ORIGINAL ARTICLE

Perceptions and Practices about Ramadan Fasting in Hemodialysis Patients

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Abstract

Background: Perceptions and practices of hemodialysis patients regarding Ramadan fasting remain a matter of debate in the Muslim world due to differing opinions and outcomes.

Objective: To evaluate the perceptions and practices about Ramadan fasting in hemodialysis patients.

Methods: A cross-sectional study conducted among patients undergoing hemodialysis at a dialysis unit of Memon Medical Institute Hospital, Karachi, during Ramadan (March 2024 to April 2024). Patients undergoing regular hemodialysis sessions were selected and grouped based on their fasting status: complete fasting, partial fasting, and non-fasting. Demographic data, biochemical parameters, and 11 question themes (5 on perceptions and 6 on practices) were collected. Data were analyzed in SPSS version 25 using descriptive statistics, one-way ANOVA, and the chi-square test; p-values < 0.05 were considered significant.

Results: A total of 179 patients were included (mean age of 51.39±16.23 years), among whom 3.93% were in the fasting group, 26.40% in the partial group, and 69.66% in the non-fasting group. Significant differences were observed in both perceptions and biochemical outcomes. 100% of fasting participants and 72.3% of partial fasting participants showed positive effects of fasting compared with only 29% of the non-fasting group (p=0.001). Adverse effects such as weakness and fatigue were reported by the majority in the non-fasting group (69.4%) compared with the partial fasting (21.3%) and fasting (42.9%) groups (p=0.001). Among biochemical parameters, only serum potassium levels differed significantly (p = 0.024), with higher levels in the fasting group.

Conclusion: Fasting and partial fasting individuals were more likely to perceive beneficial effects, whereas non-fasting individuals were more likely to report adverse effects. These findings highlight the importance of individualized education and guidance regarding fasting practices.

Keywords: *Practices of hemodialysis, perceptions of hemodialysis, hemodialysis, Ramadan fasting, hemodialysis patients.*

INTRODUCTION

The beneficial effects of Ramadan fasting have been well studied in the general population, with active involvement of the primary physician, specifically keeping the patient's perspective in mind [1, 2]. Dietary adjustments, health care professional advice, and religious beliefs may positively impact outcomes in patients [3]. A patient-centered approach, emphasizing diet, religious beliefs, and shared decision-making in healthcare management plans, especially for hemodialysis patients, is essential [4]. It is suggested that patients on hemodialysis be encouraged to fast during Ramadan, provided they discuss and receive advice from hemodialysis staff, with consideration of comorbidities, dry weight adjustment, and a potassium-restricted diet [5].

Recent studies have addressed nutritional, physical, and biochemical changes and reported positive or negative effects of Ramadan fasting among hemodialysis patients; however, these studies did not include patients' perceptions or practices [6]. It has been well studied in recent literature that patients' decision to fast during Ramadan is influenced by their physician's opinion [2]. This suggests that patient perceptions and practices regarding physician opinion, nutritional status, and communication affect Ramadan fasting among dialysis patients, as thoroughly evaluated in a recent study in Malaysia [7]. This study reflects findings on religious obligation and family support for the decision to fast. It also reflects patients' perceptions of the positive or negative effects of Ramadan fasting [7]. One recent recommendation in the literature is that patients on hemodialysis cannot fast on dialysis days due to the exchange of nutrients and chemicals during the dialysis process; however, they can fast on non-dialysis days. This recommendation doesn't reflect patients' perspectives [8]. Another perception of progressive kidney disease with Ramadan fasting was studied, and it turned out that Ramadan fasting is not associated with an increased risk of progression of kidney disease [9]. Again, communication between the clinician and the patient regarding Ramadan fasting is essential to understand the patient's perception and practice and to guide optimal care during Ramadan [10].

There are not many studies that have been conducted to understand patients' perceptions, practices, or responses locally regarding Ramadan fasting. The primary

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objective of this study is to evaluate perceptions and practices regarding Ramadan fasting among maintenance hemodialysis patients and to compare them across fasting status groups (complete, partial, non-fasting). The secondary objective of this study is to compare biochemical parameters (*e.g*., phosphorus, hemoglobin, albumin) across fasting groups and to assess determinants of the decision to fast. This study will provide valuable insights into patients' perceptions and practices regarding Ramadan fasting, thereby contributing to the development of safer, patient-centered care strategies. The findings will support shared decision-making and strengthen effective communication between patients and healthcare providers, ensuring better preparation and guidance for those who wish to fast during Ramadan.

METHODOLOGY

A cross-sectional study was conducted among hemodialysis patients admitted to the dialysis unit of Memon Medical Institute Hospital, Karachi. The study was commenced in the month of Ramadan, from March 2024 to April 2024, after approval by the Institutional Review Board (IRB) letter No. IRB/MMIH/2023/43 of Memon Medical Institute Hospital, which also reviewed the ethical aspects. Sample size was calculated using the OpenEpi sample size calculator *via* the proportion method. After estimating 2000 as the expected number of dialysis patients during the study period and 48% of hemodialysis patients who practice fasting [11], with a 95% confidence interval and a 7% margin of error, the final sample was 179. Patients on regular hemodialysis sessions (twice or thrice weekly) for more than three months were selected. Patients with a recent hospitalization or any acute bacterial or viral infection were excluded. Written informed consent was obtained from the patients for their participation in the study. Consecutive purposive sampling was employed till the required sample size was reached. This approach was feasible; however, it may introduce selection bias because patients who missed the dialysis session or were hospitalized were excluded from the study.

Ramadan fasting was defined as abstaining from eating and drinking from dawn to sunset during the month of Ramadan [12]. All patients on maintenance hemodialysis were divided into three groups based on their fasting status. Complete fasting group (those who fast for the whole month), partial fasting group (those who fast on non-dialysis days), and non-fasting group (those who didn't fast for the entire month). The assurance of Ramadan fasting or not was based on patients' answers.

Demographic data, including age, gender, comorbid conditions, duration on dialysis (in years), and cause of end-stage renal disease (ESRD), were collected. Patients' hemoglobin, albumin, potassium, and phosphorus levels were recorded at the start of Ramadan. Data were collected using a structured questionnaire consisting of eleven question themes, adopted from a recent Malaysian study [7], of which five were related to 'perceptions' and six to 'practices'. The questionnaire was pre-tested on some hemodialysis patients before data collection to assess clarity, acceptability, and reliability. Perceptions are defined in our study as patients' views and thoughts towards Ramadan fasting. Practices of Ramadan Fasting are evaluated through multiple questions, such as fasting decisions based on religious beliefs and health status, family support during fasting, and seeking health-related information or advice. Answers were recorded as' Yes' or 'No'. All questions were asked during the routine dialysis sessions during the month of Ramadan.

Data were analyzed using SPSS version 25.0. After checking data normality with the Shapiro-Wilk test, the data were found to be normally distributed. Mean ± standard deviation was calculated for continuous variables. At the same time, categorical variables are presented as frequencies and percentages. A one-way ANOVA was used to compare demographic and biochemical parameters among groups. The chi-square test was used to assess the association among groups, gender-wise, regarding practices and perceptions of hemodialysis patients. P-value ≤0.05 was considered statistically significant.

RESULTS

A total of 178 dialysis patients were enrolled in the study, comprising 3.93% in the fasting group, 26.40% in the partial group, and 69.66% in the non-fasting group. The overall mean age of the patients was 51.39 ± 16.23 years. Age- and gender-wise, no statistical significance was observed among groups (**Table 1**). Among biochemical parameters, only serum potassium levels differed significantly (p=0.024), with higher levels in the fasting group (5.80 ± 0.98) than in the partial fasting (5.17 ± 0.90) and non-fasting (4.99 ± 0.75) groups (**Table 1**). The most common comorbid was hypertension (44.4%), and the most common cause of End Stage Kidney Disease (ESRD) was hypertensive nephropathy (39.3%) (**Table 2**).

Perceptions and practices regarding fasting were compared among the fasting, partial fasting, and non-fasting groups (**Table 3**). *Perceptions*: Positive effects of fasting (less eating and water intake) were significantly different among groups (p=0.001). 100% in the fasting group and 72.3% in the partial fasting group reported positive effects, compared to only 29% in the

Table 1: Baseline characteristics of hemodialysis patients.

Descriptive	Fasting Group (n=7)	Partial Fasting (n=47)	Non-Fasting (n=124)	p-value
Age (Years) (mean±S.D)	53.14±12.38	47.62±15.12	52.72±16.70	0.179
Gender, n (%)				
Male	5(71.4)	28(59.6)	69(55.6)	0.722
Female	2(28.6)	19(40.4)	55(44.4)	
Time since dialysis, n (%)				
< 1 year	2(28.6)	8(17)	31(25)	0.763
1-5 years	4(57.1)	32(68.1)	78(62.9)	
>5 years	1(14.3)	7(14.9)	15(12.1)	
Biochemical parameters (mean±S.D)				
Hemoglobin Level	9.45±1.51	10.63±1.33	10.20±1.68	0.108
Potassium Level	5.80±0.98	5.17±0.90	4.99±0.75	0.024
Phosphorus Level	7.71±3.34	6.27±2.25	5.95±1.83	0.068
Serum Albumin Level	4.18±0.36	4.14±0.44	4.05±0.58	0.514
Kt/V	1.47±0.18	1.50±0.22	1.45±0.23	0.490

non-fasting group. Adverse effects, such as weakness and fatigue, were also significantly different between groups (p=0.001). A higher proportion of the non-fasting group (69.4%) reported adverse effects compared with the partial fasting (21.3%) and fasting (42.9%) groups. These findings suggest that patients who chose to fast were more motivated and better adjusted to the demands of fasting, which may have affected their overall experience. From a public health perspective, this highlights the importance of addressing patients' positive perceptions, as they may serve as triggers for adjustment to dietary and fluid restrictions during Ramadan. On the other side, the significant reporting of weakness and fatigue among non-fasting groups highlights the need to recognize that not fasting does not necessarily relieve the burden of symptoms.

Table 2: Comorbidities and causes of ESRD in hemodialysis patients.

Comorbid	Frequency	Percentage
HTN	79	44.38
DM with HTN	28	15.73
No Known Co Morbids	22	12.36
HTN with DM	19	10.67
HTN with CKD	12	6.74
DM	9	5.06
HTN with renal stones	4	2.25
ADPKD	3	1.69
CKD	1	0.56
HTN with IHD	1	0.56
Total	178	100
Cause of ESRD		
Hypertensive Nephropathy	70	39.33
Diabetic Nephropathy	36	20.22
CKD	42	23.60
CKD with Diabetic Nephropathy	2	1.12
HTN with Diabetic Nephropathy	8	4.49

Awareness about dietary management for sehri (pre-dawn meal) (p=0.811) and iftar (evening meal) (p=0.186) did not differ significantly across groups. Awareness of high-potassium and high-phosphorus foods showed a non-significant trend (p=0.091), with relatively higher awareness in the fasting and partial fasting groups compared to the non-fasting group.

The decision to fast was predominantly influenced by religious belief across all groups, with no significant differences (p=0.914). Support from family (p=0.423), decision based on health status (p=0.958), and following previous health advice (p=0.996) also showed no significant group differences. Seeking health-related information before Ramadan (p=0.177) and through the internet (p=0.834) did not significantly vary across groups.

Overall, significant differences were observed mainly in perceptions of the positive and negative effects of fasting, while awareness and practices showed no statistically significant differences among the groups.

DISCUSSION

Our study shows that non-fasting patients have a low perception of the positive effects of Ramadan fasting, which contrasts with all seven patients who fasted for the whole month, and the majority of the partial fasting

Table 3: Perceptions and Practice of hemodialysis patients.

Variables	Response	Fasting Group (n=7)	Partial Fasting (n=47)	Non-Fasting (n=124)	p-value
Perceptions, n (%)					
Positive effects of fasting due to less eating and water intake	Yes	7 (100)	34 (72.3)	36 (29)	0.001
	No	0 (0)	13 (27.7)	88 (71)	
Adverse effects due to weakness and fatigue	Yes	3 (42.9)	10 (21.3)	86 (69.4)	0.001
	No	4 (57.1)	37 (78.7)	38 (30.6)	
Awareness about dietary management for sehri	Yes	5 (71.4)	29 (61.7)	72 (58.1)	0.811
	No	2 (28.6)	18 (38.3)	52 (41.9)	
Awareness about dietary management for iftar	Yes	6 (85.7)	28 (59.6)	65 (52.4)	0.186
	No	1 (14.3)	19 (40.4)	59 (47.6)	
Awareness about controlling high-potassium and high-phosphorus foods	Yes	4 (57.1)	28 (59.6)	52 (41.9)	0.091
	No	3 (42.9)	19 (40.4)	72 (58.1)	
Practices, n (%)					
The decision to fast is influenced by religious belief	Yes	7 (100)	46 (97.9)	122 (98.4)	0.914
	No	0 (0)	1 (2.1)	2 (1.6)	
Support from family	Yes	7 (100)	43 (91.5)	105 (84.7)	0.423
	No	0 (0)	4 (8.5)	19 (15.3)	
Decision based on health status	Yes	6 (85.7)	41 (87.2)	106 (85.5)	0.958
	No	1 (14.3)	6 (12.8)	18 (14.5)	
Sought any health-related information regarding fasting before Ramadan	Yes	6 (85.7)	22 (46.8)	61 (49.2)	0.177
	No	1 (14.3)	25 (53.2)	63 (50.8)	
Followed previous health advice from a care professional	Yes	3 (42.9)	21 (44.7)	55 (44.4)	0.996
	No	4 (57.1)	26 (55.3)	69 (55.6)	
Sought information through the internet	Yes	0 (0)	4 (8.5)	11 (8.9)	0.834

group have a high perception of the positive effects. Our study aligns with qualitative findings by Adanan *et al*. [7], who found that hemodialysis patients who fast during Ramadan often perceive meaningful spiritual and physical benefits, yet exhibit limited health-seeking behavior and limited recognition of educational needs. Patients who fast during Ramadan despite the provision to avoid it due to health issues also do so for religious reasons, considering it an obligation [9]. However, despite the good perception, risk assessment, and individual diet plan, a clinician's perception is also required to allow patients to proceed with fasting during the month of Ramadan [13]. A recent study also shows that fasting doesn't have a significant adverse effect; in fact, it is associated with better blood pressure control [14].

Despite the documented perception of positive effects of Ramadan among the fasting group, potassium levels were significantly higher during Ramadan. It might reflect inadequate dietary management at Sehri or Iftar among the Pakistani population, which is usually rich in potassium and phosphorus [15]. The trend of hyperkalemia is lower in the partial and non–fasting group; however, there are also seasonal variations in potassium levels among hemodialysis patients, and the reason is unclear [16]. In Saudi Arabia, a single-center study found that patients who adopted dietary modifications during Ramadan showed no significant change in potassium levels [17].

Regarding perceptions of adverse side effects, the majority of patients denied them, despite not having fasted this month. A recent study found that, despite intradialytic hypotension and cramps during dialysis during Ramadan, fasting was well tolerated and had no prominent adverse effects, allowing patients to fast [18]. Partial Ramadan fasting without significant adverse side effects is also suggested in a recent study, which is consistent with our dialysis patients' perceptions across all groups [19].

Furthermore, as the partial fasting group also shows promising results in terms of positive perceptions without any significant improvement in serum albumin or phosphorus level, one of the prospective cohort data further suggests that intermittent fasting may lead to modest reductions in weight and body fat, as well as improvements in nutritional markers like serum phosphate and handgrip strength [12]. In contrast, some large-scale and retrospective studies flagged potential concerns such as reports of higher mortality among hemodialysis patients during Ramadan when fasting status was not clearly documented or considered [20].

The majority of patients in both groups had a good understanding and awareness of dietary management for Sehri or Iftar; however, when asked specifically about potassium- and phosphorus-containing foods, which are consumed primarily in our part of the world, the results were mixed but not significant. Pakistani dietary habits are rich in carbohydrates and phosphorus, and are high in potassium [21], so despite awareness, our dialysis patients may have consumed meals high in phosphorus and potassium. In other studies, a reduction in potassium levels has been observed during the month of Ramadan, whereas some studies report no change [17, 22].

Practices shared by fasting, partial-fasting, and non-fasting groups seemed similar, including deciding to fast, receiving support from family before fasting, making decisions based on health status, and seeking health-related advice or information from family or the internet. There is little work done so far to address patient practices related to Ramadan fasting, with only one qualitative study [7] that reveals the importance of communication between patient and physician, as all questions addressed above can be easily sorted out with effective communication. Communication between health care professionals and patients seeking advice before Ramadan fasting has been a discussion point due to the diverse nature of patients' beliefs, cultural differences, language barriers, and the need to tailor medication, physician knowledge, and care [3].

LIMITATIONS

This study has certain limitations. The small sample size, particularly in the fasting group with unequal group distribution, might have affected the statistical power, and the results cannot be generalized. As the data were self-reported, recall and selection bias cannot be ruled out. Lastly, the findings are context-specific to Ramadan and may not be generalizable to other populations.

CONCLUSION

The study concludes that perceptions of fasting differ significantly across the three groups, with fasting individuals reporting more positive effects and fewer negative symptoms than non-fasting participants. However, no significant differences were observed in awareness of dietary management or in practices related to decision-making, health information seeking, and following medical advice. Family support and religious beliefs were equally crucial across all groups. In general, perceptions differ, whereas awareness and practices appear consistent regardless of fasting status, indicating the need for targeted intervention and research on education that impacts dietary management and health-related practices during Ramadan.

ETHICAL APPROVAL

Ethical approval was obtained from the Institutional Review Board (IRB) of Memon Medical Institute Hospital, Karachi (REF letter No. IRB/MMIH/2023/43). All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/ or national research committee and the Helsinki Declaration.

CONSENT FOR PUBLICATION

Written informed consent was taken from the participants.

AVAILABILITY OF DATA

The data set may be acquired from the corresponding author upon a reasonable request.

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None.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

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AUTHORS' CONTRIBUTION

ARQ: Concept, data interpretation, literature search.

TM: Data analysis and interpretation.

JAS: Data collection and manuscript writing.

MKH: Data collection and manuscript writing.

RI: Data collection and literature review.

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