Original Research Paper

University J Dent Scie 2026; Vol. 12, Issue 2

Assessment of salivary and plasma glucose levels and their correlation with oral health status in adults with and without type 2 diabetes: A cross-sectional study.

Abstract:

Objectives: This study aimed to evaluate plasma and salivary glucose levels and explore their correlation with oral health status among individuals with and without type 2 diabetes in Kanpur City.

Materials and Methods: A cross-sectional study was conducted with 150 diabetic individuals and another 150 participants who were matched for age and sex but did not have diabetes. Salivary and plasma glucose levels were measured and oral health was assessed using the Decayed, Missing, and Filled Teeth (DMFT) index, Community Periodontal Index (CPI), and Loss of Attachment (LOA) index.

Results: Diabetic participants exhibited significantly higher mean plasma glucose (212.63 ± 75.47 mg/dl) and salivary glucose (10.56 ± 4.51 mg/dl) levels than controls. A significant positive relationship (r = 0.88, P = 0.001) was found between the glucose levels in saliva and plasma. Individuals with diabetes also demonstrated significantly poorer oral health outcomes, including higher DMFT scores, a greater prevalence of shallow periodontal pockets (CPI score 3), and moderate to severe attachment loss (LOA scores 2–4).

Conclusion: Elevated salivary glucose levels in individuals with diabetes are strongly correlated with plasma glucose levels and poor oral health, highlighting the potential of saliva as a noninvasive tool for glycemic monitoring and early detection of diabetes-related oral complications.

Keywords: Diabetes Mellitus, Saliva, Glucose, Periodontal diseases, Dental Caries.

Introduction:

Diabetes has rapidly escalated to epidemic proportions in India, affecting over 62 million individuals who have been diagnosed with this condition.[1,2] As of the year 2000, India had the highest number of diabetes mellitus cases globally, with 31.7 million individuals affected. China followed with 20.8 million cases, and the United States was third with 17.7 million diagnosed individuals. By the year 2030, it is anticipated that diabetes mellitus could effect as many as 79.4 million people in India.[3]

Diabetes is a rapidly expanding and silent epidemic with the potential to overwhelm the healthcare systems worldwide. Diabetes mellitus encompasses a range of chronic disorders characterized by a lack of insulin, resistance of cells to insulin, or both, leading to high blood sugar levels and other metabolic issues. This condition is linked to severe complications affecting the eyes, kidneys, heart, blood vessels, and other organs, which can greatly lower quality of life and shorten a patient's lifespan. [4]

Access this article online

Website:
www.ujds.in

DOI:
https://doi.org/10.21276/ujds.2026.12.2.10

[1]VAIBHAV BANSAL, [2]CHARANJEET SINGH, [3]DEVENDRA PAL SINGH, [4]VIKALP BANSAL, [5]ZEBA SIDDIQUI, [6]ANUKRETI AGRAWAL

[1]Department of Public Health Dentistry, Rama Dental College Hospital and Research Centre, Kanpur
[2]Department of Paediatric and Preventive Dentistry, Rama Dental College Hospital and Research Centre, Kanpur
[3]Department of Prosthodontics and Crown & Bridge, Rama Dental College Hospital and Research Centre, Kanpur
[4]Department of Conservative Dentistry and Endodontics, Rishiraj College of Dental sciences and Research Centre, Bhopal
[5]Department of Orthodontics and Dentofacial Orthopaedics, Rama Dental College Hospital and Research Centre, Kanpur
[6]Department of Conservative Dentistry and Endodontics, Rishiraj college of Dental sciences and Research Centre, Bhopal

Address for Correspondence: Dr. Devendra Pal Singh
Head of Dept.
Department Prosthodontics Rama Dental College Hospital & Research Centre, Kanpur
Email : devendrachhonkar1983@gmail.com

Received : 31 March, 2026, **Published :** 30 June, 2026

How to cite this article: Bansal, V., Singh, C., Singh, D. P., Bansal, V., Siddiqui, Z., & Aggrawal, D. A. (2026). Assessment of salivary and plasma glucose levels and their correlation with oral health status in adults with and without type 2 diabetes: A cross-sectional study. UNIVERSITY JOURNAL OF DENTAL SCIENCES, 12(2).

Diabetes is divided into two categories based on the underlying causes: type 1 and type 2. The most common form, type 2 diabetes, is marked by both insulin resistance and impaired insulin secretion. Furthermore, there are other specific types of diabetes, including those caused by autoimmune endocrinopathies; infections like congenital rubella, cytomegalovirus, and coxsackie virus; genetic disorders; and diabetes triggered by medications or pregnancy. [5]

Diabetes Mellitus (DM) can be identified using several criteria: fasting plasma glucose, plasma glucose levels two hours post-Oral Glucose Tolerance Test (OGTT), random plasma glucose readings, or glycosylated hemoglobin (HbA1c) levels. According to the American Diabetes Association, a diagnosis can be made if HbA1C is ≥ 6.5%, fasting plasma glucose (FPG) is 126 mg/dl (7.0 mmol/l), or if there is a random plasma glucose level of ≥ 200 mg/dl (11.1 mmol/l) during an OGTT. Additionally, in patients exhibiting classic hyperglycemia symptoms or experiencing a hyperglycemic crisis, a random plasma glucose level of ≥200 mg/dl (11.1 mmol/l) is also indicative.[6]

Numerous soft tissue issues within the oral cavity have been linked to diabetes mellitus (DM).These issues encompass periodontal conditions, such as periodontitis and gingivitis, as well as salivary gland problems that result in decreased saliva production, altered saliva composition, and taste disturbances. Additionally, individuals with diabetes have been reported to experience oral fungal and bacterial infections.Studies have also reported the occurrence of oral mucosal lesions, such as stomatitis, geographic tongue, benign migratory glossitis, fissured tongue, traumatic ulcers, lichen planus, lichenoid reactions, and angular cheilitis. [7,8] Furthermore, patients with diabetes have been observed to have delayed healing of mucosal wounds, neuro-sensory disorders affecting the mucosa, dental caries, and tooth loss. [9]

Managing diabetes requires frequent checks of blood glucose levels, typically performed through finger pricks or by drawing blood intravenously. A non-invasive method for measuring glucose levels is extremely valuable in many situations. [10] Saliva, much like plasma or serum, is considered a unique yet complex bodily fluid. It can be easily collected using noninvasive techniques, and its storage is cost-effective. [11]

Analyzing the biochemical properties of saliva holds significant biomedical value, as it is easily obtainable, providing a cost-efficient method for screening large groups of people. This could serve as an alternative for patients who have difficulty providing blood samples, especially when compliance is an issue.]This study aimed to evaluate glucose levels in both plasma and saliva and to examine their relationship with oral health status in individuals with and without type 2 diabetes in Kanpur city.

Methodology:

The current research utilized a cross-sectional approach and took place in the Department of Public Health Dentistry at Rama Dental College Hospital and Research Centre, Kanpur, India. Approval for this study was granted by the College's Institutional Ethical Committee [RDCHRC/ETHICSCOMMITTE/2022/0236]. Before any examinations were conducted, all participants provided written informed consent. A single examiner, who received training and calibration in the public health dentistry department to reduce diagnostic variability, carried out all evaluations. To determine the study's feasibility, a pilot study was conducted with 30 diabetic patients. Participants in the survey were categorized into case and comparison groups.

The sample size was calculated using a report from the International Diabetes Federation, which stated that the diabetes prevalence rate in India was 8.7%.[13] Consequently, a sample size of 150 was obtained. Therefore, a final sample of 150 diabetic individuals was selected along with a control group of 150 non-diabetic individuals, maintaining a 1:1 ratio.

During the study period, all patients diagnosed with type 2 diabetes who visited the General Medicine Department at Rama Hospital were included in the research. However, individuals with any medical condition, including diabetes mellitus, that would prevent an oral examination without necessary medication were not part of the study. Additionally, patients with other systemic diseases or a recent history of medication that might affect oral microflora and salivary flow were also excluded.

In the Hospital's outpatient department (OPD), an examination was performed using a mouth mirror and CPI probe under sufficient natural lighting. The assessment of caries was carried out using the decayed missing filled teeth index/decayed extracted filled (DMFT/def index), while the periodontal condition was evaluated with the Community Periodontal Index (CPI) as adapted from the WHO Oral Health Survey (2013).[14] An unstimulated saliva sample was collected to measure salivary glucose levels. All saliva samples were collected two hours after breakfast using the 'spit technique.' During the procedure, the patients were

instructed to sit with their head inclined forward and to refrain from speaking, moving their head, or swallowing any saliva present in the oral cavity. The patient was then directed to expel saliva into a sterile graduated container, capable of preserving the sample for up to three hours, once every minute over a ten-minute period.[8]

The glucose concentration in saliva was measured using the glucose oxidase technique with a semi-automated analyzer. A 100 µL saliva sample was combined with glucose oxidase reagent in a 1:3 ratio and then incubated for 5 minutes at 37°C.

The absorbance of both the standard and the sample was recorded against a reagent blank. To determine salivary glucose levels, the glucose standard was diluted to one-tenth of its original concentration. This method was standardized and could detect a minimum salivary glucose concentration of 0.2 mg/dl.[8]

Data from the precoded survey forms were digitized.Data entry, validation checks, and generation of the required outcomeswere performed using SPSS version 26.0 (IBM Corporation, Statistical Package for the Social Sciences, N.Y., USA). The threshold for statistical significance was set at $P \leq 0.05$.

RESULT

The average age of individuals diagnosed with diabetes (cases) was 50.59 ± 11.36 years, compared to an average age of 49.45 ± 10.12 years for those without diabetes (controls). In the case group, 52.0% were male and 48.0% were female, while in the control group, 50.7% were male and 49.3% were female. In both groups, the majority of individuals were married, showing a similar distribution of marital status (90.7% of cases versus 92.0% of controls). A chi-square analysis revealed no significant differences between cases and controls concerning age, gender, or marital status ($p > 0.05$), indicating that both groups were demographically matched. (Table 1)

A significantly greater proportion of individuals with diabetes (43.8%) had plasma glucose levels exceeding 200 mg/dl, whereas 95.4% of the control group had levels at or below 120 mg/dl. Similarly, 32.3% of diabetic individuals presented with salivary glucose levels greater than 13.3 mg/dl, a condition not observed in the control group. Conversely, 58.7% of non-diabetic individuals had salivary glucose levels below 4.1 mg/dl, compared to only 0.8% of diabetic individuals, highlighting a significant disparity between the groups (Table 2).The mean random plasma glucose level in individuals with diabetes was significantly higher (212.63 ± 75.47 mg/dl) than in those without diabetes (95.18 ± 13.44 mg/dl), with a t-value of 18.76 and a P-value of 0.001.In diabetic individuals, the average salivary glucose level was 10.56 ± 4.51 mg/dl, which was notably higher than that of non-diabetic individuals, who had an average of 3.94 ± 1.93 mg/dl. This difference was statistically significant, with a t-value of 16.52 and a P-value of 0.001.(Graph 1)

The study identified a strong positive correlation between salivary and random plasma glucose levels, as evidenced by a Pearson's correlation coefficient (r) of 0.88.This finding indicates that salivary glucose levels are a reliable indicator of plasma glucose levels in individuals with type 2 diabetes, thereby supporting the potential use of saliva as a noninvasive diagnostic fluid for glycemic monitoring. (Table 3)

In relation to caries experience, the overall Decayed, Missing, and Filled Teeth (DMFT) score was significantly elevated in individuals with diabetes (4.11 ± 2.37) compared to the control group (2.77 ± 1.94) ($t = 5.35$, $p = 0.001$). The Community Periodontal Index (CPI) and Loss of Attachment (LOA) scores indicated significantly poorer periodontal health among diabetic individuals than among non-diabetic individuals. Diabetic participants demonstrated a statistically significant higher mean score for shallow periodontal pockets (CPI score 3:1.96 ± 2.19) than the control group (0.57 ± 1.01).Conversely, lower scores, such as Bleeding on Probing (score 1), were significantly more prevalent in the control group ($p = 0.001$). Regarding LOA, mild attachment loss (score 1) was more common among controls, whereas moderate to severe attachment loss (scores 2 to 4) was significantly more pronounced in diabetic individuals, with score 4 (severe LOA) being notably higher (0.13 ± 0.19 vs. 0.03 ± 0.08, $p = 0.001$). These findings suggest that individuals with diabetes experience advanced periodontal destruction.

Table 1: Percentage distribution of Cases and Controls according to demographic details

Parameters		Cases	Controls	χ^2 value	p-value
		Frequency (%)	Frequency (%)		
Age (years)	<50 years	85(56.7)	87(58.0)	0.055	0.907
	>50 years	65(43.3)	63(42.0)		
Gender	Male	78(52.0)	76(50.7)	0.053	0.908
	Female	72(48.0)	74(49.3)		
Marital Status	Single	14(9.3)	12(8.0)	0.168	0.838
	Married	136(90.7)	138(92.0)		
Total		150(100.0)	150(100.0)		

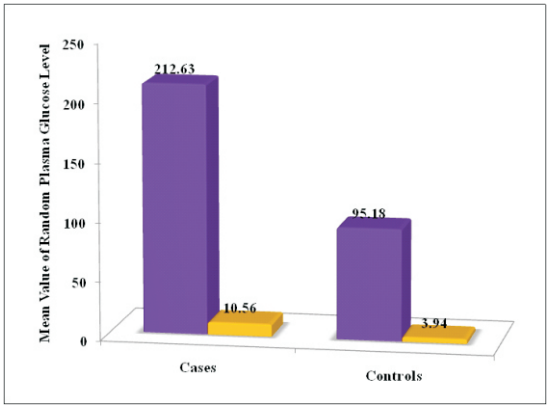
Table 2: Percentage distribution of Cases and Controls according to Random plasma glucose level and Salivary Glucose Level

Parameter		Cases	Control	p-value
		Frequency (%)	Frequency (%)	
Random plasma glucose level	=120 mg/dl	4(2.3)	142(95.4)	χ^2=252.08
	121 to 200 mg/dl	80(53.8)	8(4.6)	P=0.001
	More than 200 mg/dl	66(43.8)	0(0)	
Salivary Glucose Level	Less than 4.1 mg/dl	1(0.8)	88(58.7)	
	4.2 to 13.3 mg/dl	87(66.9)	62(41.3)	χ^2=151.24
	More than 13.3 mg/dl	42(32.3)	0(0)	P=0.001

Table 3: Correlation of salivary glucose levels and random plasma glucose levels among cases.

	Random Plasma Glucose Level	
Salivary Glucose Level	Pearson correlation coefficient (r)	0.88
	P Value	0.001*

Pearson correlation, *Significant



Graph 1: Mean value of Random plasma glucose level and Salivary Glucose Level among Cases and Controls

Index		Case	Control	t value	P value
Caries Status	D	2.79±2.14	2.20–1.58	2.72	0.007
	M	1.16±1.5	0.46–0.75	5.11	0.001*
	F	0.16+0.55	0.11+0.45	0.86	0.39
	DMFT	4.11±2.37	2.77±1.94	5.35	0.001*
CPI	0	0.77±1.26	0.33–1.23	3.19	0.015*
	1	0.59+1.05	2.71–1.84	12.25	0.001*
	2	2.65+2.11	2.36–1.92	1.24	0.21
	3	1.96±2.19	0.57–1.01	7.05	0.001*
	4	0.03+0.23	0.03–0.15	0.00	1.00
LOA	0	1.68+2.24	1.95–2.03	1.09	0.27
	1	2.67+2.21	3.19–1.92	1.75	0.03*
	2	1.16±1.52	0.77–1.44	2.17	0.023*
	3	0.36+0.98	0.06–0.17	3.69	0.001*
	4	0.13+0.19	0.03–0.08	5.94	0.001*

Table 4: Percentage distribution of caries experience and CPI scores for the study groups.

Discussion

The prevalence of dental diseases and their effects on the general public are significant public health concerns. Diabetes Mellitus, which is a major public health issue in its own right, may heighten an individual's susceptibility to dental diseases. As a result, this comparative study was conducted to assess and contrast the dental health of patients with and without DM.[15,16]

The current research underscores a notable positive relationship between glucose levels in saliva and plasma among individuals with type 2 diabetes. These findings are consistent with previous research and contribute to growing evidence supporting the diagnostic and prognostic potential of salivary glucose in diabetes. Several studies have demonstrated that salivary glucose levels are elevated in patients with diabetes and correlate significantly with plasma glucose levels, reinforcing the current study's finding of a strong positive correlation ($r = 0.88$, $p = 0.001$).According to Dwivedi et al. [17], diabetic patients exhibited notably elevated salivary glucose levels, which showed a strong correlation with plasma glucose levels. This indicates that saliva can serve as a dependable noninvasive biomarker for assessing glycemic status. Similar correlations were observed by Kadashetti et al.[18], who emphasized the utility of salivary glucose in both the diagnosis and monitoring of diabetes, and by Shaik et al.[19], who also linked elevated salivary glucose with diabetic oral manifestations.

The increased DMFT scores and the presence of decayed and missing teeth among diabetics in the current study are in agreement with findings from Kakoei et al.[20], who reported that individuals with elevated salivary glucose levels exhibited worse dental and periodontal indices irrespective of diabetic status.Likewise, Puttaswamy et al.[21] demonstrated that salivary glucose levels significantly influenced periodontal status in patients with diabetes, supporting the association between glycemic status and oral health outcomes. One plausible explanation for the observed oral health deterioration in diabetics is hyperglycemic-induced alterations in salivary composition, particularly increased glucose levels, which can promote bacterial growth and inflammatory responses. Elevated salivary glucose creates a favorable environment for cariogenic bacteria and impairs immune defense mechanisms, contributing to both dental caries and periodontal diseases [22].

The present study found that individuals with type 2 diabetes had a significantly higher prevalence of shallow periodontal pockets (CPI score 3) and moderate to severe loss of attachment (LOA), indicating advanced periodontal

breakdown, than non-diabetic controls.In contrast, gingival bleeding (CPI score of 1) was more common in the non-diabetic group.These findings align with a growing body of research supporting a strong association between type 2 diabetes and more severe periodontal diseases.

Numerous studies have found comparable outcomes using CPI and LOA indices. Research by Yavagal and Nagesh[23] found that patients with diabetes had a notably higher occurrence of CPI score 4 and LOA ≥ 6 mm compared to those without diabetes, indicating that diabetes exacerbates the severity of periodontal disease. Apoorva et al.[24] also observed that diabetic patients had notably higher mean CPI scores and more missing teeth, suggesting a greater occurrence and intensity of periodontal damage. These results can be attributed to the underlying pathophysiological mechanisms of diabetes, which compromise periodontal health. Persistent high blood sugar levels lead to an increased formation of advanced glycation end-products (AGEs), which disrupt collagen metabolism and trigger the release of pro-inflammatory cytokines TNF-α and IL-1β.These changes impair the host such as immune response and exacerbate the destruction of the periodontal tissue.[25]Additionally, Bhardwaj [26] found that patients with higher HbA1c levels and longer diabetes duration had significantly worse CPI scores and more extensive attachment loss, further supporting the link between poor glycemic control and periodontal deterioration. In contrast, the more frequent gingival bleeding observed in non-diabetic individuals may reflect an earlier stage of periodontal disease, where inflammation is present but without significant tissue breakdown. Diabetics may experience suppressed bleeding due to vascular changes and impaired immune response, despite having more severe underlying destruction.[27]

The primary drawback of this study was its cross-sectional nature, which limits the capacity to determine causal links between glucose levels and oral health conditions. Furthermore, this study relied on unstimulated saliva samples, which may be affected by various physiological conditions. Future longitudinal and multicenter studies with larger, more diverse populations are needed to explore the causal pathways, assess the impact of glycemic control on oral health over time, and evaluate the potential of salivary glucose as a non-invasive diagnostic tool for routine diabetes monitoring.

Conclusion:

The present study revealed a significant association between elevated salivary and plasma glucose levels and a compromised oral health status in individuals with type 2 diabetes. The potential of using saliva as a noninvasive method for tracking glycemic status is supported by the strong positive correlation between glucose levels in saliva and plasma. Diabetic participants exhibited a higher caries experience, poorer periodontal condition, and greater loss of attachment than non-diabetic participants. These findings underscore the importance of integrating oral health assessment into the routine management of diabetic patients and highlight the need for collaborative care between medical and dental professionals to improve overall health outcomes in diabetic populations.

References:

1. Joshi SR, Parikh RM. India; the diabetes capital of the world: Now heading towards hypertension. J-Assoc Physicians India. 2007;55(Y):323
2. Kumar A, Goel MK, Jain RB, Khanna P, Chaudhary V. India towards diabetes control: Key issues. Australas Med J. 2013;6(10):524.
3. Wild S, Roglic G, Green A, Sicree R, King H. Global prevalence of diabetes: estimates for the year 2000 and projections for 2030. Diabetes Care. 2004;27(5):1047–53.
4. Little RR, Goldstein DE. Endocrine (standardization of glycohemoglobin measurement). Anal Chem. 1995 June 15;67(12):393–7
6. Surampudi PN, John-Kalarickal J, Fonseca VA. Emerging Concepts in the Pathophysiology of Type 2 Diabetes Mellitus. Mt Sinai J Med J Transl Pers Med. 2009 June;76(3):216–26.
7. Association AD. Diagnosis and classification of diabetes mellitus. Diabetes Care. 2010;33(Supplement_1):S62–9
8. Sandberg GE, Sundberg HE, Fjellstrom CA, Wikblad KF. Type 2 diabetes and oral health: a comparison between diabetic and non-diabetic subjects. Diabetes Res Clin Pract. 2000;50(1):27–34..
9. Collin HL, Niskanen L, Uusitupa M, Töyry J, Collin P, Koivisto AM, et al. Oral symptoms and signs in elderly patients with type 2 diabetes mellitus: a focus on diabetic neuropathy. Oral Surg Oral Med Oral Pathol Oral Radiol Endodontology. 2000;90(3):299–305
10. Murray CE, Coleman CM. Impact of diabetes mellitus on bone health. Int J Mol Sci. 2019;20(19):4873
11. Hegde A, Shenoy R, D'Mello P, Smitha A, Tintu A, Manjrekar P. Alternative markers of glycemic status in diabetes mellitus. Biomed Res-INDIA. 2010;21(3):252–6.
12. Song M, Bai H, Zhang P, Zhou X, Ying B. Promising applications of human-derived saliva biomarker testing in clinical diagnostics. Int J Oral Sci. 2023;15(1):2

13. Kaufman E, Lamster IB. THE DIAGNOSTIC APPLICATIONS OF SALIVA— A REVIEW. Crit Rev Oral Biol Med. 2002 Mar;13(2):197–212
14. Pradeepa R, Mohan V. Prevalence of type 2 diabetes and its complications in India and economic costs to the nation. Eur J Clin Nutr. 2017;71(7):816–24
15. Organization WH. Oral health surveys: basic methods [Internet]. World Health Organization; 2013 [cited 2025 July 15]. Available fromhttps://books.google.com/books?hl=en&lr=&id=8rEXDAAAQBAJ&oi=fnd&pg=PP1&dq=WHO+oral+Health+Survey+(2013)&ots=fEIFW4uAXo&sig=dB_lA54kgK6U9M1dX1aovXJfTgM
16. Lamster IB, Lalla E, Borgnakke WS, Taylor GW. The relationship between oral health and diabetes mellitus. J Am Dent Assoc. 2008;139:19S-24S
17. Saini R, Al-Maweri SA, Saini D, Ismail NM, Ismail AR. Oral mucosal lesions in non oral habit diabetic patients and association of diabetes mellitus with oral precancerous lesions. Diabetes Res Clin Pract. 2010;89(3):320–6
18. Dwivedi A, Purohit BM, Purohit A, Bhambal A. Journal of Diabetes and Obesity. [cited 2025 July 15]; Available from https://www.academia.edu/download/57271219/JDO-17-RA-1378new-min.pdf.
19. Kadashetti V, Baad R, Malik N, Shivakumar KM, Vibhute N, Belgaumi U, et al. Glucose Level Estimation in Diabetes Mellitus By Saliva: A Bloodless Revolution. Rom J Intern Med. 2015 Sept 1;53(3):248–52
20. Shaik S, Jayam R, Bokkasam V, Dirasantchu S, Venkata SS, Praveen S. Salivary glucose and oral mucosal alterations in type II diabetic mellitus patients. J Indian Acad Oral Med Radiol. 2017;29(4):259–62
21. Kakoei S, Hosseini B, Haghdoost AA, Sanjari M, Hashemipour MA, Gholamhosseinian A. The detection of salivary glucose, caries and periodontal status in diabetes mellitus patients. J Oral Health Oral Epidemiol. 2014;3)2(:79–84
22. Puttaswamy KA, Puttabudhi JH, Raju S. Correlation between salivary glucose and blood glucose and the implications of salivary factors on the oral health status in type 2 diabetes mellitus patients. J Int Soc Prev Community Dent. 2017;7(1):28–33.
23. Mishra N, Trivedi A, Gajdhar SK, Bhagwat H, Khutwad GK, Mall PE, et al. Correlation of Blood Glucose Levels, Salivary Glucose Levelsand Oral Colony Forming Units of Candida Albicans in Type 2 Diabetes Mellitus Patients. J Contemp Dent Pract. 2019;20(4):2.
24. Yavagal PC, Nagesh L. Comparative evaluation of periodontal status among diabetic and non-diabetic population in davangere city: A cross-sectional study. Int J Appl Dent Sci. 2020;6(3):303–6.
25. Apoorva SM, Sridhar N, Suchetha A. Prevalence and severity of periodontal disease in type 2 diabetes mellitus (non–insulin-dependent diabetes mellitus) patients in Bangalore city: An epidemiological study. J Indian Soc Periodontol. 2013;17(1):25–9
26. Popławska-Kita A, Siewko K, Szpak P, Król B, Telejko B, Klimiuk PA, et al. Association between type 1 diabetes and periodontal health. Adv Med Sci. 2014;59(1):126–31..
27. Bhardwaj V. Prevalence and severity of periodontal disease among non-insulin-dependent diabetes mellitus patients in Shimla City, Himachal Pradesh, India. J Cranio-Maxillary Dis. 2014;3(1):11–11.
28. Bhardwaj V. Prevalence and severity of periodontal disease among non-insulin-dependent diabetes mellitus patients in Shimla City, Himachal Pradesh, India. J Cranio-Maxillary Dis. 2014;3(1):11–11.