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Oral Symptoms to Systemic Health: Protocol for a Community-Based Cross-Sectional Study of Oral-Systemic Conditions, Risk Factors, and Healthcare-Seeking Behaviour

Oral-Systemic Health and Care-Seeking: a Study Protocol

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ABSTRACT:

Background: Oral health is closely linked to general health through shared biological pathways, common risk factors, and healthcare-seeking behaviour. Oral symptoms such as toothache, gingival bleeding, oral dryness, and recurrent ulcers affect quality of life and frequently coexist with systemic conditions, including diabetes mellitus, hypertension, and cardiovascular disease. However, oral complaints are often managed independently of general medical conditions, and delays in seeking professional care may contribute to preventable morbidity.

Aim: To describe a protocol for assessing the prevalence and distribution of self-reported oral symptoms, systemic health conditions, associated behavioural risk factors, and healthcare-seeking patterns among adults.

Methods and analysis: A community-based cross-sectional study will enrol 700 adults aged 18 years and above. Data will be collected using a structured, pilot-tested questionnaire covering sociodemographic characteristics, oral symptoms, self-reported systemic conditions, lifestyle-related risk factors, oral hygiene practices, and healthcare-seeking behaviour. Descriptive statistics with 95% confidence intervals will summarise participant characteristics and prevalence estimates. Associations between systemic conditions and oral symptoms will be assessed using the chi-square or Fisher's exact test, and multivariable logistic regression will estimate adjusted odds ratios for factors

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associated with oral symptoms and delayed healthcare-seeking. Statistical significance will be set at $p < 0.05$.

Ethics and dissemination: Ethical approval will be obtained from the institutional ethics committee before recruitment, and written informed consent will be obtained from all participants. Findings will be disseminated through peer-reviewed publication, scientific conferences, and reports to local health authorities.

Conclusion: This protocol provides an integrated framework for examining oral symptoms, systemic conditions, behavioural risk factors, and healthcare utilisation together. The findings are expected to inform integrated oral and general health promotion and strengthen dental–medical referral pathways.

1. INTRODUCTION

Oral health is an essential component of general health, well-being, and quality of life [1,2]. The oral cavity supports mastication, speech, swallowing, and social interaction, and oral diseases can cause pain, discomfort, functional limitation, nutritional difficulties, and psychological distress [1,3]. Despite their substantial public health burden, oral health problems remain inadequately addressed in many populations, particularly where preventive services and routine dental consultations are not readily accessible [2].

The Global Burden of Disease studies have identified untreated caries of permanent teeth, severe periodontal disease, and other oral disorders as important contributors to morbidity worldwide [4,5]. These conditions may remain untreated for prolonged periods because early symptoms are mild, intermittent, or considered insufficiently serious to warrant professional attention. Untreated disease may progress to pulpal and periapical infection, tooth loss, and the need for more complex surgical, regenerative, or prosthetic rehabilitation [6–10]. Consequently, epidemiological assessment of oral health should extend beyond clinically diagnosed disease to include symptoms, perceived treatment needs, and patterns of healthcare utilisation.

The relationship between oral and systemic health has attracted increasing research interest. Periodontal inflammation, for example, has been associated with diabetes mellitus and cardiovascular conditions [5,11]. Several biological mechanisms have been proposed, including inflammatory signalling, immune responses, microbial interactions, host genetic susceptibility, and shared behavioural and socioeconomic determinants [12]. However, an observed association does not necessarily establish that oral disease directly causes a systemic condition. The direction and magnitude of these relationships vary according to the disease, population, study design, and potential confounding factors.

Diabetes mellitus is particularly relevant to oral-systemic research because hyperglycaemia and periodontal inflammation may influence one another [11]. Poor glycaemic control can increase susceptibility to periodontal complications, while periodontal inflammation may complicate metabolic management; diabetes and its other complications also substantially affect quality of life [13]. Similarly, xerostomia, oral discomfort, orofacial pain, and other changes in oral health may occur alongside medication use, chronic disease, sleep disturbance, tobacco exposure, dehydration, and ageing [14]. Systemic conditions and their treatment, including radiotherapy and chemotherapy, can also influence dental treatment planning and outcomes [15]. These overlapping determinants highlight the importance of collecting information on both oral symptoms and systemic health status.

Behavioural risk factors are another important component of this relationship. Tobacco use, frequent consumption of free sugars, inadequate oral hygiene, harmful alcohol use, and limited preventive dental attendance increase the risk of oral disease [1,3]. Many of these exposures also contribute to noncommunicable diseases [16]. Shared risk factors therefore provide an important opportunity for integrated prevention strategies that address oral and general health together.

Healthcare-seeking behaviour influences whether oral symptoms are assessed and treated appropriately. Some individuals consult a dentist promptly, whereas others seek medical advice, purchase medicines without professional consultation, rely on home remedies, or postpone care until symptoms become severe. Such decisions may be influenced by treatment costs, perceived severity, accessibility of dental services, previous experiences, health literacy, and competing personal responsibilities. Awareness and attitudes are known to shape the uptake of preventive health services more broadly [17]. Understanding these behaviours is necessary for designing responsive and equitable oral healthcare services.

Although research has examined oral disease prevalence and individual oral-systemic associations, combined assessment of symptoms, systemic conditions, behavioural exposures, and healthcare-seeking behaviour can provide a broader epidemiological perspective. Such assessment may help identify populations requiring preventive education, targeted screening, or improved coordination between dental and medical services.

The present study is designed to investigate these dimensions among 700 adults using a structured epidemiological questionnaire. It focuses on the distribution of self-reported oral symptoms and systemic conditions, their statistical association, behavioural risk factors, and patterns of healthcare utilisation. By examining these components together, the research aims to inform integrated approaches to oral and general health promotion.

2. AIM AND OBJECTIVES

2.1 Aim

To assess the epidemiological distribution of oral symptoms, systemic health conditions, behavioural risk factors, and healthcare-seeking behaviour among 700 adults.

2.2 Specific objectives

1. To estimate the prevalence of self-reported oral symptoms among the study participants.
2. To describe the distribution of self-reported systemic health conditions.
3. To assess behavioural and oral hygiene-related risk factors associated with oral symptoms.
4. To examine the relationship between reported systemic conditions and oral symptoms.
5. To assess the use of dental services, medical services, self-medication, and non-utilisation of healthcare among symptomatic participants.
6. To identify sociodemographic and behavioural factors associated with delayed healthcare-seeking behaviour.
7. To propose public health recommendations for integrating oral health assessment with routine medical care.

3. MATERIALS AND METHODS

3.1 Study design

A community-based cross-sectional epidemiological study will be conducted to assess oral symptoms, systemic health conditions, associated risk factors, and healthcare-seeking behaviour at a defined point in time. The cross-sectional design enables estimation of prevalence and examination of statistical associations but does not establish temporal sequence or causality between exposures and outcomes. The study will be reported in accordance with the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines.

3.2 Study setting

The setting has been selected according to the research question, feasibility of recruitment, and the intended target population.

3.3 Study population

The study will include 700 adults aged 18 years and above.

Inclusion criteria

- Adults aged 18 years or older.
- Individuals residing in the selected study area or attending the participating facility during the recruitment period.
- Individuals willing and able to provide informed consent.
- Individuals able to complete the questionnaire independently or with standardised assistance.

Exclusion criteria

- Individuals unable to provide informed consent.
- Individuals with communication or cognitive limitations that prevent reliable questionnaire completion.
- Individuals who decline participation.
- Duplicate or substantially incomplete questionnaires, according to prespecified data-quality criteria.

Exclusions will be applied consistently and documented in a STROBE participant flow diagram.

3.4 Sample size

The sample size was estimated using the formula for a single proportion:

$n = Z^2 p (1 - p) / d^2$

where n is the required sample size, $Z = 1.96$ for a 95% confidence level, p is the anticipated prevalence (assumed to be 50% in the absence of a reliable local estimate, to maximise the sample size), and d is the desired absolute precision. With $p = 0.5$ and $d = 0.04$:

$n = (1.96^2 \times 0.5 \times 0.5) / 0.04^2 = 600.25 \approx 601$

Allowing 10% for non-response or unusable questionnaires (601 / 0.90) gives 668 participants; the target was rounded up to 700 to provide a practical recruitment number. This calculation assumes simple random sampling. If cluster sampling is used, the sample size will be inflated by the anticipated design effect.

3.5 Sampling technique

Where recruitment takes place at a dental or medical facility, consecutive eligible attendees will be enrolled, and this will be reported as facility-based consecutive sampling. The sampling technique will be reported precisely because it determines the representativeness and generalisability of the findings.

3.6 Study instrument

Data will be collected using a structured questionnaire developed from the oral health and noncommunicable disease literature [2,16]. The questionnaire will be reviewed for content validity by subject experts, translated into the local language and back-translated, and pilot-tested before use. Its domains are summarised in Table 1.

Table 1. Questionnaire domains and study variables

Domain	Variables
A. Sociodemographic characteristics	Age; sex/gender (categories as per protocol); educational attainment; occupation; marital status; place of residence; household income or socioeconomic indicator
B. Oral symptoms (12-month recall)	Toothache or dental pain; bleeding gums; tooth sensitivity; bad breath; oral dryness; recurrent oral ulcers; difficulty chewing; swelling or other oral discomfort
C. Systemic health conditions	Diabetes mellitus; hypertension; cardiovascular disease; respiratory disease; thyroid disorders; other chronic medical conditions; current medications
D. Behavioural risk factors	Current and former tobacco use; smokeless tobacco use; alcohol use; frequency of sugary food and beverage intake; toothbrushing frequency; fluoride toothpaste use; interdental cleaning; preventive dental visits

Domain	Variables
E. Healthcare-seeking behaviour	Whether care was sought; type of provider consulted; time to consultation; reasons for delay or avoidance; self-medication or home remedies; barriers to care; history of preventive attendance

A 12-month recall period will be used for all oral symptoms to ensure comparability. Where feasible, self-reported systemic diagnoses will be verified against medical records or prescriptions; unverified conditions will be reported as self-reported and not as confirmed diagnoses.

3.7 Operational definitions

Oral symptom prevalence: The proportion of participants reporting at least one specified oral symptom during the recall period.

Systemic condition prevalence: The proportion of participants reporting at least one diagnosed systemic condition.

Professional healthcare-seeking: Consultation with a qualified dentist or medical practitioner for the reported complaint.

Delayed healthcare-seeking: An interval of more than 2 weeks between symptom recognition and first professional consultation.

Self-medication: Use of medicines for the complaint without consultation with a qualified healthcare professional for that episode.

Multiple responses: Participants may report more than one symptom, systemic condition, risk factor, or barrier; category percentages may therefore exceed 100%.

3.8 Data collection procedure

After ethical approval and informed consent, trained and calibrated investigators will administer the questionnaire through face-to-face interviews following a standardised protocol, in a language understood by the participant. Infection-control procedures will be followed during any clinical contact [18]. A pilot study among participants will assess clarity, feasibility, and administration time; pilot participants will not be included in the main sample.

3.9 Data management

Completed questionnaires will be checked daily for completeness, duplicate records, and inconsistent responses. A codebook will be prepared before analysis, and data will be double-entered to minimise entry errors. Identifiable information will be stored separately from the research dataset in password-protected files accessible only to the investigators. Secure electronic records will also permit future linkage with digital health and decision-support tools [19–22].

3.10 Statistical analysis

Data will be analysed using [SPSS version 20]. Descriptive analysis will include frequencies and percentages for categorical variables, means and standard deviations for approximately normally distributed continuous variables, medians and interquartile ranges for skewed continuous variables, and 95% confidence intervals for the main prevalence estimates.

The chi-square test or Fisher's exact test, as appropriate, will be used to examine associations between categorical variables, including systemic health status and the presence of oral symptoms. Multivariable logistic regression will estimate adjusted odds ratios with 95% confidence intervals for factors associated with oral symptoms and with delayed healthcare-seeking. Potential confounders, including age, sex, socioeconomic status, tobacco use, and oral hygiene practices, have been selected a priori. Model fit, multicollinearity, and missing data will be assessed. Statistical significance will be set at $p < 0.05$, and interpretation will rely on effect estimates and confidence intervals rather than p-values alone.

The planned results tables are: (i) sociodemographic characteristics; (ii) prevalence of oral symptoms; (iii) prevalence of systemic conditions; (iv) behavioural risk factors; (v) healthcare-seeking patterns among symptomatic participants; (vi) cross-tabulation of systemic health status against oral symptoms; and (vii) reported barriers to care.

4. ETHICS AND DISSEMINATION

The study will be conducted in accordance with the Declaration of Helsinki. Written informed consent will be obtained from all participants. Participation will be voluntary, and participants will be free to withdraw at any time without penalty. Confidentiality will be maintained through secure storage and restricted access to data. Participants reporting concerning symptoms will be referred to appropriate dental or medical services according to the approved referral protocol.

Findings will be disseminated through publication in a peer-reviewed journal, presentation at scientific conferences, and summary reports to local health authorities and participating institutions.

5. EXPECTED OUTCOMES AND PUBLIC HEALTH IMPLICATIONS

This study will examine oral symptoms, systemic health conditions, behavioural risk factors, and healthcare-seeking behaviour within a single epidemiological investigation. Such an approach is relevant to public health because oral disorders and noncommunicable diseases share social, behavioural, and biological determinants [1,16].

5.1 Burden of self-reported oral symptoms

Questionnaire-based symptom assessment captures perceived need and includes individuals who have not accessed formal dental services. Symptoms such as toothache, gingival bleeding, sensitivity, recurrent ulcers, and other mucosal lesions may indicate untreated caries, periodontal conditions, dentine hypersensitivity, or soft tissue pathology that requires professional assessment [23,24]; postoperative pain and swelling following dental procedures may also be reported [25]. Because symptom reporting is influenced by recall, health awareness, pain tolerance, and cultural interpretation, self-reported symptoms will not be interpreted as clinical diagnoses.

5.2 Oral-systemic health relationships

The oral-systemic relationship is biologically plausible but heterogeneous. Evidence supports a bidirectional relationship between periodontal disease and glycaemic control [11], and shared risk factors, including tobacco exposure, diet, obesity, and socioeconomic disadvantage, may contribute to observed associations [5]. Findings for periodontal disease cannot be generalised to every oral symptom or systemic condition, since tooth sensitivity, oral ulcers, dry mouth, and dental pain have different aetiologies, and medication effects, age, and comorbidity may account for some observed patterns.

5.3 Behavioural risk factors and prevention

An integrated prevention approach can address several risks simultaneously. Tobacco cessation support, dietary counselling, fluoride use and minimally invasive caries management [26], effective oral hygiene instruction, periodontal therapy with appropriate adjuncts [27,28], and routine dental assessment may provide benefits beyond a single disease category. Medical consultations also offer opportunities to identify unmet dental needs, particularly among people receiving ongoing care for diabetes or other chronic conditions.

5.4 Healthcare-seeking behaviour and unmet need

Individuals may delay care when symptoms are intermittent, when they anticipate high costs, or when dental facilities are inaccessible; fear of treatment and competing responsibilities may also influence attendance. Delayed care can result in untreated disease and greater treatment needs later, including extractions, implant or overdenture rehabilitation, and aesthetic treatment [9,29,30]. Awareness programmes, including digital and virtual patient-education tools [31], should therefore be accompanied by affordable services, clear referral pathways, and opportunities for preventive assessment. The study will distinguish delay before first consultation, delay after referral, and inability to obtain treatment after reaching a facility.

5.5 Implications for integrated health services

Combined assessment of oral and systemic health can inform service models that incorporate oral health questions into chronic disease management and primary care. Adults with diabetes may benefit from periodontal assessment and preventive dental counselling, while patients with recurrent oral symptoms may require clinical examination, medication review, or appropriate imaging [32-37]. Such integration does not imply that systemic disease can be diagnosed from oral symptoms alone; referral and diagnostic decisions should follow established clinical protocols [38]. Anticipated applications include:

1. **Integrated screening:** brief oral health assessment within primary care and chronic disease services.
2. **Preventive education:** awareness of gum bleeding, persistent pain, oral lesions, and other symptoms requiring professional assessment.
3. **Risk-factor reduction:** combining oral health promotion with tobacco cessation and healthy-diet initiatives.
4. **Improved access:** addressing affordability, geographical accessibility, appointment availability, and referral completion.
5. **Targeted follow-up:** identifying individuals with persistent symptoms or chronic conditions who may benefit from dental evaluation.
6. **Surveillance:** repeated standardised assessments to monitor changes in oral symptoms and healthcare utilisation.

6. STRENGTHS AND LIMITATIONS

The principal strength of this study is its multidimensional approach, combining oral complaints, self-reported systemic conditions, behavioural exposures, and healthcare-seeking patterns in a single sample. A sample of 700 participants provides adequate precision for estimating common outcomes, and the structured, pilot-tested questionnaire will support consistent data collection and comparisons across age, socioeconomic, and health-status groups.

Several limitations should be considered. First, the cross-sectional design cannot establish temporal sequence or causality. Second, self-reported symptoms and systemic conditions are subject to recall error, misclassification, and limited awareness of undiagnosed disease. Third, without clinical examination, specific oral diagnoses cannot be distinguished. Fourth, recruitment from a single region or through non-probability sampling may limit generalisability. Fifth, the association between systemic conditions and oral symptoms may be confounded by age, medication use, tobacco exposure, diet, socioeconomic circumstances, and access to care; multivariable analysis will address measured confounders but cannot eliminate residual confounding. Finally, healthcare-seeking behaviour varies with local service availability, cost, and cultural beliefs, so findings may not apply directly to other settings.

7. CONCLUSION

Oral symptoms, systemic health conditions, behavioural risk factors, and healthcare-seeking behaviour are interrelated dimensions of public health. This protocol describes a study of 700 adults that will estimate symptom prevalence, describe self-reported systemic conditions, and evaluate their associations with behavioural and healthcare-related factors. The findings are expected to identify gaps in professional dental attendance and opportunities for coordinated oral and general health services. Future research should build on this work with validated instruments, clinical confirmation, representative sampling, and longitudinal assessment of oral-systemic relationships.

REFERENCES

[1] Peres MA, Macpherson LMD, Weyant RJ, Daly B, Venturelli R, Mathur MR, et al. Oral diseases: a global public health challenge. Lancet. 2019;394(10194):249–60. doi:10.1016/S0140-6736(19)31146-8.

[2] World Health Organization. Global oral health status report: towards universal health coverage for oral health by 2030. Geneva: World Health Organization; 2022.

[3] World Health Organization. Oral health [Internet]. Geneva: World Health Organization; Available from: https://www.who.int/news-room/fact-sheets/detail/oral-health

[4] GBD 2017 Oral Disorders Collaborators. Global, regional, and national levels and trends in burden of oral conditions from 1990 to 2017: a systematic analysis for the Global Burden of Disease 2017 Study. J Dent Res. 2020;99(4):362–73.

[5] Tonetti MS, Jepsen S, Jin L, Otomo-Corgel J. Impact of the global burden of periodontal diseases on health, nutrition and wellbeing of mankind: a call for global action. J Clin Periodontol. 2017;44(5):456–62.

[6] Kumari A, Sawhney H, Kashwani R, Gupta G, Das S. Triple antibiotics: a synergistic approach to combating infection. IP Indian J Conserv Endod. 2023;8(4):189–92.

[7] Bahadur R, Kashwani R, Sawhney H, Kumar S, Gupta G. Platelet rich fibrin integration in impacted third molar extraction sockets for bony regeneration: a case report. J Dent Probl. 2024;6(1):46–51.

[8] Kumar V, Naik GN, Tuteja S, Bhasin MT, Chattopadhyay D, Chowdhury S, et al. Evaluation of radiographic and clinical outcomes in the use of bone substitutes in periapical surgery and periodontal regeneration. J Pharm Bioallied Sci. 2025;17(Suppl 3):S2218.

[9] Kumar V, Gupta S, Krishnan Y, Vishnoi L. Tooth supported overdenture: a preventive approach in prosthodontics. Int J Oral Health Dent. 2018;4(3):184.

[10] Kumar V, Arya G, Singh P, Chauhan P. A meta-analysis for evaluation of marginal bone level changes at dental implants. Natl J Maxillofac Surg. 2021;12(1):13.

[11] Chapple ILC, Genco R; Working Group 2 of the Joint EFP/AAP Workshop. Diabetes and periodontal diseases: consensus report of the Joint EFP/AAP Workshop on Periodontitis and Systemic Diseases. J Clin Periodontol. 2013;40(Suppl 14):S106–12.

[12] Singh J, Salam S, Pasha Z, Sharma R, Khan N, Chunara F, et al. Genetics in dentistry: a review of advances and implications. J Pharm Bioallied Sci. 2025;17(Suppl 1):S181.

[13] Mahobia A, Sahoo SR, Maiti N, Sathyanarayanan R, Aravinth R, Pandraveti RR, et al. Diabetic retinopathy and its effect on quality of life: an original research. J Pharm Bioallied Sci. 2021;13(Suppl 2):S1365.

[14] Katara AA, Parwani RA. The silent pandemic within: Using AI to decode the relationship between sleep disorders and orofacial pain.

[15] Aeran H, Nautiyal V, Kumar V, Uniyal S. Implant supported overdenture in the patients with history of radio and chemotherapy for the prostate malignancy. Natl J Maxillofac Surg. 2015;6(2):200.

[16] World Health Organization. Noncommunicable diseases [Internet]. Geneva: World Health Organization; Available from: https://www.who.int/news-room/fact-sheets/detail/noncommunicable-diseases

[17] Khan N, Kinra E, Verma N, Singh G, Kondhalkar S, Karande V, et al. Awareness and attitude toward cervical cancer and HPV vaccination among female medical students. Int J Pharm Res Technol. 2025;15(2):1771–7.

[18] Aeran H, Agarwal A, Kumar V, Seth J. Study of the effect of disinfectant solutions on the physical properties of dental impressions. Indian J Dent Sci. 2014;6(3):1.

[19] Ravindar K, Gupta M, Abdul-Zahra DS, Maiti N, Chawla R, Prashanth KS. Utilizing NLP and machine learning to predict patient outcomes from electronic health records in cloud environments. In: 2023 International Conference on Artificial Intelligence for Innovations in Healthcare Industries (ICAIIHI); 2023 Dec 29. Vol. 1. IEEE; 2023. p. 1–7.

[20] Maiti N, Chawla R, Quraishi A, Soni M, Rusho MA, Pande SD. Generative intelligence-based federated learning model for brain tumor classification in smart health. In: Generative Artificial Intelligence for Biomedical and Smart Health Informatics. 2025. p. 435–53.

[21] Gunturu V, Maiti N, Toure B, Kunekar P, Banu SB, Lenin DS. Transfer learning in biomedical image classification. In: 2024 International Conference on Advances in Computing, Communication and Applied Informatics (ACCAI); 2024 May 9. IEEE; 2024. p. 1–5.

[22] Malathy V, Maiti N, Kumar N, Lavanya D, Aswath S, Banu SB. Deep learning-enhanced image segmentation for medical diagnostics. In: 2024 International Conference on Advances in Computing, Communication and Applied Informatics (ACCAI); 2024 May 9. IEEE; 2024. p. 1–6.

[23] Katara AA, Minhas R, Kumar A, Dasgupta S. A case report on the excision of irritational fibroma using the diode laser. J Dent Res Rev. 2020;7(1):24–6.

[24] Katara A, Waghmare M, Kadakia N, Samson S, Minhas R. A case series of treatment of oral mucosal lesions using diode lasers. Sci Dent J. 2021;5(1):47–51.

[25] Gill S. Effect of preoperative dexamethasone on postoperative sequelae following mandibular third molar surgery: a randomized clinical study.

[26] Balivada A, Gill S, Makam S, Dutta B, Agrawal A, Shah N. Impact of silver diamine fluoride pretreatment on the bonding performance of glass ionomer cement to human dentin: an in vitro evaluation. World J Dent. 2026;17(6):569–72.

[27] Chandra N, Swati M, Chandrakar L, Katara AA, Shrivastava A, Bhansali D. Comparison of hyaluronic acid, chlorhexidine and persica during SRP. Bioinformation. 2026;22(2):1212.

[28] Sahoo A, Kumari A, Gill S, Parihar AS, Dhull KS, Jena D. Efficacy of green tea catechins as an adjunct to scaling and root planing in chronic periodontitis: a systematic review and meta-analysis. World J Dent. 2026;17(6):581–7.

[29] Ahuja G, Pandey S, Gill S, Galani MM, Pasha Z, Chandrasekaran S, et al. Comparing the biological response to immediate versus delayed implants placement in terms of osseointegration and bone quality. Bioinformation. 2026;22(3):1695.

[30] Maiti N, Das UK. Vital tooth bleaching: a case report. J Dent. 2014;2(1):24–8.

[31] Brar AD, Pallavi K, Das M, Saxena P, Kulkarani K, Priya P, et al. Metaverse in dentistry: bridging virtual innovation with real-world patient care and education. Bioinformation. 2025;21(2):262.

[32] Das A, Karande V, Tripathi A, Thomas LR, Pasha Z, Malhotra V, et al. Palatal bone thickness for mini-implant placement in different skeletal facial patterns: a CBCT approach. Bioinformation. 2025;21(4):635.

[33] Jain A, Singh V, Lukram A, Chatterjee S, Khan AM, Dawar G. Antibacterial efficacy of manuka honey, ocimum sanctum, curcuma longa and 0.2% chlorhexidine mouthwash on the level of streptococcus mutans and lactobacillus acidophilus-A randomized controlled trial. Indian Journal of Dental Research. 2022 Apr 1;33(2):169-73.

[34] Singh V, Bhaskar DJ, Agali C, Kishore M, Kadtane SS. Teledentistry: It's all about access to care. TMU J Dent. 2014;1(2):64-6.

[35] Bhat N, Singh V, Jain A, Bagde H. Enhancing dental diagnostics on leveraging ai for precise imaging analysis. Advancing Intelligent Networks Through Distributed Optimization. 2024:391-416.

[36] Chaitanya DE, Bhaskar DJ, Swapnil SB, Singh V, Kadtane SS. Ethical use of homeopathy and how can we use it in dentistry. Iranian Journal of Public Health. 2013 Dec;42(12):1476.

[37] Kumar V, Gupta S, Krishnan Y, Vishnoi L. Tooth supported overdenture-A preventive approach in prosthodontics. International Journal of Oral Health Dentistry. 2018;4(3):184.

[38] Aeran H, Agarwal A, Kumar V, Seth J. Study Of The Effect Of Disinfectant Solutions On The Physical Properties Of Dental Impressions. Indian Journal of Dental Sciences. 2014 Sep 1;6(3):001.