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ORIGINAL RESEARCH

Effect of Ramadan Fasting on Gingival Status: A Comparative Study

[1]Arun Narayanan, [2]PP Praveen, [3]KM Firoz, [4]EG Ajey Kumar, [5]Ritu Mathur, [6]Mythri S Bhat

ABSTRACT

Background: Ramadan is the 9th month of the Islamic calendar, and the dawn-to-dusk fast in Ramadan is observed by all adult Muslims worldwide to commemorate the 1st revelation of the Quran according to Islamic beliefs. This annual observance is regarded as one of the Five Pillars of Islam. As a potential non-pharmacological intervention for improving health and increasing longevity, fasting has been the subject of numerous scientific investigations. Ramadan fasting is safe for healthy people, but orodental health can be influenced during fasting. This short study aimed to provide data on the orodental health status in fasting candidates during Ramadan.

Materials and methods: The study was done in 20 healthy students from the 3rd-year bachelor of dental surgery course.

Results: Statistically very high significant difference was noted in the gingival index between baseline, 10th, and 40th day evaluation (p-value 0.001). Similarly, statistically very high significant difference was noted in the plaque index between baseline, 10th, and 40th day evaluation (p-value 0.001); that is, the gingival index and plaque index had significantly declined during the fasting days among the studied population.

Conclusion: This result may reflect the gingival index and plaque index in the total Muslim population who observe fasting, and this can even worse after completion of fasting in Ramadan if proper attention is not paid in this regard. Thus, improved oral hygiene measures like tooth brushing, use of chemical plaque control agents, and other medications should be practised during Ramadan before and after fasting.

Keywords: Fasting, Gingival index, Plaque index, Ramadan.

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INTRODUCTION

Ramadan is the 9th month of the Islamic calendar, and the dawn-to-dusk fast in Ramadan is observed by all adult Muslims worldwide to commemorate the 1st revelation of the Quran according to Islamic beliefs. This annual observance is regarded as one of the Five Pillars of Islam.[1] The Ramadan fast is not obligatory for all Muslims; there are several categories of healthy people and patients who are exempt from (prepubertal children, the insane) or who can postpone the Ramadan fast (the acutely ill; women during menstruation, pregnancy, post-childbirth confinement, and lactation; travelers) or who are unable to fast (the chronically ill, the frail elderly), but who are encouraged to feed a needy individual during the month of Ramadan.[2] Since the Islamic calendar is lunar, the start of the Islamic year advances 11 days each year compared with the seasonal year; therefore, Ramadan occurs at different times of the seasonal year over a 33-year cycle.[3,4] In addition, the time of sunrise and sunset varies between 12 hours at the equator and about 22 hours at the 64° of latitude in summer time. For people living in the polar regions, it is recommended, however, that they take the fasting times as those prescribed at Mecca and Medina, or from the nearest temperate zones.[5] According to a recent study, there are 1.57 billion Muslims worldwide, representing 23% of the world population, observing Ramadan fasting.[6] As a potential non-pharmacological intervention for improving health and increasing longevity, fasting has been the subject of numerous scientific investigations. Ramadan fasting is safe for healthy people, but orodental health can be influenced during fasting. The three most commonly studied fasts are caloric restriction (CR), alternate-day fasting (ADF), and dietary restriction (DR).[7] Caloric restriction is the reduction of kilocalorie (kcal) intake by a certain percentage (typically 20–40). Alternate-day fasting consists of alternating 24-hour periods: During the "feast period," fasters may consume food; during the "fast period," food consumption is restricted or halted altogether. Dietary restriction is a reduction of one or more components of dietary intake (typically macronutrients) with minimal to no reduction in total kilocalorie intake. Ramadan fasting is similar to ADF, because both fasts incorporate feast periods and fast periods. This short study aims to provide data on the orodental health status in fasting candidates.

MATERIALS AND METHODS

After screening the entire batch of 100 3rd-year Bachelor of Dental Surgery (BDS) students at Kannur Dental

[1]Professor and Head, [2,5]Postgraduate Student (3rd Year) [3]Professor, [4,6]Senior Lecturer

[1-6]Department of Periodontology, Kannur Dental College Kannur, Kerala, India

Corresponding Author: Arun Narayanan, Professor and Head Department of Periodontology, Kannur Dental College Anjarakandy, Kerala, India, Phone: +919447962598, e-mail: poduval.arun@yahoo.com

College, Kannur, 20 Muslim students in the age range 19 to 21 years were recruited in this study. Fasting subjects who were willing to participate, with at least 20 natural teeth in the permanent dentition, with mild-to-moderate gingivitis and plaque accumulation were included in our study. Subjects with any systemic diseases, using antibiotics, undergoing orthodontic treatment, using any other mouth wash/rinse, and who underwent scaling in the last 6 months were excluded. Mouth mask, gloves, mouth mirror, Williams graduated probe, tweezers, cotton gauze, and kidney tray were used as armamentarium. The subjects were blinded about the aim of the investigation in order to avoid any possible bias. In order to participate, the subjects signed a consent form and committed themselves to the study. This study was carried out at the Department of Periodontology, Kannur Dental College, Kerala, India. Oral prophylaxis was not performed so that the subjects began the treatment regimen with their existing level of plaque deposits. All subjects were instructed to continue their normal home oral hygiene procedures. Patient evaluations for gingival and periodontal index were done as follows. Day 1: Plaque index and gingival index were assessed 2 days before the beginning of the fasting month; Day 9: 1 week after the beginning of the fasting month; Day 40: 1 week after the completion of the fasting month. Plaque index (PI) scoring were measured according to the index introduced by Silness and Löe.[8] Examination was done on all teeth (28, so wisdom teeth are excluded). Gingival index (GI) scoring were measured according to the index introduced by Loe and Sillness[9] and was used to assess the severity of gingivitis on the index teeth 16, 12, 24, 36, 32, and 44. Williams graduated WHO probe was used to assess the GI of the tissues. A single examiner performed all the clinical measurements at the same time of the day throughout the study. Students' paired t test and Wilcoxon signed rank test were used to compare the plaque and gingivitis scores. The validity level was fixed to $p < 0.05$.

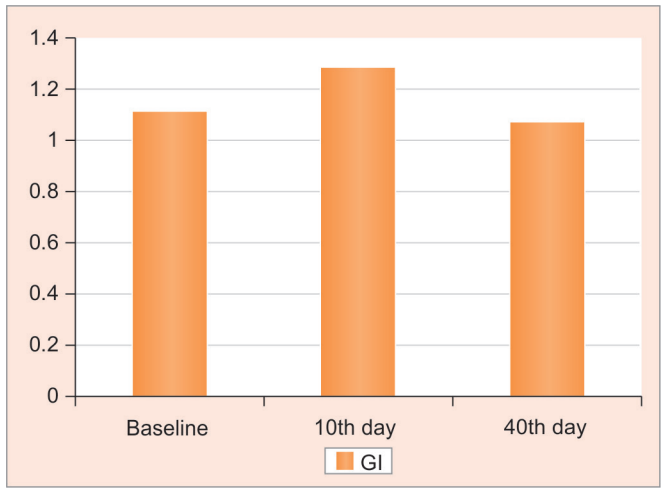
RESULTS

Statistically very high significant difference was noted in the GI between baseline, 10th, and 40th-day evaluations (p-value 0.001) (Table 1, Graph 1). Similarly, statistically very high significant difference was noted in the PI between baseline, 10th, and 40th-day evaluation (p-value 0.001) (Table 3, Graph 2). On multiple comparison, statistically significant difference was noted in GI from baseline to

Table 1: Comparison of GI between Baseline, 10th day and 40th day

		GI				
		N	*Mean*	*Std. deviation*	*F*	*p-value*
GI	Baseline	20	1.1080	0.22647		
	10th day	20	1.2790	0.16124		
	40th day	20	1.0650	0.15347	7.62	<0.001 VHS

VHS: Very high significant



Graph 1: Gingival index from baseline to 40th day

Table 2: Multiple comparison of GI between baseline and 10th day and comparison between 10th day and 40th day

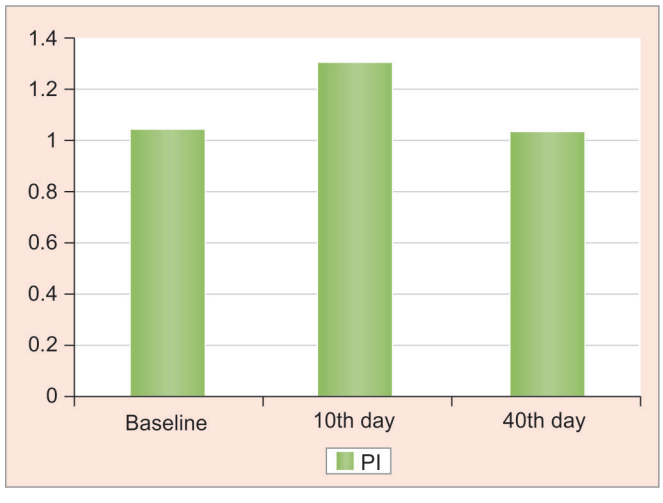
Bonferroni				
Dependent variable	*(I) time*	*(J) time*	*Mean difference (I–J)*	*p-value*
GI	Baseline	10th day	–0.17100	0.014 S
		40th day	0.04300	1.000
	10th day	40th day	0.21400	0.002 HS

S: Significant; HS: Highly significant

Table 3: Comparison of PI between Baseline, 10th day and 40th day

	PI				
	N	*Mean*	*Std. deviation*	*Minimum*	*Maximum*
Baseline	20	1.048	0.246	0.75	1.70
10 days	20	1.311	0.280	1.00	1.87
40 days	20	1.037	0.229	0.70	1.66

$F = 7.524$, $p < 0.001$ VHS



Graph 2: Plaque index from baseline to 40th day

Table 4: Multiple comparison of PI between baseline and 10th day and comparison between 10th day and 40th day

Multiple comparisons			
Dependent variable: PI			
Bonferroni			
(I) time	*(J) time*	*Mean Difference (I–J)*	*p-value*
Baseline	10 days	–0.26250	0.005
	40 days	0.01150	1.000
10 days	40 days	0.27400	0.003

10th day (p-value 0.014) and 10th day to 40th day (p-value 0.002), but no statistically significant difference was noted in GI from baseline to 40th day (p-value 1.000) (Table 2). Similarly, statistically significant difference was noted in PI from baseline to 10th day (p-value 0.005) and 10th day to 40th day (p-value 0.003), but no statistically significant difference was noted in PI from baseline to 40th day (p-value 1.000) (Table 4).

DISCUSSION

Each year, millions of Muslims refrain from eating or drinking from sunrise (Sahur) to sunset (Iftar) during the holy month of Ramadan, which lasts between 28 and 30 days. The Muslim population of Kerala is reported to comprise about 27% of the total Kerala population.[10] Among them most do fasting during the month of Ramadan, which includes systemically compromised and aged population as well. In our study, 20 healthy adult students from 3rd-year BDS were selected as test case. Based on the study result, it was noted that both GI and PI significantly declined during the fasting days. Thus, this result may reflect the GI and PI in the total Muslim population who observe fasting, and this can even worse after the completion of fasting in Ramadan if proper attention is not paid in this regard. Thus, improved oral hygiene measures like tooth brushing, use of chemical plaque control agents, and other medications should be practised during Ramadan before and after fasting. Bolouri et al reported that fasting has not been shown to aggravate periodontal problem.[11] Since there are no pioneering studies in this respect, this result may be of utmost significance in maintaining the gingival and periodontal status of Muslim population during and after fasting in the month of Ramadan.

CONCLUSION

Although the influence of fasting in different aspects of health has been studied a lot, there are no or only limited studies conducted on orodental effects of fasting during Ramadan. Current findings support the notion that fasting could affect the gingival and periodontal status if oral hygiene maintenance practises are not optimum, and it can even deteriorate the periodontium if proper attention is not paid in this aspect. Further clinical studies with larger samples and different population are warranted for the validation of our results.

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