

Ramadan fasting outcome among high-risk patients.

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Research Article

Keywords: Chronic Kidney diseases, high-risk patients, Ramadan, Fasting, Diabetes Mellites

Posted Date: February 15th, 2022

DOI: <https://doi.org/10.21203/rs.3.rs-1345285/v1>

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Abstract

Background:

The literature is building for guiding the decision for Chronic Kidney Diseases, CKD, patients fasting Ramadan. However, it is mainly considering one outcome, the impact on renal function. This study aims to assess factors influencing Ramadan fasting in patients with CKD.

Method:

This is a prospective before and after cohort study. CKD patients were consoled regarding fasting as part of a quality project and followed Ramadan for renal function status, fasting Ramadan, and other significant outcomes.

Results:

Of these 360 patients who attended the pre-Ramadan consultation, 304 were reachable after Ramadan, and 67.1% of them reported that they did fast, 4.9% attempted to fast but had to stop, and 28% did not fast a single day. They were 55.3% females, compared to 44.7% males (69.9%). They were; stage 3A (68.1%), stage 3B 21.7%, stage 4 7.9% and only 2% were stage 5. Of those who did fast, 11.1% had a drop of eGFR of 20% or more. While those who did not fast (16.7%) had a similar drop. On the other hand, among the few who attempted to fast and had to stop fasting, half had a drop in eGFR of more than 20%. In linear regression, when controlling for the CKD stage, age, gender, and comorbidity, the only predictor of drop-in eGFR was a higher percentage of the drop since last year and a lower eGFR before Ramadan. There were 17 (5.6%) significant events, including one death. More significant events were among the group who did fast, where 50% experienced an adverse event, while 16.7% were among the group who did not fast and 11.1% were among those who did fast.

Conclusion:

Fasting was not a significant determinantal factor in renal function deterioration in the studies population, neither was it having any significant association with adverse events.

Background

All Muslims must fast the ninth month of the Islamic Hijri year unless fasting poses health risks to the individual. Deciding whether an individual is entitled to such an exemption is left to physicians who can balance each patient's benefit and harms. In addition to spiritual benefits, there exist proven metabolic benefits of Ramadan fasting for both healthy individuals and some high-risk groups such as diabetics and CKD patients^{1,2}. Nevertheless, the effect of abstinence from water for long hours, the change in the meal's timings, medications adjustments, poor adherence to medication due to change in eating and sleep patterns, the acute metabolic disturbances, and medicine-related side-effect, all are potential sources of harm for patients with chronic diseases.

Fasting had been shown not to affect the renal function of CKD patients in stable mild/moderate disease stages (stages 1–3) -provided they are appropriately monitored and counseled. However, patients on hemodialysis or peritoneal dialysis were advised not to fast, and if they still chose to do so, they would need careful weekly monitoring³. A recent review by Malik et al. recommended stratifying patients with CKD by CKD severity and their overall condition and advising patients accordingly about fasting³. Similar recommendations were published for diabetic patients as well¹. Nevertheless, these recommendations require validation. The risks or benefits of fasting, especially among higher risk and more vulnerable patients, also need to be better quantified. Studies in the literature mainly focused on specific interventions in such patients with their renal function as the outcome. In practice, CKD contributes to the complexity of various conditions affecting individual patients and cannot be targeted in isolation.

Abu Dhabi Healthcare services-SEHA has a dedicated institution for kidney diseases that centrally identifies all patients with renal impairment and then assigns their care to the appropriate care provider, such as the Ambulatory Healthcare Services (AHS) centers or to the pre-dialysis or dialysis clinics⁴. AHS is the largest network of primary healthcare services in the region and provides structured chronic diseases and population health programs^{5,6}. CKD patients are assigned to their Primary Care Physicians PCP for follow-up and management by their primary care doctors. Additionally, AHS has started a project to counsel newly identified CKD patients before Ramadan on fasting. It includes a consultation with their PCP about their care and management and a nephrologist when needed. Nevertheless, the patient decides to fast, and the role of the PCP is to ensure that the patient is adequately informed. This study describes the follow-up of a cohort of CKD patients who were counseled about Ramadan fasting and tracked possible consequences of their decision to either fast or not.

Patients And Method

This is an observational cohort study of AHS CKD patients from the AHS CKD list shortly before Ramadan 1441 AH/2020 CE. The study is part of two quality projects; the first project aims to provide counseling to high-risk patients on Ramadan fasting. The project includes all chronic diseases patients and is conducted annually before Ramadan since 2016. The second project, also active for several years in AHS, specifically targets CKD patients and manages patients based on centrally generated EMR reports that include all EGFR tests of AHS patients who are called for follow-up in their AHS centers have abnormal renal function tests. In March 2020, before Ramadan (April-May), CKD patients were contacted and counseled on CKD management and fasting during Ramadan. Due to the COVID-19 pandemic, teleconsultation was used as a model of consultation. One month after Ramadan, these patients included in these projects received another call inquiring about any adverse events and whether they fasted. A follow-up renal function test (eGFR and electrolytes) was ordered for patients who were reached. Physicians who did the consultation were family medicine residents under supervision by consultant family physicians. Lists of patients were sent to care coordinators who booked the appointments and sent the list to the residents and supervisors who discussed each patient care plan. The residents next day conducted the teleconsultation and referred to the supervisor for any further

questions or remarks. The residents were instructed to book another consultation mid-Ramadan and one after Ramadan.

Training on the CKD guidelines in Ramadan was discussed before the start of the project. A total of 360 patients had their first teleconsultation. In addition to standard demographic data, information on eGFR, comorbidities, renal function, and lipid profile were recorded. Only 306 answered the phone call after Ramadan, and only 74 did the follow-up renal function test. Fasting status, the occurrence of significant health events, and admission were collected after Ramadan.

Statistical methods.

In addition to standard descriptive analyses and graphs, we used linear regression. We regressed eGFR post-Ramadan on its baseline value, age, and whether patients fasted (fasting=1) or not (fasting=0). Partial fasting was recorded as fasting=0.5.

Results

Of the 360 patients enrolled in this cohort, 48.9% were female and 51.1% male. Most were UAE nationals (69.9%), 66.1% were in stage 3A, 23.6% in stage 3B, 7.2% in stage 4 and only 2.5% were stage 5 (Table 1). Diabetes and hypertension diagnosis was 22.8% and 9.6% respectively. Although a small percentage had both diagnosis, 6.6% documented but 75.4% had neither.

Table 1
subjects characteristics.

		<=40	41-59	>=60	Total
GENDER	Female	3(21.4)	23(41.1)	139(52.7)	176(48.9)
	Male	11(78.6)	33(58.9)	125(47.3)	184(51.1)
Nationality	UAE	7(50)	32(57.1)	191(72.3)	249(69.1)
	Non-UAE	7(50)	24(42.9)	73(27.7)	111(30.8)
CKD Stage	2	0	0	2(0.8)	2(0.6)
	3A	7(50)	40(71.4)	174(65.9)	238(66.1)
	3B	3(21.4)	9(16.1)	68(25.8)	85(23.6)
	4	2(14.3)	6(10.7)	15(5.7)	26(7.2)
	5	2(14.3)	1(1.8)	5(1.5)	9(2.5)
	Hypertension	1(7.1)	5(8.9)	26(9.8)	32(9.6)
	Diabetes Mellitus	2(14.3)	7(12.5)	67(25.4)	76(22.8)
	Diabetes and Hypertension	0	3(5.4)	19(7.2)	22(6.6)
Total		14	56	264	360*
*Age missing in 11 female					

From the 360 patients who attended the pre-Ramadan consultation, 306 were reachable after Ramadan, and 67.1% of them reported that they had fasted, 4.9% had attempted to fast but had to stop, and 28% did not fast a single day. The latter were mainly in the more severe category of CKD, 4 and 5. Of patients reached through phone calls after Ramadan, only 74 underwent a renal function test within SEHA after Ramadan. Figure 1 shows the prevalence of a $\geq 20\%$ drop in eGFR after Ramadan among the three groups. Among patients fasting Ramadan, 11.1% had a drop of eGFR of 20% or more, while among those who did not fast, 16.7% experienced a similar drop. Among the few who attempted to fast and had to stop fasting, half of them had a drop in eGFR of more than 20%.

In linear regression, when controlling for the CKD stage, age, gender, and comorbidity, the only predictor of drop-in eGFR was a higher percentage of the drop since last year and a lower eGFR before Ramadan.

Linear regression of post Ramadan eGRF on its baseline value, age, and fasting yielded regression coefficients of 0.818 ($t=9.3$, $p<0.0001$), -0.130 ($t=-1.80$, $p=0.073$) and -3.48 ($t=-1.57$, $p=0.12$) respectively. So there appears to be no significant adverse effect of fasting on EGFR post-Ramadan, Table 3. There were 17 (5.6%) significant adverse events, including one death. The majority of these events (15) were in

the age group 60 years or older. In addition, six COVID19 infections occurred among the group, all of whom recovered. More significant events were among the group that chose to fast; 26.7% suffered adverse events than only 4.4% in the non-fasting group and 4.4% in the fasting group, figure 2. When those who attempted to fast were combined with those who fasted, the incidence of an adverse event was 5.9%, Table 2. This is compared to 4.4% among those who never attempted to fast. There were 38 admissions among all subjects, with 31 were in the age group 60 years or older. Fasting status showed a similar tendency to the adverse events regarding the similar incidence of admissions in those who did not fast and those who did fast or attempted to, 11.8% vs 10% respectively. The group who attempted and could not continue to fast have a higher hospitalization rate, 20%.

Table 2
Prevalence of Significant outcomes.

	Did not fast	Fasting status		Who did fast any number of days
		Did fast some days	Did fast all Ramadan	
Admitted to hospital (total 32)	10(11.8)	3(20)	19(9.3)	22(10)
Had a significant health event (total 17)	4(4.7)	4(26.7)	9(4.4)	13(5.9)
Total subjects with fasting among is 304.	85(28)	15(4.9)	204 (67.1)	219(72)

Table 3
Significant associations of the change in the eGFR from before Ramadan using Linear regression.

	Unstandardized Coefficients (B)	Std. Error	Standardized Coefficients (Beta)	P value
eGFR	1.206	0.094	0.799	<0.001
Percentage of drop in eGFR	36.017	6.896	0.324	<0.001

Discussion

Fasting was an individual choice made by patients after counseling. Knowledge about risks, possible precautions that they needed to take, and any warning signs they needed to heed may have affected the outcome in this cohort. Nevertheless, the observed effects of fasting on this high-risk group have suggested essential conclusions. Most importantly, fasting was not associated with disease progression as reflected in (changes in) eGFR value. Using linear regression, the only variable predictive of

progression was a lower baseline eGFR and a higher decline in renal function during the previous year, not age or any other comorbidity.

Nevertheless, many other factors were not studied, and the patients' overall risk and specific health conditions and risks were fully available. In this project, all patients with eGFR less than 60 were advised to consider not to fast Ramadan. Furthermore, for stages 4 and 5, all were strongly advised against fasting. Although the number of adverse events was not significantly affected by fasting, the relatively high rate of adverse events (17 including one death), despite not fasting, seems to give some support to this advice. In our study, diabetes was not an associated factor with worse outcomes, unlike an earlier study that found both diabetes mellitus and proteinuria to be independent risk determinants of renal dysfunction⁷. However, this deserves further exploration, and glycemic control and duration of diabetes may be a factor of interest in future studies.

Our findings overall support the recommendation in international guidelines regarding fasting Ramadan in CKD patients³. Nevertheless, it highlights other areas of importance to consider when suggesting decisions with regards to fasting Ramadan. There is a need to consider the patient global individual risk rather than lab value or diagnosis. The interpretation of the findings regarding increased admissions and adverse events in the group that attempted to fast but had to stop, and the similar occurrence of admissions among those who did fast and those who did not fast cannot be interpreted without considering the major influence of confounders. There may be a group where they did not fast due to their health condition or there may be those with bad health who insisted to fast but could not. This can be better studied if risk assessment and stratification was done before Ramadan and prospectively outcome is assessed which is the subject of an ongoing study.

The limitation of this study is its observational design which does not allow to conclude causality from the association. Both self-selection and confounding by unobserved variables may have affected the choice to fast and outcome. An improvement on our methodology would be to reduce confounding by measuring and adjusting for more prognostic variables. Another limitation of our study is its limited follow-up without which makes it impossible to assess long-term outcomes. Important lessons learned from this project to deliver the same project for the coming Ramadan, introduce more risk assessment tools, and intensity follow up by the PCP for the very high risk patients.

Conclusion

Fasting was not a factor in renal function deterioration or in other adverse events in patients with CKD. Higher risk for renal function deterioration was having a worse CKD stage or rapid deterioration of renal function during the preceding year.

Declarations

Conflict Of Interest: None.

Ethical approval: Abu Dhabi Healthcare Services IRB approved this Study.

Acknowledgments:

Aysha Al Mehairi for patients' care coordination.

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Figures

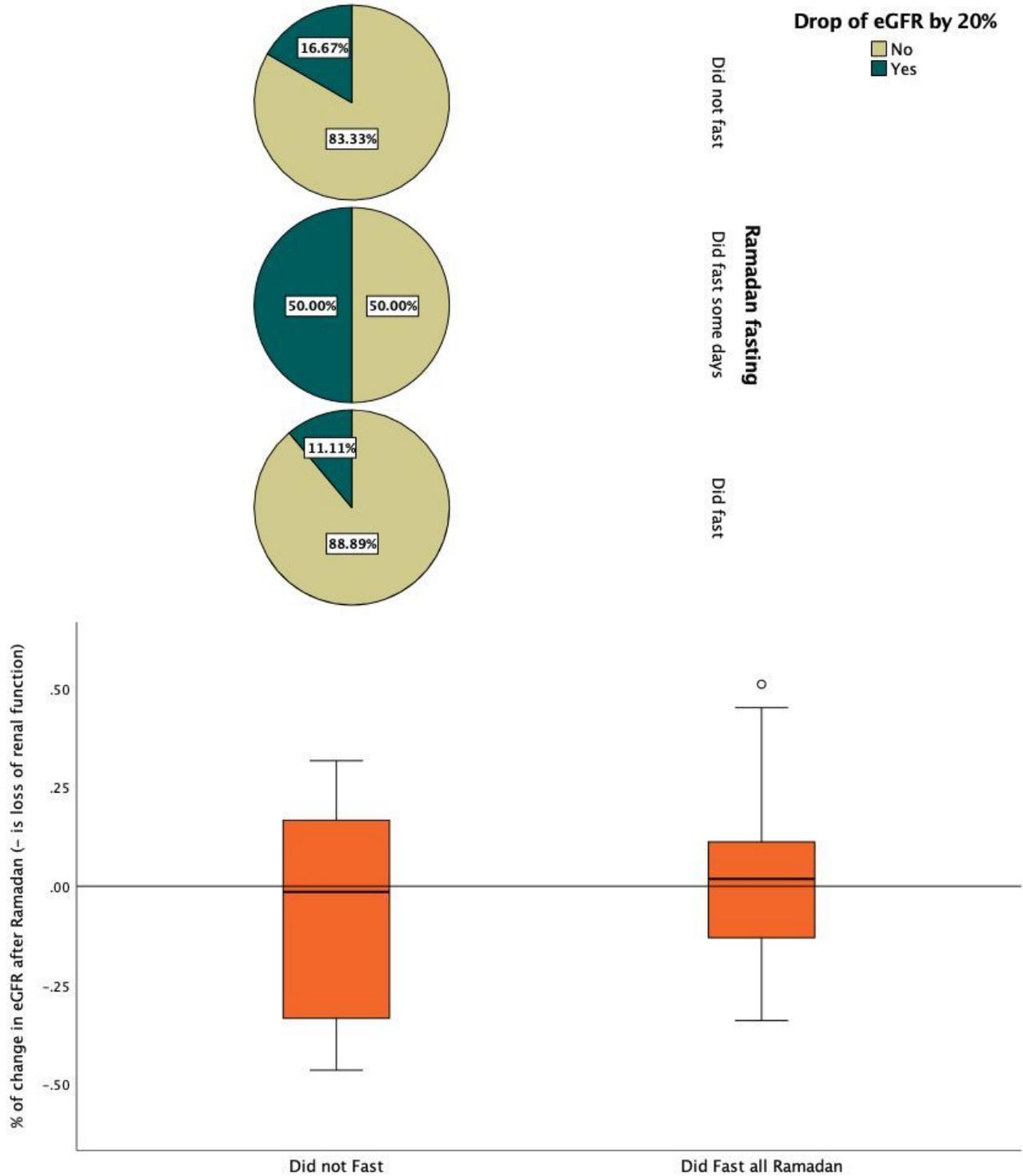


Figure 1

change in eGFR after Ramadan in the three groups; who did fast Ramadan, who attempted and had to stop and those who did not fast. A. Percentage of 20% drop in eGFR among the three groups. B. Box plot of the percentage of eGFR change in two groups; who did fast and those who did not.

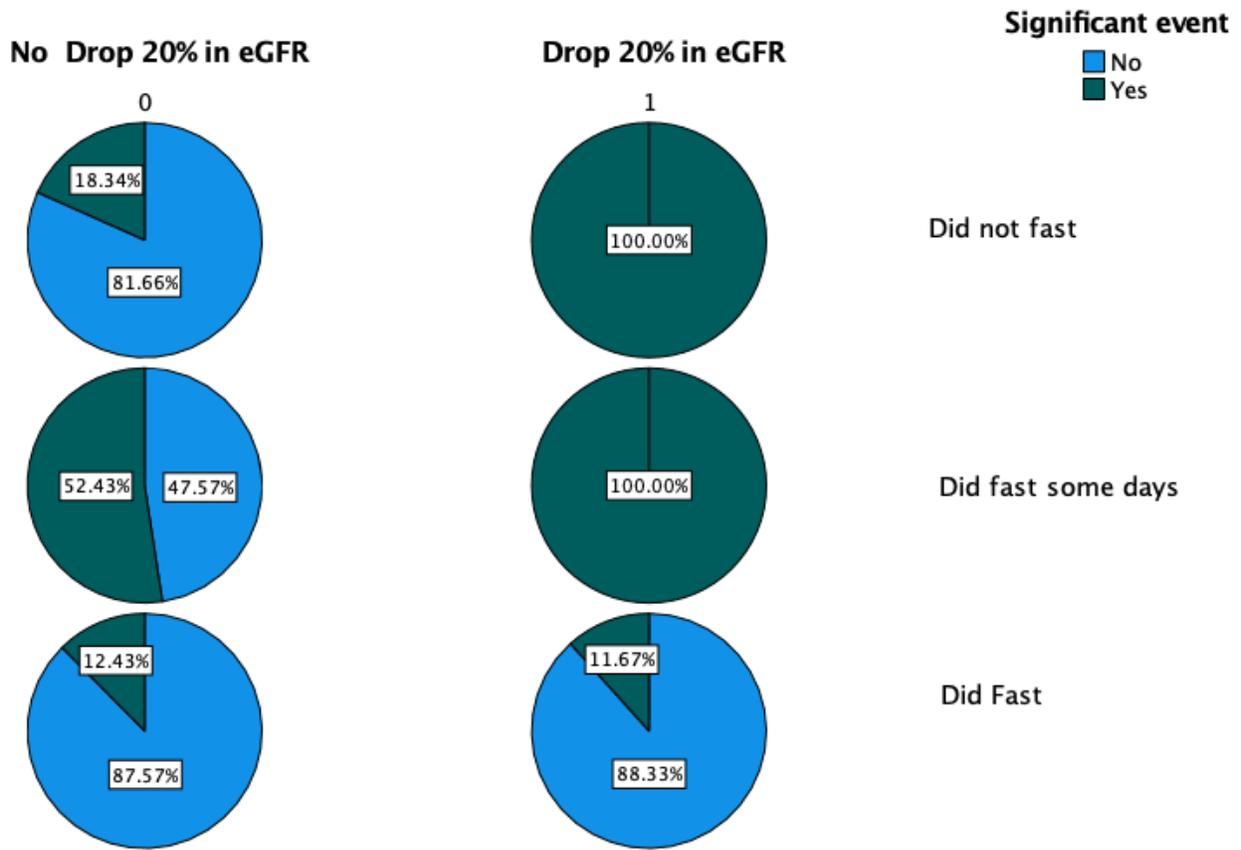


Figure 2

The occurrence of significant adverse event and the drop in eGFR in relation to fasting status.