic in our locality.

Authors' Contributions

The first author's contributions were data collection through patients' interviews, data analysis, and manuscript writing. The second author contributed to data collection. The third author reviewed this work and critically analyzed the research and the manuscript.

Conflicts of Interest

The authors declared that there are no conflicts of interest.

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