Sir Salimullah Medical College Journal

Sir Salimullah Med Coll J 2025; 33: 32-36

Original Article

DOI: https://doi.org/10.3329/ssmcj.v33i1.88671

Oral Health Behavior and Status Among Diabetic Patients: A Cross-Sectional Study

Imtiaz Uddin Ahmmed[1], Muhammad Inamul Hassan[2], Mohammed Nasim Haider[3], M A Awal[4], Sharker Md Abdulla Al Mamun[5], Swarnali Podder[6], Sarwar Mahboob[7]

Article information
Received: 07.10.2025
Accepted: 18.02.2026

Cite this article:
Ahmme IU, Hassan MI, Haider MN, Awa MA, Mamun SMAA, Podder S. Oral Health Behavior and Status among Diabetic Patients: A descriptive Cross-Sectional Study. Sir Salimullah Med Coll J 2025; 33(1): 32-36.

Key words:
Diabetes mellitus, oral health behavior, DMFT index, periodontal disease, Bangladesh

Abstract

Background: *Diabetes mellitus (DM) is a chronic metabolic disorder associated with significant systemic and oral complications. Poorly controlled diabetic patients are susceptible to periodontal disease, dental caries, and other oral pathologies. But the association of oral and dental diseases to diabetes mellitus has not received enough attention. However, oral health remains an overlooked aspect of diabetes management in Bangladesh. This study aimed to assess the oral health behavior and status of diabetic patients attending a non-government, secondary-level hospital in Bogra, Bangladesh.* ***Methods:*** *A descriptive cross-sectional study was conducted among 200 diabetic patients from January to December 2023. Data were collected using a pretested semi-structured questionnaire and clinical oral examination assessing DMFT(Decayed, Missing, and Filled Teeth) index and periodontal status. Descriptive and bivariate analyses were performed using the Statistical Package for the Social Sciences (SPSS) software, version 26.0, with statistical significance set at $p < 0.05$.* ***Results:*** *Most respondents (53%) were female and within the 46–55-year age group. Only 33.5% demonstrated adequate oral health knowledge, and 77.5% brushed once daily. Interdental cleaning (3%) and dental visits (36.5%) were uncommon. Clinically, 53.5% exhibited DMFT ≥3, and 23% had periodontitis. Significant associations were found between brushing frequency and both DMFT and periodontal status ($p < 0.05$).* ***Conclusion:*** *In this study diabetic patients generally exhibit poor oral health behavior and unsatisfactory oral status, only one-third of respondents had adequate knowledge of oral health. Regular oral hygiene, routine dental check-ups, and awareness about the oral complications of diabetes should be prioritized to improve overall health outcomes in this population.*

Introduction:

Diabetes mellitus (DM) is a chronic metabolic disorder characterized by persistent hyperglycemia resulting from defects in insulin secretion, insulin action, or both.[1] It is one of the fastest-growing global health problems, contributing significantly to morbidity and mortality. According to the World Health Organization, approximately 422 million people worldwide are living with diabetes, and this number is projected to rise to 643 million by 2030,

1. Lecturer, Department of Children Dentistry, Sir Salimullah Medical College, Dhaka, Bangladesh.
2. Associate Professor, Department of Dental Public Health, Sir Salimullah Medical College, Dhaka, Bangladesh.
3. Associate Professor, Department of Maxillofacial Surgery, Sir Salimullah Medical College, Dhaka, Bangladesh.
4. Lecturer Department of Maxillofacial Surgery, Sir Salimullah Medical College, Dhaka, Bangladesh.
5. Lecturer, Department of Conservative Dentistry, Sir Salimullah Medical College, Dhaka, Bangladesh.
6. Lecturer, Department of Periodontology and Oral Pathology, Sir Salimullah Medical College, Dhaka, Bangladesh.
7. Associate Professor, Department of Community Medicine & Public Health, Sir salimullah Medical College, Dhaka, Bangladesh

Correspondence: Dr. Imtiaz Uddin Ahmmed, Lecturer, Department of Children Dentistry, Sir Salimullah Medical College, Dhaka, Bangladesh. Email: imtiaz.ahmm @gmail.com

with the majority of cases occurring in low- and middle-income countries.[2] South Asia, including Bangladesh, is witnessing a sharp increase in diabetes prevalence due to urbanization, sedentary lifestyle, and dietary transitions.[3]

Beyond its well-known systemic complications, such as retinopathy, nephropathy, neuropathy, and cardiovascular disease, diabetes has a profound impact on oral health. Individuals with diabetes are more prone to developing oral conditions, including xerostomia, oral candidiasis, delayed wound healing, dental caries, and periodontal disease.[4] Moreover, a bidirectional relationship exists between diabetes and periodontal disease: hyperglycemia promotes periodontal tissue breakdown through increased inflammatory mediators, while chronic periodontal infection can impair glycemic control by elevating systemic inflammation.[5]

Oral health is an essential determinant of overall well-being, influencing nutrition, communication, self-esteem, and quality of life. However, despite the strong evidence linking diabetes and oral health, this aspect is often neglected in diabetic management—particularly in resource-limited settings.[6] Awareness and practice of oral hygiene behaviors, such as regular tooth brushing, interdental cleaning, and dental visits, remain inadequate among diabetic patients.[7]

This descriptive cross-sectional study aims to assess oral health behavior and status among diabetic patients in Bangladesh. The findings are expected to provide evidence for integrating oral health education and preventive strategies into diabetes care, ultimately improving both oral and systemic health outcomes.

Methods:

This descriptive cross-sectional study was conducted among adult diabetic patients attending Bogra Swasthoseba Hospital from January to December 2023. Diabetic patients on medication with available HbA1c reports were included, while those with complications or unwilling to participate were excluded. The calculated sample size was 217; however, 200 patients were selected purposively.

Data were collected using a pretested semi-structured questionnaire and clinical checklist. The questionnaire assessed socio-demographic characteristics, oral health knowledge, and behavior, while oral examinations using a mouth mirror and dental probe determined DMFT (Decayed, Missing, and Filled Teeth) scores and periodontal status. Data were analyzed with the Statistical Package for the Social Sciences (SPSS) software, version 26.0 using descriptive and bivariate statistics. The study was approved by the Institutional Review Board of the National Institute of Preventive and Social Medicine and written informed consent were obtained, ensuring confidentiality and voluntary participation.

Results:

Among 200 diabetic patients, the majority (40%) were aged 46–55 years, with a slightly higher proportion of females (53%) than males (47%). Over half (53%) resided in rural areas, and most had primary or secondary education. Homemakers constituted the largest occupational group (48.5%). About 62% had diabetes for over five years.

Only one-third (33.5%) of respondents had adequate knowledge of oral health. Dentists were the main information source (32%), while half of the respondents could not identify any source. Most participants (77.5%) brushed once daily, using toothpaste (73.5%) and toothbrushes (81.5%), whereas interdental cleaning and mouthwash use were rare. Nearly two-thirds (63.5%) had never visited a dentist.

Regarding oral health status, 37.5% had decayed teeth, 50% had missing teeth, and 37.5% had fillings. More than half (53.5%) showed a DMFT score ≥3, and periodontitis was present in 23%. A significant association was observed between oral health knowledge and dental caries, and between brushing frequency and both periodontitis and DMFT score ($p < 0.05$).

These findings indicate that diabetic patients generally exhibit poor oral health behavior and unsatisfactory oral status, emphasizing the need for targeted oral health education and preventive care.

Table I. *Relationship between oral health knowledge and Dental caries of the respondents (n=200)*

Oral Health Knowledge	Dental caries				
	Present	Absent	Total	χ^2	p
Yes	17	50	67	6.322	.005
No	58	75	133		
Total	75	125	200		

Chi square test was done. The result is significant at $p < .05$.

Table II. Relationship between frequency of tooth brushing and periodontitis of the respondents (n=200)

Frequency of tooth brushing	Periodontitis				
	Present	Absent	Total	χ^2	p
Once daily	42	113	155	6.527	.005
Twice daily	4	41	45		
Total	46	154	200		

Chi square test was done. The result is significant at $p < .05$.

Table III. Relationship between frequency of tooth brushing and Dental caries of the respondents (n=200)

Frequency of tooth brushing	Dental caries				
	Present	Absent	Total	χ^2	p
Once daily	66	89	155	7.587	.003
Twice daily	09	36	45		
Total	75	125	200		

Chi square test was done. The result is significant at $p < .05$.

Table IV. Relationship between duration of diabetes and DMFT score of the respondents (n=200)

Duration of Diabetes	DMFT score				
	< 3.0	3.0 or above	Total	χ^2	p
<5 years	96	28	124	16.078	<.0001
6 to 10 years	25	19	44		
>10 years	14	18	32		
Total	135	65	200		

Chi square test was done. The result is significant at $p < .05$.

Discussion:

Diabetes mellitus is a chronic metabolic disorder known to adversely affect oral health through impaired immune response and vascular changes. Numerous studies have demonstrated that individuals with diabetes are at greater risk of oral diseases such as dental caries, gingivitis, and periodontitis.[8] The present descriptive cross-sectional study assessed oral health behavior and status among diabetic patients, revealing

substantial gaps in oral health awareness and hygiene practices.

In this study, 200 diabetic patients were included, with a slightly higher proportion of females (53%) than males (47%), consistent with findings from India.[9] The majority of participants were within the 46–55-year age group, aligning with the study by Ismaeil and Ali, who found most diabetic participants to be middle-aged or older.[10] The demographic distribution suggests that middle adulthood represents a critical period for the manifestation and management of diabetes-related oral health problems.

62% respondents had diabetes for less than five years, which is higher than the 39.4% reported by Sahril et al. in Malaysia.[11] The shorter disease duration in this cohort may reflect earlier diagnosis or improved healthcare access. Despite this, awareness regarding the impact of diabetes on oral health was notably poor—only 49% had any knowledge about oral health. Doctors were the primary source of information (32%), followed by family, teachers, and media. These findings parallel those of Awartani in Saudi Arabia, where physicians were also the main source of oral health education, though awareness levels remained low. The lack of targeted oral health education among diabetics underscores an urgent need for integrated health promotion strategies within diabetic care programs.

Regarding oral hygiene practices, 77.5% of respondents brushed their teeth once daily, and only 22.5% brushed twice daily. This is comparable to findings by Emmanuel et al. where most participants brushed once daily and only 24% brushed twice.[12] Similarly, Mahbub et al. reported that only one-third of diabetic patients brushed twice daily. The low frequency of toothbrushing in the present study suggests insufficient awareness of its preventive benefits against dental caries and periodontal disease. Interdental cleaning habits were also poor. Only 3% of respondents used dental floss, while 16.5% used wooden toothpicks, and 80.5% did not practice any interdental cleaning. This is lower than Mahbub et al.'s (2018) findings, where 16% used floss and 34% used toothpicks.[13] The discrepancy may be attributed to limited oral health knowledge and the unavailability or cost of dental hygiene products. Similarly, mouthwash use was minimal (12%), indicating low adoption of adjunctive oral hygiene measures among diabetic individuals.

The assessment of dental health status showed that 53.5% of participants had a DMFT (Decayed, Missing, and Filled Teeth) score of e"3, with a mean DMFT of 2.73. Dental caries was found in 37.5% of respondents. This prevalence is higher than that reported by Bhrateesh et al. who found caries in only 13.6% of diabetic subjects.[14] The higher caries rate observed in this study could be due to inadequate oral hygiene and dietary habits. Furthermore, periodontitis was present in 23% of respondents, indicating a significant burden of periodontal disease among diabetic individuals. The association between diabetes and periodontal inflammation is well established, as hyperglycemia contributes to impaired wound healing and altered host response.[15]

The findings reaffirm the bidirectional relationship between diabetes and oral health. Poor glycemic control may exacerbate oral diseases, while oral inflammation may adversely affect blood glucose regulation. The study highlights that patients who maintained regular brushing habits exhibited better oral health outcomes, emphasizing the protective role of consistent oral hygiene.

The limitations of this study include its cross-sectional design, which restricts causal inference, and its reliance on self-reported behaviors, which may be subject to recall bias. Additionally, clinical parameters such as glycemic control (HbA1c) were not assessed, limiting the ability to correlate oral health outcomes with metabolic status.

Despite these limitations, the study provides valuable insight into the oral health behavior of diabetic patients in Bangladesh. The findings indicate a pressing need for comprehensive oral health education tailored to diabetic individuals. Collaboration between physicians, dentists, and diabetes educators is essential to promote regular dental visits, proper toothbrushing, and interdental cleaning. Public health programs should integrate oral health messages within diabetes care to enhance preventive practices.

Conclusion:

In this study diabetic patients generally exhibit poor oral health behavior and unsatisfactory oral

status, only one-third of respondents had adequate knowledge of oral health. Regular oral hygiene, routine dental check-ups, and awareness about the oral complications of diabetes should be prioritized to improve overall health outcomes in this population.

Limitations:
Single-center and the relatively short study duration might limit validity. Future multi-center studies with longer follow-up periods will provide more comprehensive insights.

Data Availability:
The datasets analysed during the current study are not publicly available due to the continuation of analyses but are available from the corresponding author on reasonable request.

Conflict of Interest:
The authors stated that there was no conflict of interest in this study.

Funding:
This research received no external funding.

Ethical Approval:
The study was conducted in accordance with the Declaration of Helsinki (as revised in 2013). This study was approved by the Institutional Review Board of the National Institute of Preventive and Social Medicine, Dhaka. Written informed consent was taken from all the participants before taking part of the study.

Author Contributions:
All authors made a significant contribution to the work reported, whether that is in the conception, study design, execution, acquisition of data, analysis and interpretation, or in all these areas; took part in drafting, revising or critically reviewing the article; gave final approval of the version to be published; had agreed on the journal to which the article had been submitted; and agreed to be account able for all aspects of the work.

Acknowledgments:
The authors were grateful to the staffs of the Department of Children Dentistry, Sir Salimullah Medical College Mitford Hospital (SSMCMH), Dhaka, Bangladesh.

References:

1. American Diabetes Association. Standards of medical care in diabetes—2024. *Diabetes Care. 2024;*47(Suppl 1): S1–S154.
2. World Health Organization. *Global report on diabetes.* Geneva: WHO; 2023.
3. International Diabetes Federation. *IDF Diabetes Atlas.* 10th ed. Brussels: IDF; 2022.
4. Mealey BL. and Oates TW. Diabetes mellitus and periodontal diseases. *Journal of Periodontology. 2006;*77(8):1289–1303.
5. Taylor GW, Borgnakke WS, Preshaw PM. Diabetes and oral health: A two-way relationship. *British Dental Journal.2013;* 215(1):29–35.
6. Benoist HM, Petersen PE, Bourgeois D. Oral health and chronic diseases: Addressing the links. *Community Dentistry and Oral Epidemiology. 2020;*48(6):455–460.
7. Awartani F. Oral health knowledge and practices among diabetic patients in Saudi Arabia. *Journal of Diabetes and Metabolic Disorders.2015;*14(1):28.
8. Nikbin A, et al. The effect of diabetes mellitus on oral health status. *Journal of Oral Health and Epidemiology. 2014;*3(1):1–6.
9. Aggarwal A, Panat SR. Oral health behavior and HbA1c in diabetic patients. *Journal of Indian Society of Periodontology. 2012;*16(4):524–528.
10. Ismaeil FM, Ali, N. Oral health status among diabetic patients. *International Journal of Oral Health Sciences. 2019;* 9(3):178–184.
11. Sahril N, Abdul Aziz H, Aris T. Oral health status and awareness among Malaysian adults with diabetes. *BMC Oral Health. 2019;* 19(1):103.
12. Emmanuel A, Peter A, Mbilinyi M. Oral hygiene practices among diabetic patients attending outpatient clinics. *African Health Sciences.2020;* 20(1): 123–129.
13. Mahbub S, Rahman MM, Ahmed R. Oral health problems and practices among diabetic patients in Bangladesh. *Bangladesh Journal of Dental Research and Education. 2018;* 8(2): 35–41.
14. Bhrateesh JV, Ramesh D, Kumar N. Comparison of dental caries prevalence in diabetic and non-diabetic patients. *International Journal of Dentistry and Oral Health. 2015;* 1(2): 1–6.
15. Mulla JB, Patel V, Shah R. Evaluation of DMFT index among diabetic and non-diabetic adults. *Journal of Clinical and Diagnostic Research. 2017;* 11(7): ZC01–ZC05.