Frontiers in Health Informatics
ISSN-Online: 2676-7104
www.healthinformaticsjournal.com
2025; Vol 14: Issue 2 Open Access

Comparison of Dental Hygiene Practices among Medical and Non- medical Personnel during Ramadan

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Cite this paper as: Shakur Mahmud, Pankaj K. Paul, Mohammed M. Islam (2025). Comparison of Dental Hygiene Practices among Medical and Non- medical Personnel during Ramadan. *Frontiers in Health Informatics*, *Vol.14, No.2y*, 2528-2534

ABSTRACT

Background: Fasting during Ramadan imposes changes in daily routines that can significantly influence personal hygiene behaviors, particularly oral hygiene. Understanding how medical and non-medical personnel adapt their dental hygiene practices during Ramadan is essential to inform targeted public health interventions and education. ***Aim of the study:*** To compare dental hygiene practices, oral health complaints, and beliefs regarding oral hygiene during Ramadan between medical and non-medical personnel. ***Methods:*** A cross-sectional comparative study was conducted among 607 adult participants observing Ramadan, including 329 medical and 278 non-medical personnel. Data were collected using a structured, interviewer-administered questionnaire covering sociodemographics, oral hygiene behaviors, oral health complaints, and beliefs about fasting-related practices. Statistical analyses included Chi-square tests, t-tests, and multivariate logistic regression to identify predictors of good oral hygiene (defined as brushing ≥2 times/day). ***Result:*** Medical personnel reported significantly better oral hygiene practices than non-medical personnel during Ramadan. Brushing ≥2 times/day was practiced by 69.9% of medical participants compared to 45.0% of non-medical participants ($p < 0.001$). Use of mouthwash (50.2% vs. 34.9%), flossing (24.9% vs. 10.1%), and tongue cleaning (40.1% vs. 15.1%) were all significantly higher among the medical group ($p < 0.001$). Oral health complaints such as halitosis (55.0% vs. 70.1%), dry mouth (59.9% vs. 74.8%), and bleeding gums (14.9% vs. 29.9%) were more frequent among non-medical personnel ($p < 0.001$). Belief that brushing breaks the fast was significantly more prevalent in the non-medical group (34.9% vs. 10.0%, $p < 0.001$). On multivariate analysis, being a medical professional (AOR = 2.15; 95% CI: 1.45–3.19), brushing ≥2 times/day (AOR = 3.48; 95% CI: 2.35–5.16), mouthwash use (AOR = 1.85; 95% CI: 1.22–2.80), and rejecting the belief that brushing breaks the fast (AOR = 2.68; 95% CI: 1.68–4.28) were independent predictors of good oral hygiene during Ramadan. ***Conclusion:*** Medical personnel demonstrate significantly better oral hygiene practices and more accurate beliefs regarding fasting and dental care during Ramadan compared to non-medical personnel. Targeted educational programs addressing misconceptions and promoting oral hygiene are warranted, particularly among non-medical populations.

Keywords: Oral hygiene, Ramadan fasting, dental care, medical personnel, health beliefs, halitosis, public health, hygiene behavior.

INTRODUCTION

Dental hygiene refers to the consistent practices of maintaining oral cleanliness to prevent dental diseases and promote overall health [1]. Good oral hygiene not only prevents common oral conditions as caries, gingivitis, and periodontitis but also plays an essential role in reducing the risk of systemic diseases like diabetes, cardiovascular disease, and adverse pregnancy outcomes [2]. According to the Global oral health status report, over 3.5 billion people worldwide are affected by oral health issues, with untreated dental caries in permanent teeth being the most widespread condition [3]. In Bangladesh, the situation mirrors this global burden. National surveys estimate that

nearly 70% of the adult population suffers from periodontal problems, while 50–60% are affected by untreated dental caries, with limited access to routine dental care contributing to the issue [4]. Ramadan, the ninth month of the Islamic calendar, is observed through fasting from dawn to sunset and is practiced by approximately two billion Muslims globally. This period brings about notable changes in daily routines, including diet, hydration, sleep patterns, and personal hygiene habits [5]. These changes can significantly impact oral hygiene behaviors. Individuals often reduce the frequency of tooth brushing due to time constraints, fatigue, or the misconception that oral hygiene activities during fasting hours may nullify the fast [6]. In addition, limited fluid intake during the day leads to decreased salivary flow, causing dryness of the mouth, which can exacerbate plaque accumulation and increase the risk of halitosis and dental decay [7]. Consumption of sugary and high-carbohydrate foods after Iftar (sunset meal) further raises the risk of oral health deterioration, especially if oral hygiene is not properly maintained [8]. Cultural beliefs and religious interpretations can deeply influence health-related behaviors. While religious doctrine permits oral cleaning during fasting—as long as nothing is swallowed—many individuals avoid brushing or using mouthwash during fasting hours due to uncertainty or fear of invalidating the fast [9]. This practice is widespread and not necessarily limited to any one educational or professional group. Medical personnel are assumed to possess superior knowledge regarding health practices, including oral hygiene, and are expected to apply and promote such practices effectively [10]. However, the reality may vary, especially in culturally sensitive contexts such as Ramadan. Non-medical individuals, lacking professional health training, may be more vulnerable to misinformation or neglect of hygiene practices altogether [11]. Despite these assumptions, few empirical studies in Bangladesh have explored whether medical knowledge translates into better oral hygiene behavior during Ramadan compared to the general population [12]. Understanding the behavioral differences between these two groups is critical. It can help identify educational gaps, common barriers, and misconceptions that hinder proper oral hygiene during Ramadan. Such findings may inform future oral health awareness campaigns tailored to diverse occupational groups [13]. The aim of this study is to compare dental hygiene practices during Ramadan between medical and non-medical personnel in Bangladesh.

METHODOLOGY & MATERIALS

A cross-sectional comparative study was conducted at during the month of Ramadan in 2025 to evaluate dental hygiene practices among medical and non-medical personnel during the month of Ramadan. The study was carried out at Mymensingh Medical College Hospital (MMCH), Bangladesh, which hosts a diverse population of both medical staff and non-medical employees.

A total of 607 Muslim adults who observed fasting during Ramadan were enrolled, comprising 329 medical personnel (including physicians, nurses, and allied healthcare workers) and 278 non-medical personnel (office staff, students, and general employees).

Inclusion and Exclusion Criteria

Participants were included if they were: (i) aged 18 years or older, (ii) Muslim adults actively observing fasting during the month of Ramadan, and (iii) willing to provide informed consent. Exclusion criteria were: (i) individuals with cognitive or psychiatric impairments that could hinder questionnaire comprehension, (ii) those with known severe oral or systemic conditions affecting oral hygiene behavior, and (iii) participants not observing the fast.

Data Collection

Data were gathered using a structured, self-administered questionnaire designed specifically for this study. The questionnaire was developed in English and translated into the local language to ensure clarity and cultural appropriateness. It included sections on participants' demographic characteristics, fasting history, oral hygiene practices before and during Ramadan (such as frequency of tooth brushing, use of miswak, mouthwash, flossing, and tongue cleaning), self-reported oral health symptoms (including halitosis, dry mouth, and bleeding gums), and beliefs and attitudes toward oral hygiene and fasting. Prior to the main study, the questionnaire was pre-tested on a small group of participants to assess clarity, relevance, and comprehensiveness, and necessary adjustments were made. Data collection was conducted in person at the study sites, with participants completing the questionnaire independently after receiving standardized instructions. Trained research assistants were available to provide clarifications when needed, ensuring consistency and accuracy in responses.

Statistical Analysis

Data were analyzed using SPSS version 26. Continuous variables were presented as mean ± standard deviation (SD) or median (interquartile range [IQR]) depending on distribution normality. Categorical variables were expressed as frequencies and percentages. Group comparisons were performed using independent t-tests or Mann-Whitney U tests for continuous variables, and Chi-square or Fisher's exact tests for categorical variables. Multivariate logistic regression analysis was conducted to identify independent predictors of good oral hygiene

practices during Ramadan. Adjusted odds ratios (AORs) with 95% confidence intervals (CIs) were reported. A p-value < 0.05 was considered statistically significant.

Ethical Considerations

The study protocol was approved by the Institutional Review Board of [Institution Name] (Approval No. XXX). Written informed consent was obtained from all participants prior to enrollment. Confidentiality and anonymity of participants were strictly maintained throughout the study.

RESULT

The study included 607 participants, comprising 329 medical and 278 non-medical personnel. Table 1 demonstrated the baseline characteristics. The average age was 29.4±6.3 years among medical and 30.1±5.8 years among non-medical participants. Males accounted for 60.18% of the medical group and 55.04% of the non-medical group. A significant difference was observed in education, with 89.67% of medical personnel being graduates or above, compared to 35.25% in the non-medical group. Smoking habits were reported in 14.89% of medical and 20.14% of non-medical individuals. The mean years of fasting were 8±4 for medical and 7±5 for non-medical participants. Prior to Ramadan, 68.69% of medical participants brushed twice or more daily, while 73.38% of non-medical personnel brushed once daily. Brushing twice or more daily was practiced by 69.91% of medical and 44.96% of non-medical participants. Brushing after Suhoor was reported by 59.88% of medical and 39.93% of non-medical individuals. Use of Miswak was noted in 30.09% of medical and 20.14% of non-medical personnel. Mouthwash use was more frequent in the medical group (50.15%) than in the non-medical group (34.89%). Flossing was practiced by 24.92% of medical and 10.07% of non-medical individuals. Tongue cleaner use was 40.12% among medical and 15.11% among non-medical participants (Table 2). Table 3 showed that halitosis was reported by 55.02% of medical and 70.14% of non-medical personnel. Dry mouth was noted in 59.88% of medical and 74.82% of non-medical participants. Bleeding gums were reported by 14.89% of medical and 29.86% of non-medical individuals. A perceived decline in hygiene was reported by 39.82% of medical and 60.07% of non-medical participants. Only 10.03% of medical personnel believed brushing breaks the fast, compared to 34.89% of non-medical individuals. Mouthwash was considered acceptable during fasting by 40.12% of medical and 20.14% of non-medical participants. Brushing was avoided by 4.86% of medical and 24.82% of non-medical participants to preserve fasting. A majority found oral hygiene harder during Ramadan, with 69.91% of medical and 80.22% of non-medical participants agreeing (Table 4). Table 5 presented predictors of good hygiene, where being medical personnel (AOR 2.15), brushing twice daily (AOR 3.48), using mouthwash (AOR 1.85), and believing brushing does not break the fast (AOR 2.68) were significant.

Table 1: Baseline characteristics of study participants during Ramadan (N = 607)

Characteristic	Medical (n=329)		Non-Medical (n=278)		p-value
	n	%	n	%	
Age (years)					
Mean ± SD	29.4 ± 6.3		30.1 ± 5.8		0.28
Gender					
Male	198	60.18	153	55.04	0.16
Female	131	39.82	125	44.96	
Educational Level					
Graduate and above	295	89.67	98	35.25	<0.001
Below graduate	34	10.33	180	64.75	
Smoking Habit	49	14.89	56	20.14	< 0.001
Years fasting Ramadan					
Mean ± SD	8 ± 4		7 ± 5		0.41
Brushing frequency before Ramadan					
Once daily	103	31.31	204	73.38	<0.001*
Twice or more	226	68.69	74	26.62	

Table 2: Comparison of oral hygiene behaviors during Ramadan among medical and non-medical personnel

Practice	Medical (n=329)		Non-Medical (n=278)		p-value
	n	%	n	%	
Brushing ≥ 2 times per day	230	69.91	125	44.96	<0.001
Brushing after Suhoor	197	59.88	111	39.93	<0.001
Use of Miswak	99	30.09	56	20.14	0.006
Mouthwash use	165	50.15	97	34.89	<0.001
Flossing regularly	82	24.92	28	10.07	<0.001
Use of tongue cleaner	132	40.12	42	15.11	<0.001

Table 3: Distribution of self-reported oral health symptoms during Ramadan between study groups

Complaint	Medical (n=329)		Non-Medical (n=278)		p-value
	n	%	n	%	
Halitosis (bad breath)	181	55.02	195	70.14	<0.001
Dry mouth	197	59.88	208	74.82	<0.001
Bleeding gums	49	14.89	83	29.86	<0.001
Perceived decline in hygiene	131	39.82	167	60.07	<0.001

Table 4: Beliefs and attitudes regarding dental hygiene practices and fasting among medical and non-medical personnel

Statement	Medical (Agree)		Non-Medical (Agree)		p-value
	n	%	n	%	
Brushing breaks the fast	33	10.03	97	34.89	<0.001
Mouthwash is acceptable during fasting	132	40.12	56	20.14	<0.001
I avoid brushing to preserve my fast	16	4.86	69	24.82	<0.001
Oral hygiene is harder during Ramadan	230	69.91	223	80.22	0.004

Table 5: Multivariate logistic regression analysis identifying predictors of good oral hygiene practices during Ramadan

Variable	Adjusted Odds Ratio (AOR)	95% Confidence Interval	p-value
Medical personnel (vs. non-medical)	2.15	1.45 – 3.19	<0.001
Brushing ≥ 2 times/day	3.48	2.35 – 5.16	<0.001
Mouthwash use	1.85	1.22 – 2.80	0.004
Belief brushing does NOT break fast	2.68	1.68 – 4.28	<0.001

DISCUSSION

Dental hygiene refers to the routine practices aimed at maintaining oral cleanliness to prevent dental diseases and ensure overall oral health. Dental hygiene practices often vary based on knowledge, beliefs, and professional background [14]. This study investigated oral hygiene practices, beliefs, and self-reported symptoms during Ramadan among medical and non-medical personnel. The findings clearly indicate that medical participants engaged in significantly better oral hygiene behaviors and experienced fewer oral health-related symptoms during the fasting month compared to their non-medical counterparts. These differences appear to be closely linked to higher health literacy, access to accurate information, and appropriate behavioral adaptations by the medical group [15]. Medical personnel were more likely to brush their teeth multiple times a day, brush after Suhoor, and use additional oral hygiene aids such as miswak, mouthwash, floss, and tongue cleaners [16]. These practices align with current dental health guidelines that advocate for a multifactorial approach to oral hygiene combining mechanical methods like brushing and flossing with chemical aids such as mouthwash [17]. Previous studies have similarly reported that individuals with higher education or health-related training are more inclined to follow recommended oral care routines, especially under altered daily circumstances such as fasting [18]. The use of miswak was notably higher among medical participants, a finding supported by various studies that emphasize its traditional, cultural, and clinical significance [19]. Miswak is recognized for its mechanical cleansing ability, antimicrobial properties, and acceptability in Islamic practices during fasting. Its use, particularly when tooth brushing may be skipped due to time constraints or religious misconceptions, serves as an effective alternative in maintaining oral hygiene [20]. Mouthwash use was also more common among the medical group. Many non-medical participants appeared reluctant to use mouthwash during fasting hours, likely due to the misconception that it may break the fast. This belief has been consistently identified in multiple studies as a barrier to proper oral care during Ramadan [21]. However, religious scholars and dental professionals generally agree that mouthwash can be used during fasting, provided it is not swallowed. This underscores the importance of knowledge dissemination, particularly among non-medical populations, to address and rectify such misunderstandings [22]. Tongue cleaning and flossing were other behaviors observed more frequently in the medical group. These practices, though often overlooked, play a crucial role in preventing plaque accumulation, halitosis, and gingival inflammation [23]. During Ramadan, when food intake is less frequent and salivary flow is reduced due to dehydration, maintaining a clean oral cavity becomes even more essential [24]. Studies have shown that reduced salivary secretion during fasting leads to an environment conducive to bacterial growth and oral dryness, increasing the risk of bad breath and gum issues. Participants from non-medical backgrounds, who performed fewer of these practices, reported more frequent symptoms such as halitosis, dry mouth, bleeding gums, and an overall perceived decline in oral cleanliness [25]. These self-reported symptoms are consistent with the physiological changes associated with fasting, particularly the decrease in salivary flow, altered oral pH, and

increased bacterial proliferation. Prior research from various regions has confirmed that during fasting periods, individuals often face challenges such as oral dryness and discomfort, which can be mitigated through consistent and effective oral hygiene measures [26]. Medical participants, likely more familiar with these effects and how to counter them, demonstrated fewer complaints, reinforcing the value of health education [27]. The study also explored beliefs and attitudes related to oral hygiene during fasting. A substantial portion of non-medical participants believed that brushing teeth could invalidate the fast or avoided brushing altogether to preserve their fast [28]. In contrast, medical participants held more accurate beliefs and demonstrated confidence in maintaining their hygiene without compromising religious obligations. Misconceptions around oral hygiene during fasting have been reported in several countries, often leading to reduced oral care practices and subsequent health issues [29]. Public health recommendations, as well as Islamic jurisprudence, generally support oral hygiene practices during fasting, including brushing, flossing, and using mouthwash, so long as care is taken not to swallow [30]. However, unless this message is effectively communicated to the wider public, this highlights the urgent need for culturally sensitive and religiously informed health education during Ramadan, delivered through channels trusted by the community [31]. Key predictors of good oral hygiene behavior identified in this study include being part of the medical profession, brushing multiple times daily, using mouthwash, and believing that brushing does not break the fast. These findings are consistent with health behavior theories which state that accurate knowledge and positive beliefs are strong motivators for engaging in health-promoting behaviors [32]. Prior literature on Ramadan-related health practices also emphasizes the interplay between belief systems, educational background, and personal health practices, especially during periods of religious observance [33]. Moreover, recent studies investigating the effect of Ramadan fasting on oral health have found that while fasting can temporarily alter the composition of saliva and oral flora, these changes do not necessarily lead to deterioration of oral health if proper hygiene is maintained [34]. Some reports have even suggested that intermittent fasting, when coupled with regular oral care, may help reduce inflammation and oxidative stress in the oral cavity. These findings lend further support to the idea that fasting alone is not detrimental to oral health; rather, the outcome depends on the individual's hygiene practices and knowledge base [35]. Faith-based health promotion strategies may be particularly effective in addressing this gap. Involving religious scholars alongside healthcare providers in awareness programs can increase public trust and correct false beliefs regarding what is permissible during fasting [36]. Oral hygiene campaigns delivered through mosques, religious lectures, or community health workers during Ramadan could reach a wider audience and improve practices among non-medical populations [37]. Additionally, integrating oral hygiene discussions into broader Ramadan health initiatives can help normalize the conversation around fasting and dental care [38].

Limitations of the study:

This study relied on self-reported data, which may be subject to recall bias and social desirability bias, particularly among medical personnel. The use of convenience sampling may have introduced selection bias, limiting generalizability beyond the study population. Additionally, clinical assessments of oral health status were not performed, preventing correlation between reported practices and actual oral health outcomes. Beliefs and practices were assessed only during Ramadan, without pre- or post-Ramadan comparison. Finally, the study was conducted in a single geographic region, which may not reflect nationwide trends.

CONCLUSION AND RECOMMENDATIONS

This study revealed significant disparities in oral hygiene practices and health beliefs between medical and non-medical personnel during Ramadan. Medical personnel demonstrated superior dental care behaviors, including higher frequency of brushing, use of adjunctive cleaning aids, and fewer misconceptions about the permissibility of oral hygiene during fasting. In contrast, non-medical participants exhibited suboptimal practices and a higher prevalence of oral complaints, likely driven by false religious beliefs and limited health literacy. These findings underscore the urgent need for culturally sensitive oral health education campaigns during Ramadan, particularly targeting non-medical populations to improve hygiene practices and reduce preventable oral health issues.

Funding: *No funding sources*
Conflict of interest: *None declared*
Ethical approval: *The study was approved by the Institutional Ethics Committee.*

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