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Chronobiological Assessment Of Periodontal Health Awareness In Daytime And Nocturnal Shift Employees: A Questionnaire-Based Study

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Abstract

Background: Periodontal integrity is profoundly modulated by behavioural determinants, oral hygiene discipline, and chronobiological regulation of circadian rhythms, parameters that are frequently perturbed in individuals engaged in nocturnal occupational schedules. Disruption of these temporal biological rhythms may predispose to altered host responses within the periodontium and to suboptimal oral health perception.

Aim: The present investigation sought to conduct a comparative chronobiological appraisal of patient perception and awareness of periodontal health between diurnal (day-shift) and nocturnal (night-shift) workers through a structured, self-administered questionnaire.

Materials and Methods: The instrument encompassed domains related to demographic characteristics, oral-hygiene behaviour, awareness of periodontal pathology, self-perceived manifestations such as gingival bleeding, halitosis, and gingival recession, together with knowledge of preventive and prophylactic measures.

Results: Analysis revealed that nocturnal-shift employees more frequently reported subjective periodontal disturbances, particularly gingival haemorrhage and halitosis alongside diminished awareness regarding preventive regimens and the significance of periodic dental consultations. Conversely, diurnal-shift participants exhibited superior oral-hygiene practices, heightened periodontal awareness, and a more favourable perception of their periodontal well-being.

Conclusion: Circadian desynchronisation inherent to night-shift employment exerts an adverse influence on periodontal health perception and awareness. These findings accentuate the necessity for targeted occupational-specific educational and preventive interventions aimed at mitigating periodontal risk and enhancing oral-health literacy among nocturnal workforce populations.

Keywords: Periodontal health; patient perception; circadian rhythm; chronobiology; night-shift workers; day-shift workers; oral hygiene; occupational health.

INTRODUCTION

Periodontal health constitutes a pivotal dimension of comprehensive oral and systemic wellness, encompassing the morphofunctional integrity of the gingiva, periodontal ligament, alveolar bone, and associated supporting tissues that collectively ensure dentition stability and masticatory harmony. The preservation of periodontal homeostasis demands disciplined oral hygiene practices, periodic professional surveillance, and cognizance of etiological determinants such as tobacco exposure, psychosocial stress, metabolic dysregulation, and systemic comorbidities. In recent decades, the paradigm of oral health research has progressively transitioned toward patient-centred outcomes, emphasizing self-perception, psychosocial awareness, and behavioural determinants that critically mediate preventive orientation and health-seeking propensity.[1]

Occupational shift work, particularly nocturnal employment has been increasingly implicated in circadian desynchronization, sleep–wake cycle disturbance, and behavioural maladaptation, each of which exerts deleterious repercussions on both systemic and oral health. Night-shift workers frequently manifest erratic dietary patterns, heightened occupational stress, and irregular oral hygiene regimens when compared with their diurnal counterparts.[2] This chronobiological disequilibrium not only perturbs physiological homeostasis but may also distort subjective self-appraisal of oral well-being, thereby diminishing motivation for preventive dental care and compliance with routine professional consultations.

Understanding the perceptual and behavioural ramifications of such circadian perturbation is imperative for devising context-specific educational and prophylactic interventions. A comparative chronobiological evaluation between diurnal and nocturnal occupational cohorts provides an avenue to elucidate how temporal work patterns and lifestyle disparities modulate periodontal health awareness, self-perception, and hygiene practices. The present investigation thus endeavours to delineate these perceptual divergences and behavioural correlates, furnishing empirical substantiation for the formulation of targeted oral health strategies among chronically desynchronized workforce populations.[3]

Cumulative evidence indicates that lifestyle behaviours inherent to night-shift employment such as irregular meal timing, enhanced intake of fermentable carbohydrates, diminished oral cleansing frequency, and increased dependence on tobacco or alcohol exacerbate susceptibility to periodontal pathology.[4] Moreover, nocturnal work schedules inherently constrain accessibility to routine dental services due to temporal incongruity with standard clinical hours, culminating in deferred diagnosis and management of periodontal disease. Conversely, diurnal workers tend to preserve circadian alignment and behavioural regularity, factors that may collectively favour superior oral hygiene maintenance and more favourable periodontal outcomes.

In summary, the escalating prevalence of shift-based employment in contemporary society necessitates a meticulous appraisal of its implications for periodontal well-being. Individuals engaged in nocturnal occupational schedules encounter distinctive physiological and behavioural challenges that may predispose them to compromised periodontal status, whereas diurnal workers generally benefit from structured routines conducive to maintaining oral health. Elucidating these disparities offers meaningful insight into preventive dental care, occupational health, and holistic well-being, thereby underscoring the intricate interrelationship between work chronobiology, lifestyle determinants, and periodontal integrity.

Accordingly, the present questionnaire-based investigation was conceived to analyse and compare the perception, awareness, and self-reported periodontal health status among day- and night-shift workers, thereby establishing an evidence base for tailored preventive and educational strategies.

MATERIALS AND METHODS

A cross-sectional, questionnaire-based survey was conducted from 29 August 2025 to 29 September 2025 to evaluate the perception and awareness of periodontal health among employees engaged in diurnal (day-shift) and nocturnal (night-shift) occupational schedules. The study population comprised individuals employed across diverse occupational sectors who routinely worked in either of these shift categories.

The survey was developed using Google Forms and incorporated a structured questionnaire consisting of 35 close-ended and multiple-choice items designed to assess multiple domains, including demographic characteristics, oral hygiene behaviour, awareness and knowledge of periodontal disease, self-perceived clinical manifestations such as gingival bleeding and halitosis, and frequency of professional dental consultations.

The questionnaire underwent content validation by subject-matter experts in Periodontology to ensure clarity, relevance, and comprehensiveness. Participation in the study was entirely voluntary, and no personally identifiable information was collected at any stage.

Informed consent was obtained electronically. The introductory section of the online questionnaire contained a detailed consent statement outlining the study's objectives, the voluntary nature of participation, assurances of confidentiality, and maintenance of respondent anonymity. Only those participants who selected the option "I agree to participate" were permitted to proceed with the questionnaire.

All responses were subsequently compiled and tabulated using Microsoft Excel and subjected to statistical analysis to compare periodontal health perception, awareness levels, and self-reported oral hygiene practices between the two cohorts. Descriptive and comparative statistical tests were employed to evaluate intergroup variations in awareness and perception parameters.

RESULTS

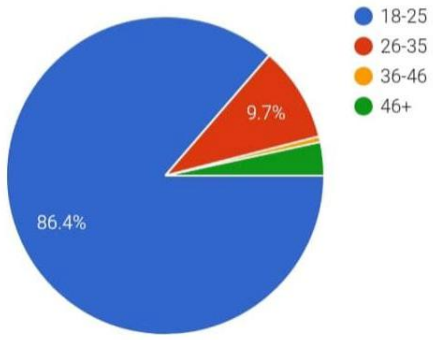
Analysis of the collected data revealed discernible trends in the patient perception of periodontal health that appeared to correlate with occupational schedules, particularly between diurnal (day-shift) and nocturnal (night-shift) workers. A substantial proportion of respondents reported experiencing symptomatic indicators of periodontal disease, including gingival swelling, tenderness, bleeding, and tooth sensitivity, while a smaller yet notable segment also acknowledged parafunctional habits such as tooth grinding and masticatory discomfort.

The distribution of responses illustrated a moderate level of confidence among participants regarding their ability to maintain satisfactory gingival health despite their work routines. However, a considerable percentage expressed apprehension that occupational stress and circadian disruption associated with shift schedules might exacerbate gingival problems.

Furthermore, irregular dietary patterns and lifestyle behaviours such as frequent snacking, elevated caffeine intake, tobacco use, and occasional alcohol consumption were reported to adversely influence both oral hygiene practices and perceived periodontal well-being.

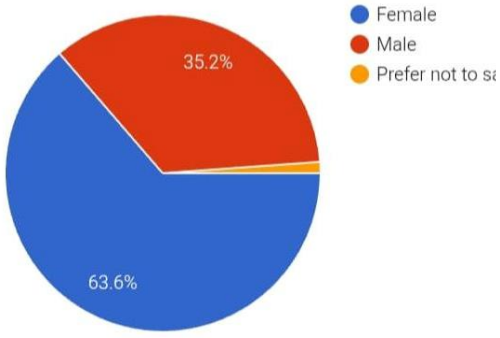
Despite these challenges, the majority of participants demonstrated positive attitudes toward preventive oral care, acknowledging the importance of periodic dental examinations for maintaining periodontal health. Notably, a large proportion of respondents expressed willingness to participate in workplace-based oral health awareness or preventive programs, reflecting a favourable disposition toward structured periodontal education and intervention initiatives.

Question 1 : Age details



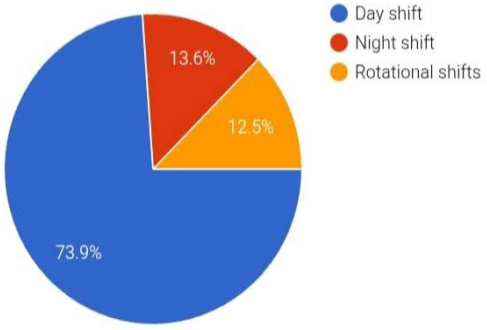
Majority (86.2%) were 18–25 years, with only 9.8% in 26–35 years and very few above 35. This shows the study group is mostly young working adults, where lifestyle and work shifts may strongly influence oral hygiene habits.

Question 2: Gender



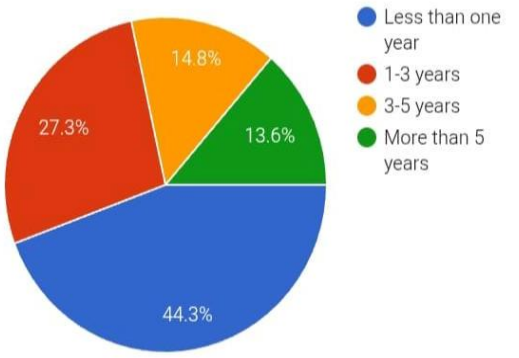
63.2% female and 35.6 %male. Indicates a female-predominant sample, but both genders are fairly represented in analyzing gum health perception.

Question 3: Work shift type



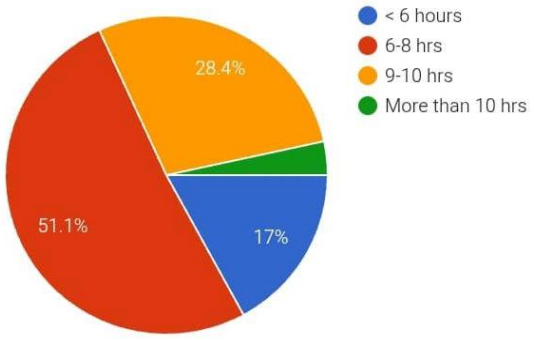
73.6% Dayshift,13.8% Nightshift, 12.6% Rotational. Majority are day workers, but the night/rotational group (26.4%) allows comparison forgum health perceptions between different shifts.

Question 4 : Duration of current shift pattern



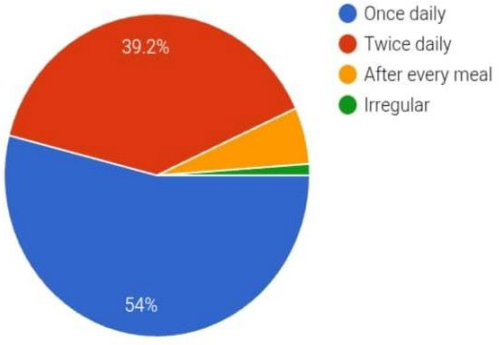
43.7% <1year, 27.6% 1–3 years, 14.9% 3–5 years, 13.8% > 5 years. This suggests a mix of new and long- term shift which could influence gum health due to prolonged irregular schedules.

Question 5 : Average working hours per day



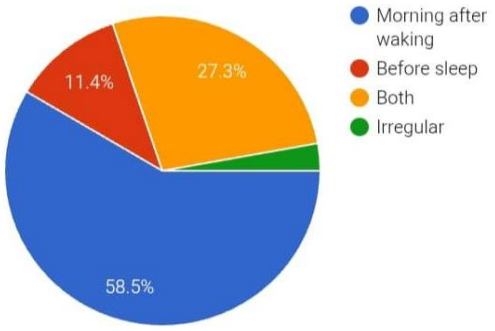
Extended work hours especially >10hrs are more common in night/rotational workers, which may negatively affect oral hygiene practices and gum health perception.

Question 6 : Frequency of tooth brushing



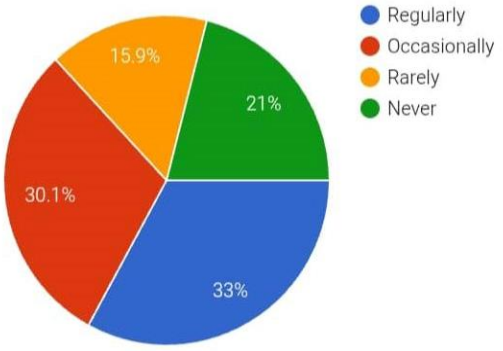
Night shift workers are more likely to brush only once a day due to fatigue and irregular sleepcycles ,possibly perceiving poorer gum health. Day workers show better brushing regularity (twice daily).

Question 7: Time of tooth brushing



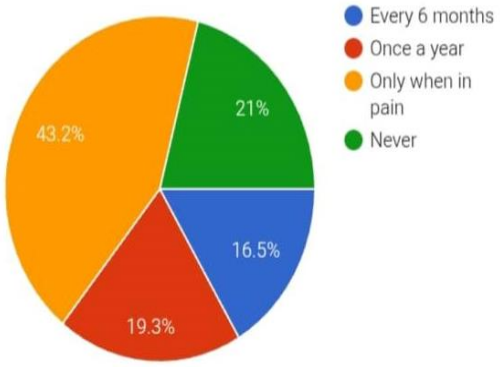
Day shift workers more often brush in the morning while night workers skip night brushing due to late hours ,increasing gum issues like bleeding/ swelling.

Question 8: Use of additional oral hygiene aids



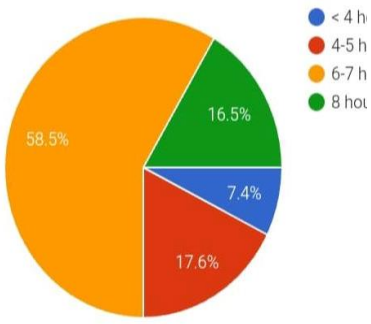
33.3% regular, 30.5% occasional, 21.3% rarely, 14.9% never. Night workers tend to rarely/never use floss or mouthwash, possibly leading to a higher perception of gum problems compared to day shift workers

Question 9: Frequency of Dental Visits



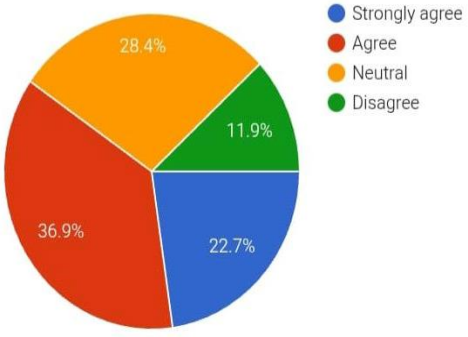
The chart shows dental visit frequency, emphasizing that regular checkups are vital for gum health. Night shift workers often struggle to schedule visits due to irregular hours, increasing their risk of periodontal disease.

Question10: Sleep pattern of Employees



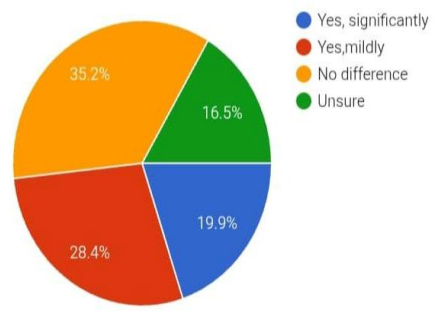
Adequate sleep is linked to better immune function and oral health. The chart shows varying sleep patterns, likely reflecting different shift work schedules. Night shift workers often experience disrupted or reduced sleep, which may compromise their periodontal health due to weakened immune response and increased inflammation.

Question 11: Do you believe working shifts affects oral health



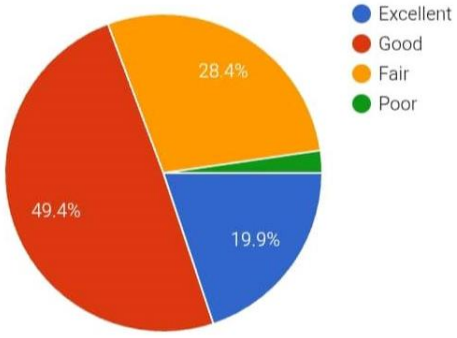
Nearly half 48.3% of the workers perceive a worsening of their gum health since starting their current shift, suggesting the work schedule (likely night shift) is widely viewed as detrimental. This negative perception is stronger than the 35.1%who report no difference.

Question 12: Do you experience more gum problems since starting your current shift



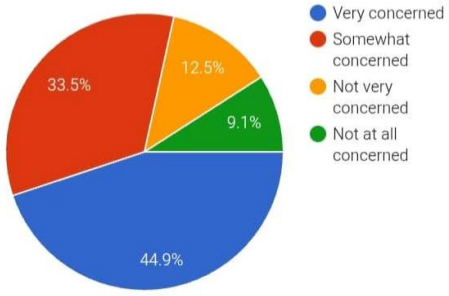
This indicates a high level of awareness and concern among shift workers regarding the potential adverse effects of their work schedule on their oral (gum) health. Only 12.1% disagree with this perception.

Question 13: Self perception of gum health



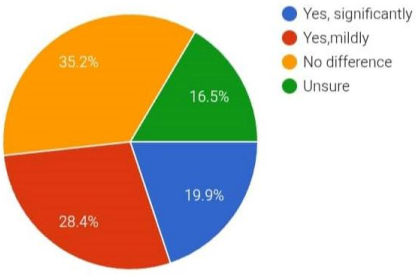
The majority of people (68.9%) have a positive self-perception of their gum health, rating it as either Good (49.4%) or Excellent (19.5%). Only a small fraction (2.4%) rated their gum health as Poor.

Question 14: How concerned are you about bad breath



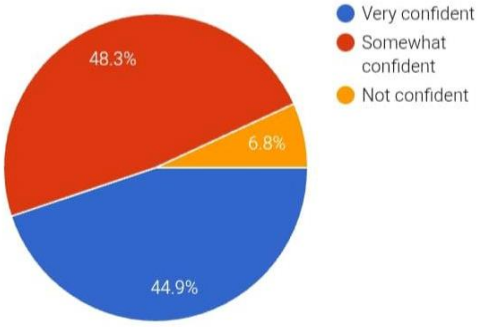
The majority of respondents (about 79%) expressed concern (either very or somewhat) about bad breath, highlighting its importance as a common oral health issue. Only a small fraction showed little or no

Question 15: Do you believe stress from your work schedule contributes to gum problems?



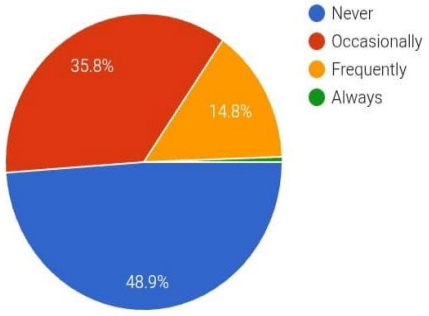
Over half (54.6%) of respondents strongly agree that stress from their work schedule contributes to gumproblems. Nightshift workers typically report higher stress due to irregular, late and fatiguing oral hygiene and increasing susceptibility to periodontal issues. Day shift workers with more regular routines are less likely to experience such stress related effect.

Question 16: Confidence in maintaining good gum health despite work schedules



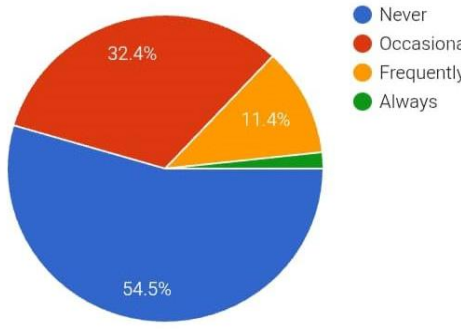
The chart indicates that a majority are concerned about bad breath, reflecting awareness of periodontal health, with concern more pronounced among night shift workers due to lifestyle factors.

Question 17: Gum bleeding while brushing or spontaneously



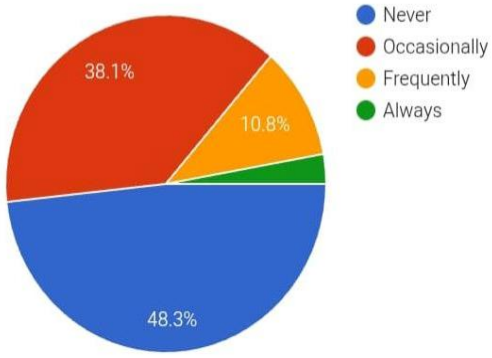
About half of the respondents experience gum bleeding, a key sign of early gum disease (gingivitis), indicating that a significant portion of the group has poor gum health.

Question 18: Gum swelling or redness



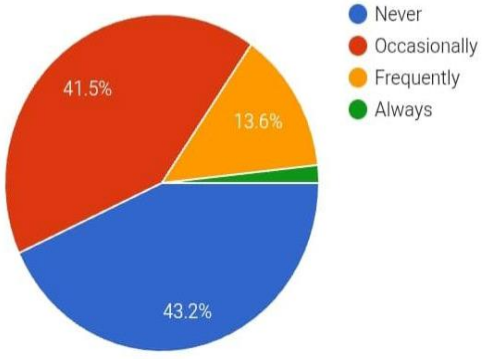
Over 45% of respondents experience gum swelling and redness, indicating that gum inflammation is prevalent among the surveyed group and highlighting poor periodontal health in the population.

Question 19: Gum pain or tenderness



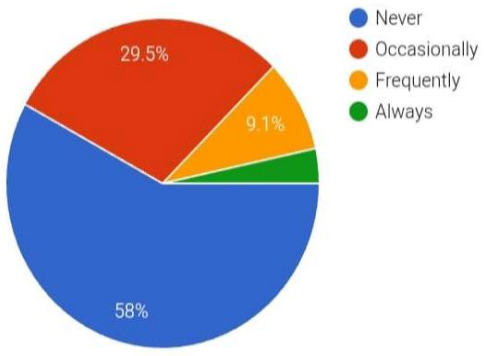
Over 59% experience gum pain or tenderness, with night shift workers reporting it more frequently due to irregular hygiene routines and sleep disruption, contributing to increased gum inflammation.

Question 20: Bad breath



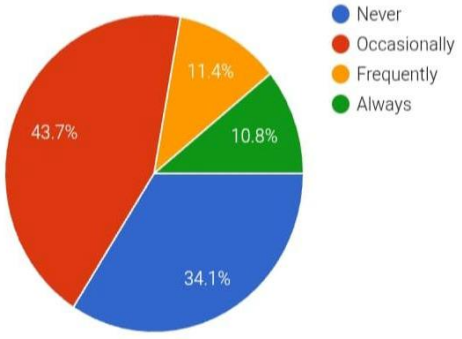
Around 59.4% report some degree of bad breath. Night shifts lead to inconsistentoralcare, contributing to a higher prevalence in these workers versus those on day shifts.

Question 21: Tooth mobility or looseness



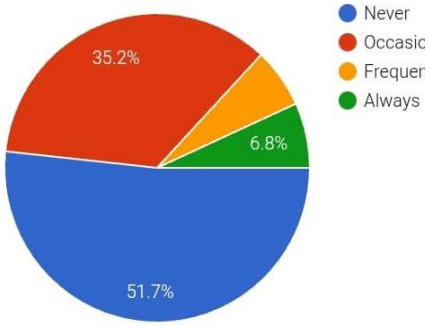
Although a majority never notice tooth loosening, about 40.5% experience some degree, with night shift workers being at higher risk due to progressive periodontal breakdown from less frequent dental care and greater systemic stress.

Question 22: Sensitivity to cold or sweet foods



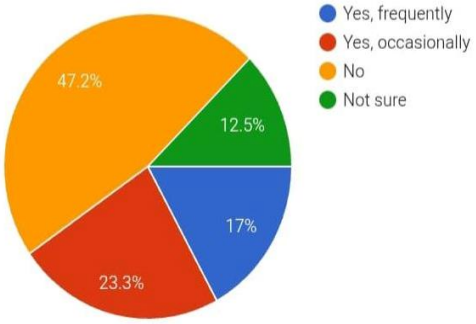
About 59.4% experience some sensitivity. Nightshift workers often encounter these symptoms more frequently, as interrupted routines can allow minorperiodontal inflammation to progress.

Question 23: Difficulty chewing due to Gum or Tooth discomfort



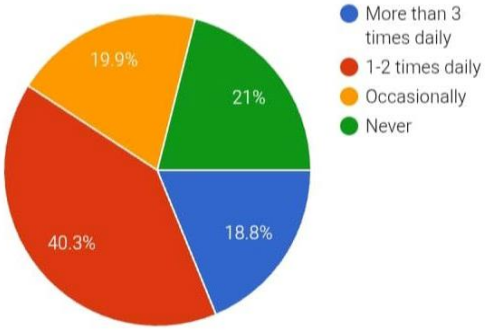
About 49% have at least occasional difficulty chewing, highlighting potential underlying gum or tooth issues that may be exacerbated by erratic schedules, especially among night workers.

Question 25: Do you experience tooth grinding (bruxism)



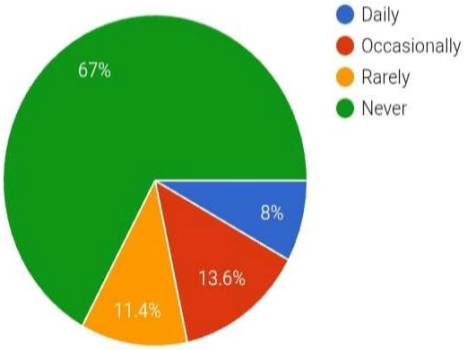
Over half (53.4%) report tooth grinding, a behavior linked to stress and sleep disruption, which is more commonly observed among individuals working night shifts.

Question 26: Frequency of caffeinated drinks



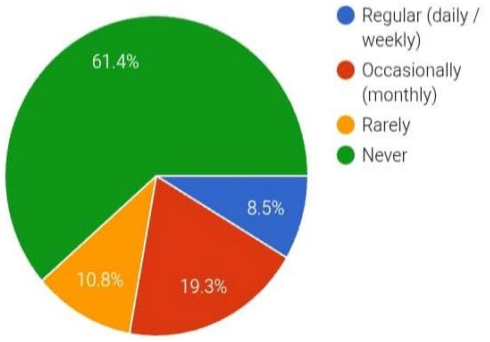
Over 70% report high caffeine consumption, particularly among night shift workers who use it to manage fatigue, leading to dry mouth and increased risk of gum disease.

Question 27: Frequency of smoking /tobacco use



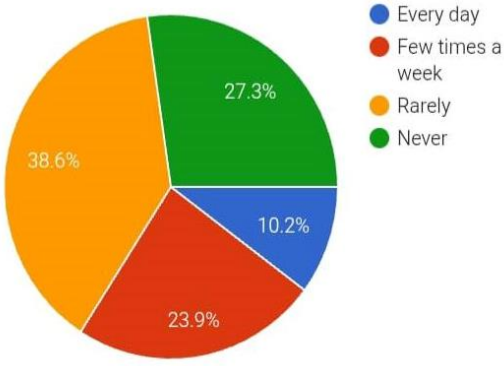
About one-third report tobacco use, which is a significant periodontal risk factor and more commonly noted in night shift cohorts.

Question 28: Frequency of Alcohol consumption



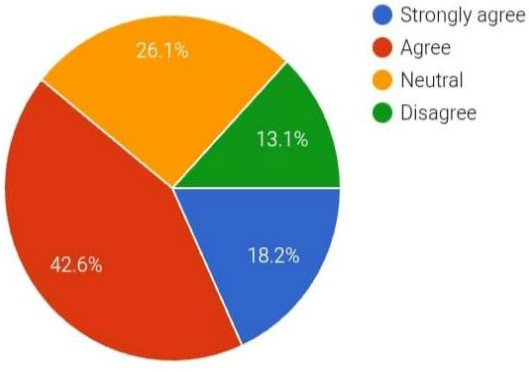
Alcohol consumption frequency impacts gum health by causing dry mouth and promoting bacterial growth. While most respondents drink rarely, increased intake in any shift group raises periodontal disease risk.

Question 29: Frequency of late night snacking



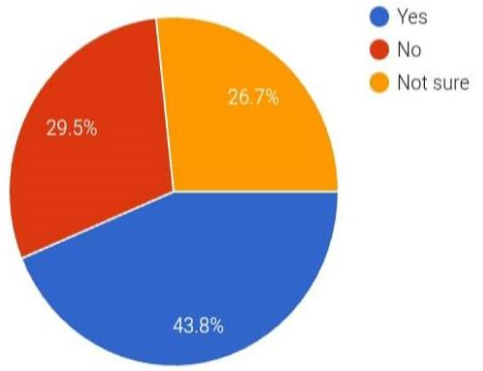
Over 40% frequently snack late at night, with higher rates among night shift workers. This increases gum disease risk due to prolonged food exposure and disrupted oral hygiene routines.

Question 30: Do you believe irregular eating patterns affect your gum health



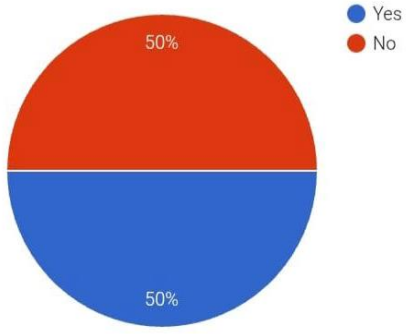
A majority (60.9%) acknowledge that irregular eating patterns affect gum health, while only 13.2% disagree, indicating strong awareness of the role of diet in periodontal health.

Question 31: Do you think gum disease can affect overall health



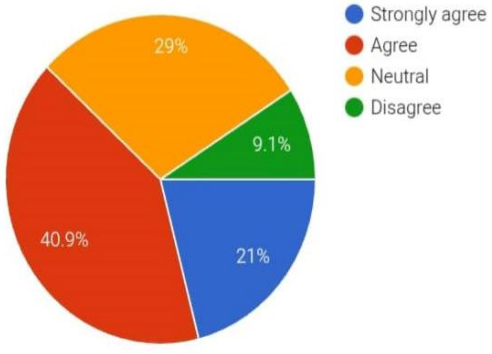
Over 62% recognize that gum disease affects overall health, including heart disease and diabetes. Awareness is higher among night shift workers due to greater oral challenges, while day shift workers also show substantial understanding.

Question 32 : Have you ever received professional talk on gum health from a dental professional?



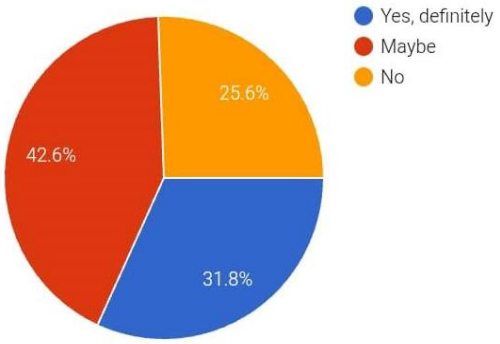
Out of 174 respondents, 50.6% had not received professional gum health advice, while 49.4% had, showing a nearly even split but with slightly more lacking dental guidance.

Question 33: Do you think regular Dental checkups are necessary for gum health?



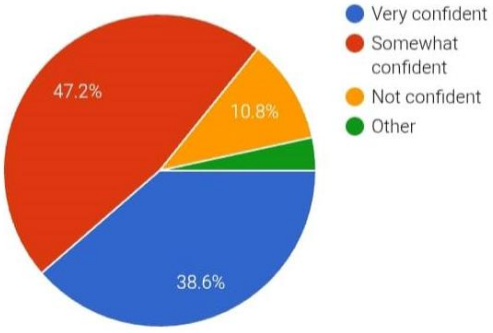
Nearly 78% support regular dental checkups, recognizing their importance in preventing and detecting early gum disease especially vital for night shift workers who face challenges in maintaining consistent appointments.

Question 34: Would you participate in workplace oral health programs?



Over 84% are open or undecided about joining workplace oral health programs, indicating strong potential for such initiatives to improve preventive care especially for night shift workers.

Question 35: How confident are you in maintaining good health despite your work schedule?



About 59% report low confidence in maintaining gum health due to their work routine, with night shift workers more affected by irregular hours and fatigue, making oral care harder to sustain.

DISCUSSION

The findings of the present investigation underscore the multifactorial interplay between occupational schedule, lifestyle behaviour, and periodontal health perception among diurnal and nocturnal workers. Analysis of participant responses revealed that lifestyle irregularities and occupational stressors exert a discernible influence on both self-perceived and clinically related indicators of periodontal well-being. Notably, the data demonstrated that while 44% of respondents reported never experiencing dentinal hypersensitivity to thermal or sweet stimuli, 22.3% experienced such sensitivity occasionally, 15.9% frequently, and 17.8% persistently. Similarly, masticatory discomfort attributable to gingival or dental pain was absent in 61% of respondents but was reported occasionally by 18.1%, frequently by 10.1%, and consistently by 10.7%. Furthermore, 57.5% had never received a formal diagnosis of gingival recession, indicating that while the majority remained symptom-free, a substantial minority continued to experience chronic or recurrent periodontal manifestations.

Lifestyle behaviours demonstrated distinct occupational patterns. Late-night snacking was reported by 37.4% of participants, while habitual alcohol consumption formed part of the daily routine for 58.7%. Caffeine intake was also considerable, with 40.8% consuming caffeinated beverages occasionally during work and nearly 20% reporting more than three caffeinated drinks daily. Such habits particularly prevalent among night-shift workers are recognised contributors to deteriorating oral and systemic health outcomes. Tobacco use, although less pervasive, persisted as a concern within a visible subset of participants. Collectively, these behaviours reinforce the association between circadian rhythm disruption, behavioural maladaptation, and periodontal risk.[5]

Occupational stress emerged as another significant determinant of perceived periodontal health. Over half the respondents (54.6%) agreed or strongly agreed that occupational stress exacerbated gingival problems, corroborating the recognised psychosomatic dimension of periodontal disease. Chronic stress has been associated with altered immune responses, heightened inflammatory mediators, and neglect of personal oral care—factors that together may amplify both perceived and actual periodontal vulnerability. Despite these constraints, a commendable proportion of respondents expressed proactive attitudes: 50.6% were willing to participate in workplace-based oral health programmes, and 58.6% acknowledged the indispensability of regular dental check-ups in preserving gingival health. Nevertheless, only 36.8% reported high confidence in maintaining optimal gum health, highlighting persistent uncertainty and diminished self-efficacy among shift-based workers.

Perceptions of professional support and oral health literacy also varied considerably. Many participants indicated that they had never received professional counselling regarding gingival care, and only 40.2% were aware of the bidirectional relationship between periodontal disease and systemic disorders such as cardiovascular disease and diabetes mellitus. These findings point to significant deficits in both periodontal awareness and preventive engagement, substantiating the need for structured educational and motivational interventions in occupational settings.

Comparatively, night-shift workers were more likely to report gingival sensitivity, bleeding, halitosis, and maladaptive lifestyle behaviours such as frequent snacking, elevated caffeine and alcohol intake, and irregular meal timing than their day-shift counterparts. These patterns align with prior literature suggesting that circadian misalignment and disrupted hormonal homeostasis adversely influence both host immune modulation and oral hygiene practices.[6],[7] The resultant alteration in behavioural and biological rhythms appears to heighten susceptibility to periodontal inflammation and impairs self-perception of oral health.

Existing evidence consistently supports that individuals engaged in irregular or nocturnal work schedules manifest poorer oral hygiene routines, lower brushing frequency, and greater plaque accumulation than those adhering to regular daytime work patterns.[8] Limited access to dental facilities during working hours, coupled with fatigue and sleep deprivation, further delays diagnosis and treatment, compounding both actual and perceived deterioration in oral health.

The psychosocial component of periodontal disease warrants particular emphasis. Psychological distress, fatigue, and disrupted circadian cycles among night-shift workers contribute to increased inflammatory burden and behavioural neglect, culminating in diminished periodontal well-being.[9] When juxtaposed with day-shift workers who typically maintain consistent routines, adequate rest, and structured oral hygiene practices nocturnal workers exhibit a more negative perception of their gingival health and reduced motivation for preventive care.

Cumulatively, the present findings corroborate that occupational chronodisruption, stress exposure, and lifestyle dysregulation are salient determinants of self-perceived periodontal health. Night-shift workers, burdened by irregular routines and higher physiological stress, tend to evaluate their oral health less favourably than day-shift employees.[10] These disparities reflect not only behavioural and psychological influences but also broader socio-occupational gradients, wherein demanding work conditions and limited healthcare access translate into suboptimal oral health awareness and practices.

Thus, the study reinforces that occupational schedule, behavioural habits, and psychosocial stressors collectively shape both the subjective and objective dimensions of periodontal health. It underscores the imperative for targeted oral health education, stress management interventions, and flexible preventive dental programmes tailored to the unique needs of shift-based workforce populations.

CONCLUSION

The present investigation elucidates that individuals engaged in nocturnal occupational schedules demonstrate a comparatively poorer perception and diminished awareness of their periodontal health than those employed in diurnal work patterns. Irregular working hours, circadian rhythm disruption, heightened psychological stress, and sleep insufficiency appear to collectively contribute to neglected oral-hygiene behaviour and reduced motivation for preventive dental care. Consequently, night-shift workers exhibited

a greater prevalence of gingival manifestations including bleeding, halitosis, and hypersensitivity reflecting the adverse influence of occupational chronodisruption on periodontal well-being.

In contrast, day-shift employees generally displayed superior oral-hygiene awareness, healthier attitudes toward periodontal maintenance, and more consistent preventive behaviours, plausibly attributable to a stable lifestyle and regular self-care routines.

These findings underscore the necessity of implementing targeted oral-health education and preventive strategies tailored specifically to the needs of night-shift employees. Emphasis should be placed on stress-management interventions, reinforcement of effective oral-hygiene practices, and facilitation of regular dental attendance to mitigate the periodontal risks inherently associated with circadian misalignment and shift-based employment.

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