Assessment of Oral Health Status and Treatment Needs of Karnataka State Reserve Police, Belagavi District: A Cross-Sectional Study

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LIST OF ABBREVIATION

Abbreviation	Expanded form
WHO	World Health Organisation
KSRP	Karnataka State Reserve Police
DMFT	Decayed-Missing-Filled-Teeth
DT	Decayed Teeth
MT	Missing Teeth
FT	Filled Teeth
BOP	Bleeding on Probing
PPD	Periodontal Pocket Disease
PPP	Public-Private Partnership
OHRQoL	Oral Health Related Quality of Life

ABSTRACT

BACKGROUND: Law enforcement personnel, such as those serving in the KSRP, play an indispensable role in maintaining public safety and order. The nature of their duties exposes them to a myriad of stressors, including irregular working hours, a demanding environment, and potential exposure to hazardous situations.

AIM: To assess the oral health status and treatment needs of Karnataka State Reserve Police (KSRP), Belagavi district.

METHOD: This was a cross-sectional study conducted over 4 months from September to December 2022, following the STROBE guidelines. The study included police personnel from the KSRP unit in Belagavi, including officers of 5 different ranks. All KSRP personnel stationed in Belagavi during the study period were recruited, with a final sample size of 720 participants. Data Collection was done using oral examinations conducted using the WHO Oral Health Assessment Form (2013) to evaluate oral health status and treatment needs and WHO Oral Health Questionnaire for Adults (2013) was used to document oral hygiene practices, sugar consumption, and deleterious habits. Rigorous training and calibration of the single examiner was done to ensure consistency. Detailed protocols were followed for infection control, examination area setup, and recording. Statistical Analysis included descriptive statistics, Chi-Square tests and parametric tests like t-test and ANOVA were used. Regression analysis was performed to examine relationships between variables. The significance level was set at $p < 0.05$.

RESULTS: The overall prevalence of dental caries among KSRP personnel was 84.2%, with higher rates observed in females (87.96%) compared to males (82.54%). The mean DMFT score was significantly higher in females (5.48 ± 2.91) compared to

males (5.02 ± 2.93). Caries prevalence and DMFT scores were highest among the younger age groups and lower ranks of personnel like constables and head constables. The prevalence of periodontal diseases, including bleeding on probing (71.4%) and periodontal pocket depth (27.2%), also showed associations with gender, age, and rank, with the highest rates seen in females, younger age groups, and lower ranks. Oral hygiene practices like brushing frequency and dental visit patterns were suboptimal, while the use of tobacco and alcohol was prevalent, especially among the lower-ranking personnel. Oral mucosal lesions were present in a small proportion, with leukoplakia (4.7%) and oral submucous fibrosis (4.2%) being the most common. Overall, the study highlights the oral health disparities among KSRP personnel and the need for targeted interventions to address the identified issues.

CONCLUSION: The present study found a high prevalence of dental caries among 720 police personnel, with lower-ranked officers experiencing greater caries burden. Periodontal diseases like bleeding on probing were also highly prevalent, while oral mucosal lesions, erosion, and trauma had lower prevalence. Oral hygiene practices and access to dental care were suboptimal, while tobacco and alcohol use was common, especially among higher-ranked officers. The majority of personnel required preventive and routine dental treatments, highlighting the need for targeted oral health initiatives and longitudinal research to address the disparities observed among this high-stress occupational group.

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INTRODUCTION

"Your body is a temple, but only if you treat it as one." — Astrid Alauda

Oral health is an indispensable component of an individual's overall well-being, and has a significant influence on overall health.[1] The World Health Organisation (WHO) has emphasised the importance of oral health as a fundamental human right that is essential to a high quality of life, acknowledging its crucial role.[2] Various systemic conditions are influenced by oral health, as it effects on the body extends beyond the confines of the oral cavity. There is evidence linking poor dental hygiene to a higher chance of developing chronic illnesses such respiratory infections, diabetes, and cardiovascular disease.[3] Additionally, inflammation and infections in the oral cavity can contribute to systemic inflammation, potentially exacerbating existing health issues.[4] Hence, it is vital to maintain good oral health for overall well-being of the individuals.

Occupation can significantly impact oral health, as the nature of one's work often dictates daily routines and habits that may affect the well-being of the oral cavity.[5] Certain professions, such as those involving long hours of sedentary desk work or frequent consumption of sugary snacks, can result in increased chance of dental diseases like caries and periodontitis.[6] Jobs that expose individuals to environmental hazards or substances harmful to oral health, such as chemicals or excessive dust, may also pose risks.[7,8] Furthermore, irregular working hours and physically demanding occupations such as fishing has shown to increase the risk of caries and cause

inappropriate oral hygiene, as individuals may be more prone to neglecting dental care routines.[9] One such strenuous and physically demanding occupation is policing. Law enforcement personnel, often encounter unique challenges that can impact their oral health.[10]

Police personnel encounter unique challenges in maintaining good oral hygiene, often influenced by the demanding nature of their profession. Previous research has indicated a high risk of dental diseases, including caries and periodontal disease, within this population.[10,11] A police personnel's occupation, categorized as a blue-collar job, encompasses responsibilities such as upholding law and order, safeguarding the public, and enforcing regulations. Their duties include responding to emergencies, conducting crime investigations, and patrolling designated areas. Research conducted among police personnel in various Indian states has indicated elevated levels of psychological distress.[12] Long work hours, exposure to traumatic situations, and increasing public scrutiny are factors that contribute to this. These factors may raise the incidence of depression and anxiety and lower quality of life.[13] The stress and irregular working hours inherent in law enforcement roles can lead to disrupted oral hygiene routines and an increased likelihood of consuming convenience foods, which are often rich in fermentable sugars and that are detrimental to oral health.[14] Previous research among police personnel have also highlighted a lower oral health-related quality of life.[11,14] Recognizing and addressing these challenges can contribute to enhancing the overall well-being and job satisfaction of those dedicated to maintaining law and order in our communities.

The Karnataka State Reserve Police (KSRP) functions as a law enforcement agency at state-level, comprising twelve battalions designed to provide supplementary

support to the standard police force when required. The second battalion, situated in the Belagavi district, is comprised of both male and female personnel.[15] Each battalion comprises officers of five ranks: inspectors, sub-inspectors, assistant sub-inspectors, head constables, and constables. These individuals undergo similar training programs and share comparable responsibilities with their counterparts in the regular police force.[16] The deployment of KSRP battalions proves essential in addressing specific emergencies and reinforcing law and order as needed.

Law enforcement personnel, such as those serving in the KSRP, play an indispensable role in maintaining public safety and order. The nature of their duties exposes them to a myriad of stressors, including irregular working hours, a demanding environment, and potential exposure to hazardous situations.[17] Due to which they may indulge in certain deleterious habits such as tobacco chewing and smoking.[18] The increased usage of tobacco among police personnel poses significant health risks and can have detrimental effects on their overall well-being. It is a known contributor to various serious health conditions, including respiratory issues, and an elevated risk of cancer.[19,20] Moreover, the physical demands of police work combined with tobacco use can exacerbate these health concerns, potentially compromising an officer's ability to perform optimally in physically demanding situations. Additionally, the mental health implications of tobacco use, such as increased stress and anxiety, can negatively impact an officer's ability to cope with the demands of their job.[21] These factors can contribute to the neglect of personal health, including oral health, as these professionals prioritize their duties over self-care. Additionally, limited access to preventive dental care and awareness programs may further exacerbate oral health issues among this specific population.[15]

The present study aims to fill the lacuna in literature on oral health status and treatment requirements of law enforcement personnel in India. It will provide valuable insights that can inform precise oral health policies and interventions. The novelty of this cross-sectional study lies in its potential to enhance the broader understanding of oral health within high-stress occupational groups. The rationale for this study is specifically aligned with assessing the oral health status and treatment requirements of KSRP personnel in Belagavi, offering comprehensive exploration of previously overlooked aspect in the existing literature.

AIM AND OBJECTIVES

Aim of the study:

To assess the oral health status and treatment needs of Karnataka State Reserve Police (KSRP), Belagavi district.

Objectives of the study:

- To assess the oral health status of KSRP personnel based on their ranks.
- To determine the oral hygiene practices and deleterious habits among the different ranks of the KSRP personnel.
- To assess the dental treatment needs of the KSRP personnel.

REVIEW OF LITERATURE

Studies done on oral health status of police personnel in India

1. Bhalla et al. conducted a cross-sectional investigation involving 475 central reserve police personnel situated in Mathura city. Their research findings predominantly featured male subjects aged between 21 and 35 years. The average condition of their teeth highlighted a pressing requirement for immediate intervention, particularly in terms of scaling. This study emphasizes the significance of giving precedence to the oral health of police personnel. It proposes the inclusion of health education focused on prevention and oral hygiene practices within their training programs. Implementing such initiatives can contribute significantly to ensuring the overall health and welfare of these indispensable members of the community.[10]

2. Singh et al. conducted a cross-sectional examination in Bhopal city, focusing on the dentition status of 781 police personnel, with an average age of 40.5 years. Their investigation revealed a noteworthy observation: the count of decayed, missing, and filled teeth among this demographic was notably lower, suggesting a comparatively reduced incidence of dental caries. However, the study highlighted a prevalent lack of oral health awareness among many of the police personnel surveyed. It emphasizes the critical need for initiatives aimed at promoting awareness regarding oral hygiene practices within this occupational group, thereby contributing to their overall health and welfare.[22]

3. In a study conducted in Ghaziabad city, the focus was on evaluating the dental health of police personnel, considering the potential impact of stress and irregular work schedules on their oral well-being. The research encompassed 472 individuals from the police force, with an average age of 41.92 years. Results unveiled a significant

prevalence of periodontal disease (82.2%) and dental caries (67.4%), both of which showed correlations with age and years of service within the profession. Furthermore, adverse habits were observed among nearly all participants (83.6%). These findings underscore the necessity for community-based initiatives aimed at oral health prevention and promotion, specifically tailored to address the distinctive requirements of police personnel, thus fostering improved oral health outcomes within this occupational group.[23]

4. A study led by Dilip examined 1293 police recruits/trainees across 8 Police Training Schools in Karnataka, uncovering a notable prevalence of dental caries and periodontal disease among them. Dental caries affected 74% of the subjects, with its prevalence escalating with age. Similarly, periodontal disorders were prevalent in 91% of the subjects, with severity also escalating with age. Disparities were observed in dental visit frequency and oral hygiene practices, with a noteworthy association found between dietary habits and dental caries/periodontal disease. The study underscored the necessity for restorative care and highlighted a lack of dental awareness and in-house facilities for oral health care delivery as contributing factors to the substantial levels of untreated dental disease among police recruits.[24]

5. Santhosh et al. conducted a cross-sectional study to investigate the influence of dental caries and periodontal disease on the Oral Health-Related Quality of Life (OHRQoL) among Karnataka State Reserve Police (KSRP) stationed in Belagavi, India. Their study included 720 randomly selected personnel, with OHRQoL assessed using the Oral Health Impact Profile 14 (OHIP-14). The results revealed that domains such as physical pain and psychological discomfort were the most affected. Moreover, constables exhibited higher mean OHIP-14 scores, indicating poorer OHRQoL. The

study also identified significant correlations between oral health parameters and OHIP-14 domains, particularly noting the impact on predictors like physical pain, psychological discomfort, and physical disability. Ultimately, the findings underscored the substantial impact of dental caries and periodontal disease on the OHRQoL of reserve police personnel, especially among those in lower-ranking positions.[25]

6. Abhishek et al. conducted a study to explore the correlation between oral health-related quality of life (OHRQoL) and periodontal status among police personnel in Virajpet, India. The research involved 72 randomly selected participants, who underwent assessments of OHRQoL through self-administered questionnaires and periodontal status using the community periodontal index (CPI). The findings revealed a significant link between OHRQoL and CPI, indicating that individuals with better periodontal health tended to report higher levels of OHRQoL. These results underscore the importance of maintaining optimal periodontal health to enhance the overall quality of life among police personnel in Virajpet, Coorg.[11]

7. Rajagopalachari et al. conducted a study among 212 police personnel at the state intelligence headquarters division in Bengaluru to evaluate the influence of oral health variables on oral health-related quality of life (OHRQoL). Utilizing the Oral Health Impact Profile-14 (OHIP-14), the study revealed dental caries and periodontal disease prevalence rates of 43.4% and 68%, respectively, while oral hygiene status was deemed fair. Significant associations were noted between decayed, missing, and filled teeth and various domains of OHIP-14, particularly functional limitation and physical disability. The research underscores the substantial impact of decayed teeth on OHRQoL, emphasizing the importance of addressing dental caries to enhance the overall quality of life among police personnel.[26]

8. In a cross-sectional study conducted by Bhardwaj et al. in Shimla city, the oral health status and treatment needs of 371 police personnel aged 18-58 years were evaluated. Findings revealed a heightened prevalence of dental caries, periodontal diseases, and edentulousness, particularly among older age groups, males, and constables. Notably, factors such as the frequency of brushing, smoking, and alcohol consumption significantly influenced oral health outcomes. The study underscores the imperative of fostering awareness regarding the maintenance of good oral hygiene, regular dental check-ups, and discouraging smoking and alcohol consumption among police personnel to enhance their oral health.[27]

Global studies done on oral health status of police personnel

9. In a cross-sectional study conducted by Majeed et al. among 174 police personnel from the Special Security Unit (SSU) of Sindh Police in Karachi, Pakistan, the oral health status and treatment needs were evaluated using the WHO 2013 Oral Health Assessment Form. Findings revealed a notable prevalence of periodontal diseases, with 35% reporting gingivitis and periodontitis, and 21.8% reporting moderate to severe periodontitis. Moreover, over 83.3% of participants were afflicted with dental caries. The study underscored the imperative for urgent oral health awareness sessions integrated into police personnel's training and daily routine to address the compromised oral health status observed among them.[28]

10. In a cross-sectional epidemiological survey conducted by Faragó et al. in 2008 at the Miskolc Law Enforcement Secondary School in Hungary, 792 Hungarian police student volunteers participated in assessing their caries experience and its association with various factors. The study revealed a mean DMFT number of 10.3 ± 5.7, highlighting significant relationships between DMFT values and the education level of

fathers, frequency of dental attendance, and use of dental floss. Furthermore, specific components of caries prevalence exhibited notable associations with dental attendance frequency, paternal education level, and dental floss usage. These findings underscore the necessity of implementing effective caries-preventive programs among police student populations to fulfill official health requirements and ensure suitability for subsequent service. The study's outcomes offer valuable insights for crafting and evaluating healthcare strategies tailored to this demographic.[29]

11. Moreno-Quispe et al. conducted a cross-sectional prevalence study in the Ancash region of Peru to assess the prevalence and severity of dental caries among police personnel. The study spanned from May 2012 to May 2013 and involved the examination of 925 subjects, as well as a review of their medical records. The findings revealed a DMFT index of 10.63 ± 4.96, indicating a notable prevalence of caries within the police population. Moreover, significant variations in disease severity were observed across different age groups, with a considerable portion of subjects requiring oral rehabilitation. The study highlights the urgency of implementing effective oral health intervention programs tailored to the needs of police personnel to address the identified high severity of dental caries.[30]

12. In a cross-sectional study conducted by Liu et al. in Changsha city, Hunan province, China, the prevalence rates of recurrent aphthous stomatitis (RAS), oral submucosal fibrosis (OSF), and oral leukoplakia were assessed among populations aged 20-59 years, categorized into doctor/nurse, police officer, and non-doctor/nurse and non-police officer groups. The findings indicated a higher prevalence of RAS among doctor/nurse populations compared to the non-doctor/nurse and non-police officer groups. Interestingly, male doctors/nurses exhibited lower prevalence rates of OSF and

oral leukoplakia, whereas male police officers had higher rates of OSF, oral leukoplakia, and the combination of both conditions. These variations in the prevalence of oral mucosal lesions across different occupational groups suggest potential associations between professional stress and oral health outcomes.[31]

13. Araújo et al. conducted a study to explore the prevalence of oral mucosa lesions (OMLs) among Brazilian police officers. Through interviews and oral cavity examinations involving 395 officers, an overall OML prevalence of 8.61% was identified. Among the observed lesions, traumatic injuries and benign migratory glossitis (BMG) were the most prevalent. Interestingly, the prevalence of potentially malignant disorders was lower compared to the general Brazilian population. The study underscores the importance of oral health surveillance among police personnel, particularly considering the prominence of trauma-related issues. Notably, individuals dissatisfied with their oral health were found to be at a higher risk of presenting OMLs.[32]

14. Faragó et al. conducted a study to examine the dietary patterns, oral hygiene practices, dental surgeon attendance, and their correlations among students at the Police School of Miskolc, Hungary. With 792 participants averaging 20.43 ± 1.25 years in age, statistical analysis was performed using SPSS software. Findings revealed that 30.8% of students reported daily consumption of sweets, with no notable discrepancy based on fathers' educational levels. However, sweet consumption decreased with an increasing number of siblings. Moreover, 28.8% reported daily intake of soft drinks. Dental floss usage was reported by only 10%, while 60.0% cleaned their teeth twice daily. Approximately 28.4% attended dental check-ups, with students who practiced frequent tooth cleaning more likely to have visited dentists in the past year compared

to those with less frequent dental care. The study underscores the necessity for enhancements in factors influencing oral health within the examined student population.[33]

15. Minaya-Sánchez et al. conducted a cross-sectional study aimed at identifying variables associated with periodontal status and tooth loss among 161 policemen in Campeche, Mexico. Utilizing the Florida Probe System and a fixed dental chair, comprehensive periodontal clinical examinations were conducted, evaluating factors such as dental plaque, calculus, probing depth, gingival insertion, loss of attachment, gingival retraction, suppuration, and probing blood. Statistical analyses employed a bivariate negative binomial regression model due to over-dispersion in the dependent variable. Results unveiled a high prevalence of tooth loss (73.3%), with an average of 3.55 missing teeth overall and 4.84 among participants experiencing tooth loss. Furthermore, variables such as gingivitis, probing depth, gingival retraction, attachment loss, and age were identified as correlates of increased tooth loss. These findings underscore the common occurrence of tooth loss within the adult population studied and underscore various periodontal status variables associated with this phenomenon.[34]

Studies done on oral health status of similar occupation

16. Naysmith et al. conducted a study aiming to evaluate the oral health status of recruits and officer cadets entering the New Zealand Defence Force (NZDF) over a 13-month period and explore associated factors. Data from initial dental examinations, radiographs, and socio-dental questionnaires were analyzed. Of the 1,053 recruits, 83% participated, revealing a caries prevalence of nearly 70%. The mean Decayed, Missing, and Filled Teeth (DMFT) was 3.0, with higher rates among females and Māori individuals. Third molars were frequently observed, with many presenting potential

issues. Prevalence was notably elevated among younger age groups and those with medium or low socioeconomic status. The study concludes that while the oral health of recruits was generally acceptable, attention is warranted for addressing potentially problematic third molars before operational deployment.[35]

17. Kelbauskas et al. aimed to assess smoking prevalence among Lithuanian army recruits and its impact on oral health, alongside other influencing factors. The study revealed that 70% of recruits were smokers, with smoking significantly affecting oral hygiene and exacerbating periodontal issues. Smokers exhibited higher Community Periodontal Index of Treatment Needs scores compared to nonsmokers. Furthermore, factors such as oral hygiene, age, and education level were associated with oral health status, with recruits from rural areas and lower education levels demonstrating poorer oral hygiene and higher rates of decayed and untreated teeth. Logistic regression analysis identified poor education, rural residence, irregular tooth brushing, poor oral hygiene, and smoking as significant factors linked to a greater number of untreated decayed tooth surfaces.[36]

18. Skec et al. conducted a study to evaluate oral health habits and status among Croatian soldiers, recognizing the crucial role of good oral health in operational readiness and combat effectiveness. Data from examinations and questionnaires of 912 soldiers, comprising recruits and professional soldiers, revealed generally poor oral health marked by a high prevalence of dental caries, bleeding on probing, and odontogenic pain. Only a small percentage of soldiers exhibited completely healthy teeth. These findings emphasized the significant impact of poor oral health on combat readiness, necessitating frequent dental interventions and potentially causing absences

from duties. The study underscores the urgent need for mandatory regular dental check-ups to enhance oral health and operational readiness within the Croatian Army.[37]

19. Kovacević et al. conducted a study to assess the periodontal condition among Serbian military personnel and its correlation with general life habits and local risk factors. This prospective cross-sectional pilot study involved 101 participants aged 20-64 years, evaluating periodontal health using the Community Periodontal Index of Treatment Needs (CPITN). Results revealed inadequate periodontal health, with the majority of participants presenting periodontal pockets of 4-5 mm. While the oral hygiene index improved with age, overall periodontal health remained poor across different age groups. These findings emphasize the necessity for tailored preventive programs focusing on oral hygiene training and education about periodontal disease prevention and treatment within the Serbian military community.[38]

20. Sutthavong et al. conducted a study to evaluate oral health problems among deployed military personnel in Thailand and their impact on personnel fitness. Spanning from April 2011 to March 2013, this cross-sectional study surveyed 2,884 Royal Thai Army (RTA) personnel from task forces in southern provinces. The results revealed a notable prevalence of oral health issues, with toothache/hypersensitivity and dental caries being the most prevalent. Many participants reported recurrent oral problems, with a minority requiring sick leave due to oral conditions. A majority noted that their oral health issues significantly affected their quality of life and duties. These findings underscore the necessity for an effective dental health program to ensure the fitness of RTA personnel for deployment.[39]

21. In a cross-sectional study conducted by Ziebolz et al., oral health in young German women and men, including soldiers of the German armed forces (Bundeswehr), was

compared. Ninety women and ninety men, matched based on age, school qualification, and origin, underwent clinical examination. Oral health parameters such as the decayed, missing, and filled surfaces index (DMF-S), oral hygiene index (QHI), and periodontal index (CPITN) were assessed, along with data on smoking habits. While the mean DMF-S did not significantly differ between genders, women displayed a higher prevalence of dental restorations in caries-affected teeth. Moreover, women exhibited superior oral hygiene and fewer deep probing depths compared to men. Smoking significantly impacted periodontal health in both groups. Overall, men demonstrated poorer oral health outcomes, indicating the necessity for intensified preventive care, particularly focusing on smoking cessation, among young adults in Germany.[40]

22. Bhat et al. conducted a study to evaluate the prevalence of dental anxiety among army recruits in Bangalore city and its correlation with dental caries and periodontal disease. A total of 836 participants underwent questionnaire-based assessments and clinical examinations. Findings indicated a 47% prevalence of dental anxiety, with anxious individuals exhibiting higher DMFS scores and CPITN scores, suggesting inferior oral health. These results underscore the significance of managing dental anxiety to enhance oral health outcomes among army recruits.[41]

23. Varkey et al. conducted a cross-sectional study to evaluate and compare the oral health status between fishermen and non-fishermen in South Goa, India. A cohort of 400 participants underwent examinations utilizing the WHO Oral Health Assessment Form and OHI-S. Findings revealed notably higher caries prevalence and inferior oral hygiene among fishermen in comparison to non-fishermen. Moreover, fishermen exhibited increased treatment needs, with extraction and pulp care being predominant. Logistic regression analysis indicated that fishermen were more than twice as likely to

experience dental caries compared to non-fishermen, emphasizing the necessity for tailored oral health interventions within this demographic.[9]

24. Kumar et al. conducted a study investigating the impact of tobacco consumption on oral health, with a particular focus on smokeless tobacco (SLT) products prevalent in regions like South Asia, notably India. The research aimed to examine the prevalence and usage patterns of SLT among various demographic segments in India and evaluate its consequences for oral health. Employing standardized methodologies, researchers collected data on tobacco consumption patterns, oral hygiene behaviors, and oral health conditions via interviews and clinical assessments. Results revealed a notable prevalence of SLT usage within the study population, with marked variations observed across different age groups, genders, and geographical areas. Additionally, the study established a correlation between SLT consumption and adverse oral health outcomes, including a heightened risk of oral cancer, periodontal diseases, and dental caries. Furthermore, the findings underscored the pressing need for targeted interventions aimed at tobacco cessation and the enhancement of oral hygiene practices among SLT users in India. These insights hold significant implications for public health policies and preventive initiatives aimed at mitigating the oral health burden associated with SLT consumption in the country.[42]

25. Keles et al. conducted a study at an apprentice training center in western Turkey to evaluate the oral health status and oral health-related quality of life (OHRQoL) among adolescent workers, a topic with limited exploration in existing literature. This cross-sectional study involved 514 students aged 14 to 18 years, utilizing the DMFT Index, the Turkish version of the Oral Health Impact Profile-14 (OHIP-14), and socio-demographic information forms for data collection. Results revealed significant

correlations between tooth brushing frequency, dental visit frequency, dental trauma history, smoking, and various OHIP-14 subdomains. These findings emphasize the importance of promoting positive oral health behaviors and implementing dental health education programs in collaboration with schools and dental health services to enhance the OHRQoL of working adolescents.[43]

26. Janapareddy et al. conducted a cross-sectional study among production line and administration workers of a steel factory to assess the oral health status and Oral Health-Related Quality of Life (OHRQoL) in relation to occupational exposure. The study found a dental caries prevalence of 62.5% among production line workers and 74.9% among administration workers, with periodontal status prevalence rates of 91.6% and 74.8%, respectively. Mean OHIP-14 scores were 2.13 ± 0.73 for production line workers and 2.33 ± 0.77 for administration workers. Significant associations were observed between OHIP-14 scores and various oral health indicators in both groups. Notably, production line workers exhibited a significantly higher prevalence of periodontal disease, oral mucosal lesions, and OHIP-14 scores compared to administration workers.[44]

27. Eskandari et al. conducted a descriptive analytical study involving 1170 community health workers in East Azerbaijan, Iran, to evaluate their understanding and perspective on oral health. The results unveiled a commendable level of both knowledge and attitude among the participants. However, factors such as age, professional experience, and the frequency of engaging in continuing education programs showed an inverse correlation with knowledge scores. This underscores the significance of continuous training initiatives and the need for refining educational approaches tailored to

community health workers and other healthcare professionals. Interestingly, no notable correlations were detected between attitude and the examined variables.[45]

28. Mochida et al. conducted a longitudinal study assessing the effectiveness of a condensed version of an oral health promotion initiative in the workplace, analyzing data from 2545 workers spanning ages 20 to 68. The research focused on dental and medical care expenses. Results indicated that individuals enrolled in the program were more inclined to seek dental and periodontal treatments compared to their non-participating counterparts. Notably, those who engaged in the program repeatedly exhibited reduced expenditures for dental, periodontal, and medical care, along with fewer dental appointments. These findings imply that workplace-based oral health promotion endeavors hold promise in mitigating expenses associated with dental, periodontal, and medical treatments.[46]

29. The study by Yoshino et al. aimed to explore the correlation between self-reported oral health symptoms and levels of job stress among male financial workers. Recruiting 950 participants aged 25 to 64 from Japanese registrants, the researchers utilized 7 items from The Brief Job Stress Questionnaire (BJSQ) to assess job stress and collected data on self-reported oral health symptoms. Findings indicated that participants reporting challenges in completing work on time tended to have more decayed teeth. Moreover, individuals perceiving their job as highly demanding were more likely to report oral health issues such as food impaction, difficulty in eating certain foods, halitosis, and jaw clicking sounds. Additionally, a higher cumulative stress score correlated with an increased likelihood of experiencing multiple oral health symptoms. These results suggest a potential bidirectional relationship between job stress and oral health, underscoring the importance of integrating oral health considerations into workplace

health promotion initiatives aimed at mitigating job-related stress among male financial workers.[47]

30. Ali et al. conducted a cross-sectional study aimed at evaluating the prevalence of tobacco use and associated oral mucosal lesions among construction workers in Cochin, Kerala, India. Involving 2,163 participants, the study collected data on tobacco consumption habits, oral health status, and the presence of mucosal lesions. Findings revealed a notable prevalence of tobacco use among the workers, with common occurrences of premalignant lesions such as leukoplakia and oral submucous fibrosis. The study underscores the significance of workplace screening and early detection initiatives to combat oral cancer, particularly within at-risk populations like construction workers, who may encounter barriers to accessing healthcare services. Given their precarious socioeconomic status and heightened health risks, targeted oral health education and intervention efforts are deemed essential for fostering improved health outcomes among this demographic.[48]

Studies done on oral health status of Indian adults

31. In a rural area of Paschim Bardhhaman district, West Bengal, a community-based cross-sectional study was conducted by Haque et al. among adults of the Santhal tribe to assess oral hygiene status and associated factors. Data from 103 participants revealed a high proportion (38.8%) with poor oral hygiene status. Significant predictors of poor oral hygiene included age, gender, alcohol consumption, use of "datun," smokeless tobacco (SLT) use, and both smoking and SLT use. Multivariable analysis confirmed "datun" use, SLT use, and both smoking and SLT use as significant factors associated with poor oral hygiene. These findings underscore the importance of raising awareness and implementing oral care strategies tailored to tribal communities in the region.[49]

32. Kumaraguru et al. conducted an epidemiological cross-sectional study among 880 tribals in Tamil Nadu, India, including Irulars and Narikuravars, to assess their oral health status, self-assessment, and associated risks. The study revealed a higher mean DMFT score among Irulars compared to Narikuravars, indicating poorer oral health among Irulars. Significant variations in periodontal status were noted based on age, gender, ethnicity, and education levels. Prevalence rates of Leukoplakia and Tobacco Pouch Keratosis were found to be 3.3% and 1.6%, respectively. These findings emphasize the need for heightened awareness and targeted dental care interventions tailored to the specific needs of tribal communities in Tamil Nadu.[50]

33. In a cross-sectional study by Bhat et al., conducted among adults aged 35-54 years in rural areas of Karnataka, India, findings revealed a prevalence of poor self-rated oral health (SROH) at 15.2%. Factors associated with poor SROH encompassed age (particularly 40-44 years), female gender, lower socioeconomic status, high caries experience (DMFT ≥ 4), and periodontal disease. Notably, individuals who had visited a dentist in the previous year were more likely to report poor oral health. These results highlight the necessity of addressing socioeconomic disparities and promoting regular dental visits to enhance oral health perception among rural populations in India.[51]

34. The study conducted by Varghese et al. aimed to evaluate the prevalence of dental issues and oral health-seeking behavior among an urban population aged over 14 years in south India. In this population-based cross-sectional study involving 101 households and 419 participants, dental caries, periodontal problems, and tooth wear were found to be highly prevalent. Significant associations were observed with factors like age, education level, oral hygiene practices, tobacco use, and alcohol consumption. Despite the high prevalence, only a small proportion of participants acknowledged having

dental problems, and even fewer sought dental care. These results highlight the importance of community-based awareness programs and regular dental health screenings to facilitate early diagnosis and enhance the treatment of oral health issues.[52]

35. Maru et al. conducted a study to evaluate the oral health status and dental treatment requirements among a rural Indian population. Their research, encompassing 189 participants, revealed a high prevalence of untreated caries, affecting over 80% of the subjects. The mean DMFT and DMFS scores were recorded as 5.1 ± 3.9 and 13.8 ± 17.8, respectively, with no discernible gender disparities. The identified dental treatment needs varied from fillings to extractions, indicating a substantial demand for oral healthcare services. Interestingly, individuals with a better perception of oral health tended to exhibit lower caries scores, underscoring the significance of oral health education and intervention initiatives in rural settings.[53]

36. Patro et al. conducted a community-based cross-sectional study in Dakshinpuri, New Delhi, aiming to fill the gap in understanding the prevalence of dental caries among adults aged 35-44 years and the elderly (60 years and above). While dental caries remains a significant oral health concern in developing nations like India, existing research primarily focuses on school children, leaving a dearth of information regarding adults and the elderly. The study revealed a strikingly high prevalence of dental caries in both age groups, with rates reaching 82.4% and 91.9%, respectively. Notably, tobacco consumption exhibited a statistically significant association with dental caries. These findings underscore the imperative of promoting oral health awareness and implementing accessible dental care services at the primary level to address the oral health needs of such populations.[54]

37. Grewal et al. conducted a school-based cross-sectional study aimed at gauging the prevalence of dental caries and associated treatment needs among schoolchildren in Delhi. Dental caries presents a pervasive oral health concern affecting a significant segment of the Indian populace, with prevalence rates varying between 31.5% and 89%. Analyzing 520 children aged 9-12 years, the study unveiled a notable prevalence of dental caries, impacting 52.3% of the children. The mean deft and DMFT scores stood at 0.5038 ± 1.0859 and 0.8250 ± 1.3437, respectively, indicative of a considerable caries burden. Nearly half of the participants necessitated restorative treatment. These findings underscore the pressing necessity for preventive and promotional oral health interventions to tackle the elevated prevalence of dental caries among schoolchildren in Delhi, underscoring the significance of heightened awareness campaigns and enhanced accessibility to dental care services.[55]

38. Janakiram et al. conducted a systematic review with the aim of determining the pooled prevalence of periodontal disease among Indian adults through an analysis of available literature. Thirty cross-sectional studies focusing on periodontal disease prevalence among adults aged 18 years and older were identified during the search. The pooled prevalence estimates revealed that approximately 51% of Indian adults grapple with periodontal disease, with gingivitis affecting 46.6% of the population. Among adults, mild to moderate periodontitis was prevalent in 26.2%, while severe periodontitis afflicted 19% of the population. The study highlighted that individual aged 65 years or above had the highest proportion of severe periodontitis, and urban populations exhibited a higher prevalence of mild to moderate periodontitis. Additionally, females displayed a slightly lower prevalence of periodontitis compared to males. These findings underscore the importance of adopting standardized and

precise measurement tools for evaluating periodontal health, given the substantial burden of periodontal disease observed among Indian adults.[56]

39. Peter et al. conducted a study to gauge the prevalence and severity of periodontal disease among adults. They examined a sample of 700 individuals who visited a dental college outpatient department, gathering demographic and lifestyle information alongside clinical evaluations. Periodontal status was assessed using various indices, with periodontitis defined as clinical attachment loss (CAL) ≥3mm. The results revealed a high prevalence of periodontitis, affecting around 72% of the individuals, with a noticeable trend of deteriorating periodontal health with advancing age. Further examination showed that 41% of the population had at least one site with CAL ≥5mm, and 21% had at least three such sites. These findings underscore the considerable burden of periodontal disease and emphasize the imperative for heightened dental health awareness among the populace.[57]

40. Sekhon et al. conducted a study to gauge the prevalence and treatment needs related to periodontal disease in a rural community within Belgaum district, India. The research encompassed 1680 dentate adult participants from 12 villages and employed the Community Periodontal Index for Treatment Needs (CPITN) to assess periodontal health status and associated treatment requirements. Their findings unveiled a direct relationship between CPITN score and age, indicating elevated treatment needs among older individuals. Moreover, males, smokers, and those using finger and tooth powder demonstrated notably higher treatment requirements. While dietary habits did not emerge as a significant influencer of treatment needs, the study emphasized the critical role of oral hygiene awareness and preventive measures in curbing the prevalence of periodontal disease within the community.[58]

MATERIALS AND METHODS

Study Design, Duration and Setting

The present study employed a cross-sectional research design. It aligned with the recommended standards outlined in Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines. The study was conducted for a four-month period, spanning from September to December 2022.

Source of data

The participants of the study were police personnel from KSRP unit stationed in Belagavi. The police personnel belonged to five ranks which included inspectors, sub-inspectors, assistant sub-inspectors, head constables, and constables.

Selection Criteria

Inclusion criteria

- Police personnel who were deployed at KSRP Belagavi unit during the period of the study.
- Participants who gave consent for participating in the study.

Exclusion criteria

- *Participants who refused to provide informed consent and who were not willing to participate were also excluded*

Ethical Considerations, permissions, and informed Consent

The Institutional Research and Ethics Committee granted ethical approval (Reference number: 1577; Date:30/03/2024) for the study, and all ethical standards were strictly followed [Annexure I].” The superintendent of police at KSRP unit granted official permission for the conduct of the study [Annexure II]. Before the

research commenced, each participant received a written consent document, which they thoroughly read and signed. The informed consent form is attached in Annexure III**.**

Sample size calculation

Sample size estimation was carried out using the following formula.

$$n = \frac{\left(Z_{1-\frac{\alpha}{2}}\right)^2 (pq)}{d^2}$$

Where, $\left(Z_{1-\frac{\alpha}{2}}\right)^2 = 1.96$

p = prevalence (from Parent Article)

q = 1-p

d = Precision

The prevalence of dental caries was found to be 74% from a previous study by C.L. Dilip.[24] Using it in the aforementioned formula,

p = 0.74 q = 0.26 d = 3.7

Substituting the values, the minimum sample size was found to be *540*.

A final sample size of **N = 720** was obtained at the end of the study.

Sampling technique

The list of police personnel stationed at KSRP unit in Belagavi was obtained. All the participants were recruited for the study.

Organization of the study

1.Pilot study

A pilot study was conducted among 50 police personnel to evaluate the feasibility and identify any potential challenges encountered during the execution of the study.

2. Training and calibration

A single investigator underwent a meticulous standardization and calibration process before to the start of the study at the Department of Public Health Dentistry, KLE V.K Institute of Dental Sciences, Belagavi to ensure consistent assessment under the guidance of a professor. The investigator then conducted clinical examinations on ten subjects using the WHO Oral Health Assessment Form (2013), five of them were randomly recalled for a repeated assessment. Intra-examiner reliability was evaluated using Kappa statistics, resulting in a weighted Kappa coefficient value of 0.86, indicating a high level of agreement.

3. Data collection

a) WHO Oral Health Assessment Form (2013)

The present study utilized the WHO Oral Health Assessment Form (2013), which was obtained from the "Oral Health Survey – Basic Methods 5th Edition" and was distributed in printed form. This structured format is specifically tailored for evaluating both the oral health status and treatment requirements of individuals. It furnishes essential data necessary for devising comprehensive oral healthcare initiatives. It recorded the dentition status, which included the assessment of Decayed, Missing, and Filled teeth (DMFT), as well as the periodontal status, which involves evaluating Bleeding On Probing (BOP) and Periodontal Pocket Disease (PPD). Additionally, any oral mucosal lesions observed were documented, along with the type of dental treatment need. Additional details regarding the format can be found in Annexure IV.

b) WHO Oral Health Questionnaire for Adults (2013)

WHO Oral health Questionnaire for Adults (2013) was a pre-validated standard questionnaire taken from “Oral Health Survey – Basic Methods 5th Edition”

was used in this study. It included 16 closed ended multiple choice questions in English. It was recorded in the form personal interview. It served to document the oral hygiene practices, including the frequency and methods of toothbrushing, as well as the frequency of dental visits. Additionally, the questionnaire captured sugar consumption frequency and documented any deleterious habits, such as tobacco use in any form and alcohol consumption. This questionnaire has been included in Annexure V.

4. Implementation of the survey

a) Scheduling:

The examination schedule for police personnel was organized and presented to the superintendent of police at KSRP, Belagavi unit. A total of 720 police personnel who gave consent were allocated for oral examinations, followed by personal interviews. Each day, a maximum of 25 subjects underwent examinations and interviews. The examinations took place during daylight hours, specifically from 10:00 am to 1:00 pm and from 2:00 pm to 5:00 pm, utilizing natural light. The examinations were conducted at a consistent location within the premises of the KSRP Unit.

b) Emergency care and referral:

Participants requiring emergency or additional treatment from the KSRP unit were appropriately referred to the KLE Vishwanath Katti Institute of Dental Sciences for further assistance.

*c) Personnel and organization**:***

1. Recording clerk: Five recording clerk underwent training to proficiently record the WHO Oral Health Assessment Forms and provided assistance to the examiner during the survey, fulfilling the role of recording clerks. To ensure seamless coordination and accuracy in coding, a preliminary session was conducted where the examiner and recording clerks jointly recorded a certain number of forms prior to the commencement

of the survey. This preparatory step aimed to optimize workflow efficiency and precision of the collected data.

2. Organizing clerk: A health officer from the KSRP units' office was designated as the organizing clerk to oversee the smooth progression of participants for oral examination and personal interviews. The officer helped in maintaining the orderly flow of activities and ensuring the availability of necessary equipment in a sterile condition.

d) Infection control

Disposable gloves and mouth masks were utilized throughout the examination process. Gloves were replaced prior to examining each participant to maintain sterilization standards. Instruments were consistently sterilized during the survey. A total of 100 instruments were allocated for examinations, and they were sterilized at the end of each day. Additionally, 25 CPI probes were provided, and cold sterilization was conducted during the examinations to maintain the sterilization protocols.

e) Examination area:

The examination sites were established at two specific locations within the premises of the KSRP unit. All essential arrangements were meticulously arranged at these sites to ensure smooth operations.

f) Examiner position:

The participants were positioned on chairs equipped with backrests, while the examiner carried out the examination standing behind.

g) Lighting:

All examinations were carried out under natural daylight to ensure optimal illumination. In cases where additional light was necessary, a torch was utilized.

h) Seating of the recording clerk / intern:

The recording clerk was positioned strategically to ensure clear auditory reception of the codes and a clear view of the examination area. Simultaneously, the examiner had visibility of the codes being inputted into the form, minimizing the likelihood of recording errors. Following the oral examination, participants engaged in one-on-one sessions with the recording clerk and principal investigator for the personal interview, during which the contents of WHO Oral Health Questionnaire were recorded.

i) Instruments and supplies:

Adequate supply of instruments was maintained at the site of examination site.

The following instruments and supplies were used:

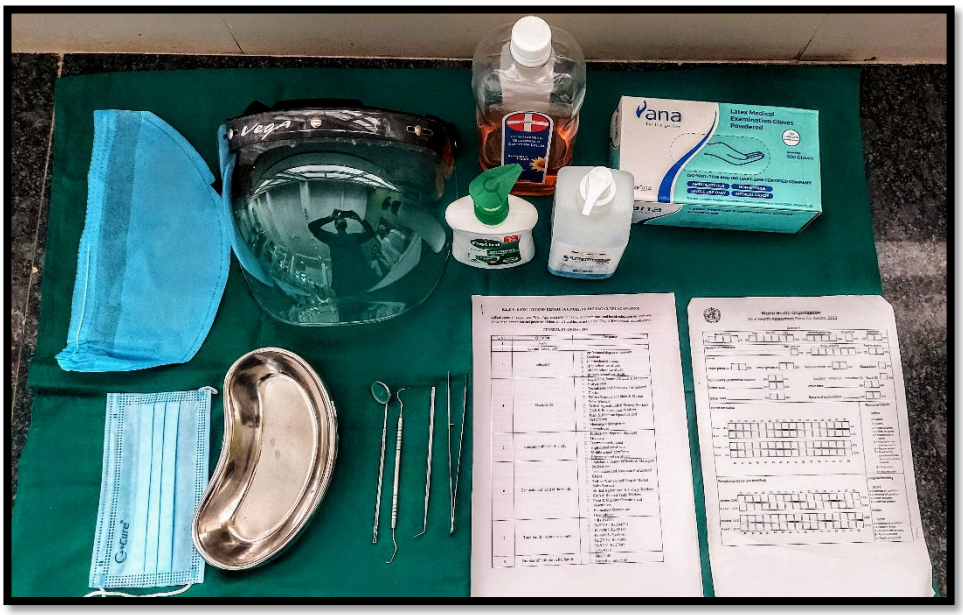
- CPI probe
- Plane mouth mirrors
- Chip blower
- Korsolex Solution for cold Sterilization – (Composition: Glutaraldehyde 7 g, 1.6 Dihydroxy, 2,5 Dioxahexane (chemically bound formaldehyde) 8.2 g Polymethylol urea derivatives 17.6 g, Rust inhibitors.)
- Gauze and cotton
- Tweezers
- Kidney trays
- Autoclave
- Cloth hand towels
- Torch
- Gloves and mouth masks
- WHO Oral Health Assessment Form (2013)
- WHO Oral Health Questionnaire for Adults (2013).

Statistical analysis

The collected data were inputted into a spreadsheet utilizing the Microsoft Excel 2019 program by the examiner. Descriptive statistics, including frequencies, means, and standard deviations, were computed. Subsequently, the data were visually represented through graphs and tables for clearer presentation and interpretation.

Statistical analysis was conducted using IBM-SPSS® Statistics Version 21 (USA) and STATA® Statistics Version 13.1 (USA). The Kolmogorov–Smirnov test was employed to assess the normality of the data distribution. The data was found to be normally distributed. Parametric tests and the Chi-square test were used for comparing frequencies among different groups. The Independent student t-test for comparing means between two groups, and Analysis of Variance (ANOVA) for comparing means among more than two groups were utilized. Additionally, multiple linear regression analysis was performed to examine the relationships between various dependent and independent variables of the study. The significance level was set at $p < 0.05$.

Photographs illustrating the study progression and methodology



Photograph 1: Armamentarium used in the study

Photograph 2: Police personnel filling the informed consent form

Photograph 3: Oral examination carried out in one of the sites

Photograph 4: Oral examination carried out at another site

RESULTS

This study was undertaken to evaluate the Oral Health Status and treatment needs of KSRP personnel in Belagavi, Karnataka. The data collection involved oral examinations and interviews utilizing the WHO Oral Health Assessment Form (2013) and the WHO Oral Health Questionnaire for Adults (2013). Subsequently, the data was entered into Microsoft Excel 2013 and was subjected to analysis using SPSS for Windows (Version 21.0). The findings were organized and conveyed through tabulation, presenting frequencies, mean values, and standard deviations, accompanied by pertinent p-values for statistical significance.

Table 1 and **Figures 1, 2, and 3** depicts the demographic characteristics of the participants. The gender distribution revealed a predominance of male participants, constituting 70%, with females comprising 30% of the sample. The mean age of the participants was 39.48 ± 10.65 years, ranging from 21 to 60 years. Among the age groups, the highest representation was observed in the 31–40-year bracket, accounting for 35% of the participants, followed by 21-30 years (24.3%), 51-60 years (21.7%), and 41-50 years (19.0%). Based on occupational ranks the KSRP personnel in the present study comprised constables (35.6%), head constables (24.4%), assistant sub-inspectors (16.1%), sub-inspectors (13.3%), and inspectors (10.6%).

Table 2 and **Figure 4** presents the prevalence of dental caries across various demographic variables among KSRP personnel. The overall prevalence of dental caries among this population was 84.2%. Upon stratification by gender, the prevalence of caries was notably higher among females (87.96%) compared to males (82.54%). Analysis across different age groups revealed the highest prevalence within the 21-30 years bracket (88.6%), whereas the lowest prevalence was observed among individuals

aged 31-40 years (82.5%). Rank wise, head constables (89.80%) and constables (89.50%) exhibited the highest prevalence of caries, whereas inspectors demonstrated the lowest prevalence at 65.80%. There was a statistically significant association observed between the ranks of personnel and the prevalence of dental caries (P = 0.001).

Table 3 and **Figure 5** depicts the comparison of gender-specific distribution concerning mean DMFT, Decayed Teeth (DT), Missing Teeth (MT), and Filled Teeth (FT) scores among KSRP personnel. The mean DMFT, DT, MT, and FT scores were notably higher among females, with values of 5.48 ± 2.91, 3.33 ± 2.89, 1.02 ± 1.26, and 1.13 ± 1.26, respectively. Correspondingly, among males, the mean DMFT, DT, MT, and FT scores were 5.02 ± 2.93, 3.04 ± 2.90, 0.87 ± 1.12, and 1.12 ± 1.24, respectively. While a statistically significant difference was observed in the DMFT score between genders (p = 0.052), no significant disparity was noted in DT, MT, and FT scores between males and females.

Table 4 and **Figure 6** illustrate the comparative analysis of age group-wise distribution concerning mean DMFT, DT, MT, and FT scores among KSRP personnel. Notably, the highest mean DMFT score was observed within the age group of 21-30 years (5.69 ± 2.81), whereas the lowest was recorded among individuals aged 31-40 years (4.87 ± 2.93). A statistically significant difference was noted in the mean DMFT scores among the various age groups (p = 0.038). Conversely, no significant differences were observed in mean DT, MT, and FT scores among the four age groups. The highest mean DT, MT, and FT scores were recorded within the 21-30 years age bracket, with values of 3.50 ± 2.9, 1.02 ± 1.2, and 1.17 ± 1.28, respectively. Upon pairwise comparison of mean DMFT scores, statistical significance was only found between the

age group of 31-40 years and other age groups. However, no significant differences were noted in pairwise comparison of DT, MT, and FT scores across age groups.

Table 5 and **Figure 7** depicts the comparison of mean DMFT, DT, MT, and FT scores among the various ranks of KSRP personnel. The mean DMFT, DT, MT, and FT scores showed a statistically significant difference across the five ranks of KSRP personnel ($p = 0.001$). The highest mean DMFT scores was observed in constables (5.62 ± 2.97) and the least among inspectors (3.66 ± 2.70). However, the mean DT scores were highest among head constables (3.55 ± 3.03) and the least in inspectors (1.99 ± 2.36). The mean MT score was highest among constable (1.15 ± 1.27) and lowest in inspectors (0.64 ± 0.96). However, the mean FT was highest among assistant sub-inspector (1.53 ± 1.39) and the least in constables (0.97 ± 1.19). When pairwise comparison was observed in mean DMFT scores, all the groups showed statistically significant difference with each other, except for sub-inspectors. Pairwise comparison of DT scores revealed that except constables and head constables, other three groups did not show any statistically significant difference. Pairwise comparison of MT scores revealed that except constables other four groups displayed statistically significant difference with each other. However, in pairwise comparison of FT scores except assistant sub-inspector, other three groups did not display statistically significant difference with each other.

Table 6 and **Figure 8** presents the prevalence of Bleeding On Probing (BOP) across various demographic variables among KSRP personnel. The overall prevalence of BOP among this population was 71.4%. Upon stratification by gender, the prevalence of BOP was notably higher among females (81.50%) compared to males (67.10%). Analysis across different age groups revealed the highest prevalence within

the 21-30 years bracket (84.0%), whereas the lowest prevalence was observed among individuals aged 41-50 years (62.80%). Rank wise, constables (90.20%) exhibited the highest prevalence of BOP, whereas assistant sub inspectors demonstrated the lowest prevalence at 53.40%. There was a statistically significant association observed between the prevalence of BOP with gender ($p = 0.001$), age ($p = 0.001$) and rank of personnel ($p = 0.001$).

Table 7 and **Figure 9** presents the prevalence of Periodontal Pocket Disease (PPD) across various demographic variables among KSRP personnel. The overall prevalence of PPD among this population was 27.2%. Upon stratification by gender, the prevalence of PPD was highest among females (30.10%) followed by males (26.00%). Analysis across different age groups revealed the highest prevalence within the 21-30 years bracket (35.40%), whereas the lowest prevalence was observed among individuals aged 31-40 years (20.60%). Rank wise head constables (35.80 %) exhibited the highest prevalence of PPD, whereas sub-inspectors demonstrated the lowest prevalence at 14.60%. There was a statistically significant association observed between the prevalence of PPD with age ($p = 0.006$) and rank of personnel ($p = 0.001$)

Table 8 and **Figure 10** and **11** presents the prevalence of erosion and trauma across various demographic variables among KSRP personnel. The overall prevalence of erosion and trauma among this population were 1.3% and 1.8%, respectively. Erosion (8) and trauma (7) were highest among males. Among the age groups, number of erosions was high among 31-40 years (4), whereas trauma was high among 21-30 years (5). When rank was considered, constables had the highest number of trauma (7) and erosion (4). There was no statistically significant association seen between erosion and trauma with various demographic variables.

Table 9 and **Figure 12** represents the toothbrushing habits among the participants. Among the participants, 79.4% brushed only once a day and the remaining 20.6% brushed twice a day. There were no significant associations observed between toothbrushing habits and demographic variables. **Table 10** and **Figure 13** presents the mode of teeth cleaning. Among the participants, a majority (92.4%) of them used a toothbrush, however 7.60% still used finger/chewsticks for cleaning their teeth. There were no significant associations observed between mode of teeth brushing and demographic variables.

Table 11 and **Figure 14** depicted the time since last dental visit among the KSRP personnel. Among the participants, 29.20% have never visited a dentist, whereas 19.60%, 19.30% and 19.20% of the participants have visited the dentist in the past 6-12 months, last 6 months and more than 5 years, respectively. Only 6.40% of participants have visited the dentist in less than 2 years and less than 5 years, respectively. There were no significant associations observed between last dental visit and demographic variables.

Table 12 and **Figure 15** depicted the reason for last dental visit mong the KSRP personnel. Among the participants, 19.2% visited the dentist routine dental treatments and follow up, whereas 19.6% visited the dentist for pain/trouble. 6.5% study participants visited the dentist for advice/consultation and 19.2% could not remember the reason for last dental visit. There were no significant associations observed between the reason for last dental visit and demographic variables.

Table 13 presented the frequency of sugar intake among KSRP personnel. Majority of the participants consumed fresh fruits, Biscuits, cakes, cream cakes, jam or honey, chewing gum containing sugar/candy and lemonade, Coca Cola or other soft drinks

several times a month (p = 0.001). Among the participants, 104 and 78 personnel consumed tea and coffee with sugar several times a day, respectively (p = 0.001).

Table 14 and **Figure 16** depicted the use of dentures among KSRP personnel. Majority (92.2%) of the participants did not use any kind of denture, however 7.8% of participants used partial denture. There were no significant associations observed between the use of dentures and demographic variables. **Table 15** presented the perception of the participants towards their teeth and gums as well as their knowledge on presence of fluoride in their toothpaste. Majority of participants felt that the state of their teeth (p = 0.001) and gums (p = 0.001) is either poor or fair. Majority (434) of the participants believed that their toothpaste contained fluoride, however 240 personnel were not knowing whether their toothpaste contained fluoride or not (p = 0.001).

Table 16 presented the dental problems faced by KSRP personnel during the last 12 months. Majority of the participants did not face any dental problems (p = 0.001). 72 police personnel had trouble in biting food fairly often (p = 0.001) and 190 police personnel experienced dry mouth sometimes (p = 0.001). Whereas 96 police personnel experienced interrupted sleep due to dental problem fairly often (p = 0.001).

Table 17 and **Figure 17** presented the frequency of alcohol consumption in last 30 days among KSRP personnel. Majority (36.9%) of the participants did not drink alcohol, while 32,4% participants had one drink, 24.7% participants had less than one drink and only 6% had two drinks past 30 days. When rank wise distribution was considered, 105 constables, 72 head constables, 50 assistant sub inspectors, 26 sub inspectors and 13 inspectors did not drink, while 84 constables, 53 head constables, 38 assistant sub inspectors, 45 sub inspectors and 56 inspectors had one to two drinks in the past 30 days (p = 0.001). There was a significant

association seen between frequency of alcohol consumption and the rank of the police personnel (p = 0.001).

Table 18 and **Figure 18** presented the frequency of smoking habit among KSRP personnel. Majority (64.9%) of the participants did not have a smoking habit, while 10.4% smoked rarely, however 8.6% participants smoked every day. When rank was considered, 177 constables, 122 head constables, 78 assistant sub inspectors, 54 sub inspectors and 36 inspectors never smoked, however 29 constables, 14 head constables, 11 assistant sub inspectors, 12 sub inspectors and 9 inspectors smoked every day (p = 0.001). There was a significant association seen between frequency of smoking and the rank of the police personnel (p = 0.001).

Table 19 and **Figure 19** presented the frequency of tobacco chewing habit among KSRP personnel. Majority (70.1%) of the participants did not have tobacco chewing habit, while 11.8% used it several times a week, 6% used it several times a month and 3.6% used it rarely. When gender wise distribution was considered, 17 males and 13 females used it every day whereas 20 males and 6 females used it rarely (p = 0.053). When rank was considered, everyday use was found only in 8 head constables and 22 constables, whereas 6 inspectors, 3 sub inspectors, 4 assistant sub-inspectors, 5 head constables and 8 constables rarely used tobacco (p = 0.053). There was a significant association seen between the frequency of tobacco chewing with gender (p = 0.001) and the rank of the police personnel (p = 0.001).

Table 20 and **Figure 20** depicted the prevalence of oral mucosal lesions among KSRP personnel. The prevalence of leukoplakia, oral submucous fibrosis and ulcerations were 4.7%, 4.2% and 1.9% respectively. There was a significant association between age and the prevalence of oral mucosal lesions (p = 0.001). **Table 21** and **Figure 21** depicted the site of oral mucosal lesions among KSRP personnel. The sites of the oral mucosal lesions were buccal mucosa (6.1%), lips (2.9%), tongue (0.8%), gingiva/alveolar ridge (0.6% and floor of mouth

(0.4%), respectively. There was a significant association between age and the site of oral mucosal lesions ($p = 0.001$).

Table 22 and **Figure 22** presented the various treatment needs of KSRP personnel. Majority (46.8%) participants required preventive or routine treatments, while 24.2% required prompt treatments like scaling, 9.9% required immediate treatment, 9.7% required referral for comprehensive evaluation and 9.4% required no treatment. There were no significant associations between treatment needs and demographic variables of the KSRP personnel.

Table 23 presented the multiple linear regression analysis between DMFT and other independent variables. It was found that rank of the personnel ($r = 0.197$; $p = 0.001$), oral hygiene aid ($r = 0.111$; $p = 0.024$) and the frequency of dental visit ($r = 0.223$; $p = 0.048$) were found to be significant predictors for DMFT, while other predictors did not show such significant associations.

Table 24 presented the multiple linear regression analysis between PPD and other independent variables. It was found that rank of the personnel ($r = 0.109$; $p = 0.001$) was found to be a significant predictor for PPD, while other predictors did not show such significant associations. **Table 25** presented the multiple linear regression analysis between BOP and other independent variables. It was found that rank of the personnel ($r = 0.109$; $p = 0.001$) was found to be a significant predictor for PPD, while other predictors did not show such significant associations.

Table 1: Demographic profile of KSRP personnel

Demographic Variables	**Constable n (%)**	**Head Constable n (%)**	**Assistant Sub Inspector n (%)**	**Sub Inspector n (%)**	**Inspector n (%)**	**Total n (%)**
Gender						
Male	118 (46.1%)	137 (77.8%)	96 (82.8%)	77 (80.2%)	76 (100%)	504 (70.0%)
Female	138 (53.9%)	39 (22.2%)	20 (17.2%)	19 (19.8%)	0 (0.0%)	216 (30.0%)
Age Groups						
21-30 years	116 (45.3%)	39 (22.2%)	20 (17.2%)	0 (0%)	0 (0.0%)	175 (24.3%)
31-40 years	60 (23.4%)	59 (33.5%)	19 (16.4%)	76 (79.2%)	38 (50.0%)	252 (35.0%)
41-50 years	20 (7.8%)	58 (33.0%)	20 (17.2%)	20 (20.8%)	19 (25.0%)	137 (19.0%)
51-60 years	60 (23.4%)	20 (11.4%)	57 (49.1%)	0 (0.0%)	19 (25.0%)	156 (21.7%)
Total	256 (100%)	176 (100%)	116 (100%)	96 (100%)	76 (100%)	720 (100%)

All values are expressed as frequency with percentages (in parentheses)

Table: 2 Association between prevalence of dental caries with demographic variables of KSRP personnel

Demographic Variables	Caries Present	Caries Absent	X^2	P-value
Gender				
Male	416 (82.5%)	88 (17.5%)	3.337	0.068
Female	190 (88.0%)	26 (12.0%)		
Age Groups				
21-30 years	155 (88.6%)	20 (11.4%)	3.397	0.334
31-40 years	208 (82.5%)	44 (17.5%)		
41-50 years	114 (83.2%)	23 (16.8%)		
51-60 years	129 (82.7%)	27 (17.3%)		
Rank				
Inspecter	50 (65.8%)	26 (34.2%)	31.969	0.001*
Sub inspector	76 (79.2%)	20 (20.8%)		
Assistant Sub Inspector	93 (80.2%)	23 (19.8%)		
Head Constable	158 (89.8%)	18 (10.2%)		
Constable	229 (89.5%)	27 (10.5%)		
Total	606 (84.2%)	114 (15.8%)		

*The statistical test applied: Chi- Square Test; *P ≤ 0.05 indicates statistically* significant

Table 3: Comparison of gender with mean DMFT and its components (DT, MT, FT)

Gender	DMFT	DT	MT	FT
Male	5.02 ± 2.93	3.04 ± 2.90	0.87 ± 1,12	1.12 ± 1.24
Female	5.48 ± 2.91	3.33 ± 2.89	1.02 ± 1.26	1.13 ± 1.26
Total	5.16 ± 2.93	3.13 ± 2.91	0.91 ± 1.16	1.12 ± 1.25
t- Value	-1.949	-1.261	-1.633	-0.124
P - Value	0.052*	0.208	0.103	0.902

*All values are expressed as mean ± standard deviation (SD). The statistical test used: Independent student t test; Level of significance: * p ≤ 0.05 is considered statistically significant.*

Table 4: Comparison of age groups with mean DMFT and its components (DT, MT, FT)

Age groups	DMFT	DT	MT	FT
21-30 years	$5.69 \pm 2.81^{\alpha}$	$3.50 \pm 2.93^{\alpha}$	$1.02 \pm 1.23^{\alpha}$	$1.17 \pm 1.28^{\alpha}$
31-40 years	$4.87 \pm 2.93^{\beta}$	$2.85 \pm 2.79^{\alpha}$	$0.91 \pm 1.16^{\alpha}$	$1.12 \pm 1.22^{\alpha}$
41-50 years	$5.01 \pm 2.93^{\alpha}$	$3.07 \pm 2.86^{\alpha}$	$0.81 \pm 1.10^{\alpha}$	$1.13 \pm 1.29^{\alpha}$
51-60 years	$5.15 \pm 3.001^{\alpha}$	$3.21 \pm 3.06^{\alpha}$	$0.88 \pm 1.12^{\alpha}$	$1.06 \pm 1.23^{\alpha}$
Total	5.16 ± 2.93	3.13 ± 2.90	0.91 ± 1.16	1.12 ± 1.25
F - Value	2.818	1.799	0.934	0.185
P- value	0.038*	0.146	0.424	0.906

*All values are expressed as mean ± SD. The statistical test used: Repeated measures ANOVA; Level of significance: * $p \leq 0.05$ is considered statistically significant. Groups with different letters in superscript show statistically significant differences ($^{\alpha, \beta, \gamma,}$ Test Applied: Bonferroni's post-hoc test- Pairwise comparison within the group).*

Table 5: Comparison of Rank of KSRP personnel with mean DMFT and its components (DT, MT, FT)

Age groups	DMFT	DT	MT	FT
Inspecter	$3.66 \pm 2.70^{\alpha}$	$1.99 \pm 2.36^{\alpha}$	$0.64 \pm 0.96^{\alpha}$	$1.03 \pm 1.24^{\alpha}$
Sub inspector	$4.46 \pm 2.60^{\alpha}$	$2.41 \pm 2.35^{\alpha}$	$0.77 \pm 1.04^{\beta}$	$1.28 \pm 1.24^{\alpha}$
Assistant sub inspector	$5.34 \pm 2.81^{\beta}$	$3.00 \pm 2.95^{\alpha}$	$0.80 \pm 1.14^{\gamma}$	$1.53 \pm 1.39^{\beta}$
Head Constable	$5.39 \pm 2.96^{\gamma}$	$3.55 \pm 3.03^{\beta}$	$0.83 \pm 1.09^{\delta}$	$1.02 \pm 1.19^{\alpha}$
Constable	$5.62 \pm 2.97^{\delta}$	$3.50 \pm 2.99^{\gamma}$	$1.15 \pm 1.27^{\alpha}$	$0.97 \pm 1.19^{\alpha}$
Total	5.16 ± 2.93	3.13 ± 2.90	0.91 ± 1.16	1.12 ± 1.25
F - Value	8.691	4.995	4.623	6.639
P- value	0.001*	0.001*	0.001*	0.001*

*All values are expressed as mean ± SD. The statistical test used: Repeated measures ANOVA; Level of significance: * $p \leq 0.05$ is considered statistically significant. Groups with different letters in superscript show statistically significant differences ($^{\alpha, \beta, \gamma, \delta}$ Test Applied: Bonferroni's post-hoc test- Pairwise comparison within the group).*

Table: 6 Association between prevalence of Bleeding on Probing (BOP) with demographic variables of KSRP personnel

Demographic Variables	BOP Present	BOP Absent	X^2	P-value
Gender				
Male	338 (67.1%)	166 (32.9%)	15.388	0.001*
Female	176 (81.5%)	40 (18.5%)		
Age Groups				
21-30 years	147 (84.0%)	28 (16.0%)	21.440	0.001*
31-40 years	168 (66.7%)	84 (33.3%)		
41-50 years	86 (62.8%)	51 (37.2%)		
51-60 years	113 (72.4%)	43 (27.6%)		
Rank				
Inspecter	44 (57.9%)	32 (42.1%)	75.829	0.001*
Sub inspector	59 (61.5%)	37 (38.5%)		
Assistant Sub Inspector	62 (53.4%)	54 (46.6%)		
Head Constable	118 (67.0%)	58 (33.0%)		
Constable	231 (90.2%)	25 (9.8%)		
Total	514 (71.4%)	206 (28.6%)		

*The statistical test applied: Chi- Square Test; *P ≤ 0.05 indicates statistically* significant

Table: 7 Association between prevalence of PPD with demographic variables of KSRP personnel

Demographic Variables	PPD Present	PPD Absent	X^2	P-value
Gender				
Male	131 (26.0%)	373 (74.0%)	1.283	0.257
Female	65 (30.1%)	151 (69.9%)		
Age Groups				
21-30 years	62 (35.4%)	113 (64.6%)	12.327	0.006*
31-40 years	52 (20.6%)	200 (79.4%)		
41-50 years	35 (25.5%)	102 (74.5%)		
51-60 years	47 (30.1%)	109 (69.9%)		
Rank				
Inspecter	12 (15.8%)	64 (84.2%)	19.848	0.001*
Sub inspector	14 (14.6%)	82 (85.4%)		
Assistant Sub Inspector	32 (27.6%)	84 (72.4%)		
Head Constable	63 (35.8%)	113 (64.2%)		
Constable	75 (29.3%)	181 (70.7%)		
Total	196 (27.2%)	524 (72.8%)		

*The statistical test applied: Chi- Square Test; *P ≤ 0.05 indicates statistically* significant

Table: 8 Association between prevalence of erosion and trauma with demographic variables of KSRP personnel

Demographic Variables	Erosion Present	P-value	Trauma Present	P-value
Gender				
Male	8 (1.6%)	0.213	7 (1.4%)	0.200
Female	1 (0.5%)		6 (2.8%)	
Age Groups				
21-30 years	0 (0.0%)		5 (2.9%)	0.518
31-40 years	4 (1.6%)	0.330	5 (2.0%)	
41-50 years	3 (2.2%)		1 (0.7%)	
51-60 years	2 (1.3%)		2 (1.3%)	
Rank				
Inspecter	1 (1.3%)		1 (1.3%)	0.355
Sub inspector	1 (1.0%)	0.983	3 (3.1%)	
Assistant Sub Inspector	1 (0.9%)		1 (0.9%)	
Head Constable	2 (1.1%)		1 (0.6%)	
Constable	4 (1.6%)		7 (2.7%)	
Total	9 (1.3%)		13 (1.8%)	

*The statistical test applied: Chi- Square Test; *P ≤ 0.05 indicates statistically* significant

Table: 9 Association between brushing habit and demographic variables of KSRP personnel

Demographic Variables	Once daily	Twice daily	X^2	P-value
Gender				
Male	399 (79.2%)	105 (20.8%)	0.079	0.778
Female	173 (80.1%)	43 (19.9%)		
Age Groups				
21-30 years	140 (80.0%)	35 (20.0%)	0.069	0.995
31-40 years	200 (79.4%)	52 (20.6%)		
41-50 years	109 (79.6%)	28 (20.4%)		
51-60 years	123 (78.8%)	33 (21.2%)		
Rank				
Inspecter	61 (80.3%)	15 (19.7%)	0.340	0.987
Sub inspector	75 (78.1%)	21 (21.9%)		
Assistant Sub Inspector	94 (81.0%)	22 (19.0%)		
Head Constable	139 (79.0%)	37 (21.0%)		
Constable	203 (70.3%)	53 (20.7%)		
Total	572 (79.4%)	148 (20.6%)		

*The statistical test applied: Chi- Square Test; *P ≤ 0.05 indicates statistically* significant

Table: 10 Association between mode of teeth cleaning and demographic variables of KSRP personnel

Demographic Variables	Toothbrush	Finger/Chewstick	X^2	P-value
Gender				
Male	467 (92.7%)	37 (7.3%)	0.211	0.646
Female	198 (91.7%)	18 (8.3%)		
Age Groups				
21-30 years	159 (90.9%)	16 (9.1%)	1.868	0.600
31-40 years	235 (93.3%)	17 (6.7%)		
41-50 years	129 (94.2%)	8 (5.8%)		
51-60 years	142 (91.0%)	14 (9.0%)		
Rank				
Inspecter	72 (94.7%)	4 (5.3%)	0.819	0.936
Sub inspector	89 (92.7%)	7 (7.3%)		
Assistant Sub Inspector	106 (91.4%)	10 (8.6%)		
Head Constable	162 (92.0%)	14 (8.0%)		
Constable	236 (92.2%)	20 (7.8%)		
Total	665 (92.4%)	55 (7.6%)		

*The statistical test applied: Chi- Square Test; *P ≤ 0.05 indicates statistically* significant

Table: 11 Association between last dental visit and demographic variables of KSRP personnel

Demographic Variables	< 6 months	6-12 months	> 1 year & < 2 years	> 2 years & < 5 years	> 5 Years	Never received dental care	X^2	P-value
Gender								
Male	95 (18.8%)	101 (20.0%)	32(6.3%)	31 (6.2%)	101 (20.0%)	144 (28.6%)	1.385	0.926
Female	44 (20.4%)	40 (18.5%)	14(6.5%)	15 (6.9%)	37 (17.1%)	66 (20.6%)		
Age Groups								
21-30 years	32 (18.3%)	36 (20.6%)	12 (6.9%)	12 (6.9%)	32 (18.3%)	51 (29.1%)	3.163	0.999
31-40 years	52 (20.6%)	48 (19.0%)	15(6.0%)	16 (6.3%)	48 (19.0%)	73 (29.0%)		
41-50 years	24 (17.5%)	27 (19.7%)	8 (5.8%)	11 (8.0%)	29 (21.2%)	38 (27.7%)		
51-60 years	31 (19.9%)	30 (19.2%)	11(7.1%)	7 (4.5%)	29 (18.6%)	48 (30.8%)		
Rank								
Inspecter	15 (19.7%)	17(22.4%)	3 (3.9%)	5 (6.6%)	16 (21.1%)	20 (26.3%)	4.736	1.000
Sub inspector	19 (19.8%)	17(17.7%)	7 (7.3%)	6 (6.3%)	19 (19.8%)	28 (29.2%)		
Assistant Sub Inspector	22 (19.0%)	22(19.0%)	9 (7.8%)	5 (4.3%)	22 (19.0%)	36 (31.0%)		
Head Constable	31 (17.6%)	36 (20.5%)	13 (7.4%)	12 (6.8%)	35 (19.9%)	49 (27.8%)		
Constable	52 (20.3%)	49 (19.1%)	14 (5.5%)	18 (7.0%)	46 (18.0%)	77 (30.1%)		
Total	139 (19.3%)	141(19.6%)	46 (6.4%)	46 (6.4%)	138 (19.2%)	210 (29.2%)		

*The statistical test applied: Chi- Square Test; *P ≤ 0.05 indicates statistically* significant

Table: 12 Association between reason for dental visit and demographic variables of KSRP personnel

Demographic Variables	Consultation /Advise	Pain/ trouble	Treatment/ follow-up	Routine check-up	Don't remember	X^2	P-value
Gender							
Male	32 (6.3%)	103 (20.4%)	93 (18.5%)	62(12.3%)	70 (13.9%)	3.279	0.657
Female	15 (6.9%)	38 (17.6%)	45 (20.8%)	30 (13.9%)	22 (10.2%)		
Age Groups							
21-30 years	13 (7.4%)	31 (17.7%)	36 (20.6%)	24 (13.7%)	20 (11.4%)	5.058	0.992
31-40 years	15 (6.0%)	51 (20.2%)	49 (19.4%)	30 (11.9%)	34 (13.5%)		
41-50 years	11 (8.0%)	27 (19.7%)	21 (15.3%)	20 (14.6%)	20 (14.6%)		
51-60 years	8 (5.1%)	32 (20.5%)	32 (20.5%)	18 (11.5%)	18 (11.5%)		
Rank							
Inspecter	7 (9.2%)	15 (19.7%)	13 (17.1%)	12 (15.8%)	9 (11.8%)	7.501	0.995
Sub inspector	4 (4.2%)	21 (21.9%)	18 (18.8%)	10 (10.4%)	15 (15.6%)		
Assistant Sub Inspector	7 (6.0%)	20 (17.2%)	26 (22.4%)	13 (11.2%)	14 (12.1%)		
Head Constable	13 (7.4%)	35 (19.9%)	32 (18.2%)	21 (11.9%)	26 (14.8%)		
Constable	16 (6.3%)	50 (19.5%)	49 (19.1%)	36 (14.1%)	28 (10.9%)		
Total	47 (6.5%)	141 (19.6%)	138 (19.2%)	92 (12.8%)	92 (12.8%)		

*The statistical test applied: Chi- Square Test; *P ≤ 0.05 indicates statistically* significant

Table: 13 Frequency distribution of sugar intake among KSRP personnel

Food containing sugar	Several times a day	Every day	Several times a week	Once a week	Several times a month	Seldom/ never	P-value
Fresh fruit	0 (0%)	0 (0%)	129 (17.9%)	102 (14.2%)	489 (67.9%)	0 (0%)	0.001*
Biscuits, cakes, cream cakes	0 (0%)	0 (0%)	26 (3.6%)	103 (14.3%)	539 (74.9%)	52 (7.2%)	0.001*
Jam or honey	0 (0%)	0 (0%)	25 (3.5%)	101 (14.0%)	439 (61.0%)	155 (21.5%)	0.001*
Chewing gum containing sugar	0 (0%)	0 (0%)	0 (0%)	52 (7.2%)	103 (14.3%)	565 (78.5%)	0.001*
Sweets/candy	0 (0%)	0 (0%)	0 (0%)	206 (28.6%)	488 (67.8%)	26 (3.6%)	0.001*
Lemonade, Coca Cola or other soft drinks	0 (0%)	0 (0%)	25 (3.5%)	130 (18.1%)	488 (67.8%)	77 (10.7%)	0.001*
Tea with sugar	104 (14.4%)	310 (43.1%)	152 (21.1%)	154 (21.4%)	0 (0%)	0 (0%)	0.001*
Coffee with sugar	78 (10.8%)	75 (10.4%)	100 (13.9%)	286 (39.7%)	155 (21.5%)	26 (3.6%)	0.001*

*The statistical test applied: Chi- Square Test; *P ≤ 0.05 indicates statistically* significant

Table: 14 Association between use of partial denture and demographic variables of KSRP personnel

Demographic Variables	No denture	Partial Denture	X^2	P-value
Gender				
Male	464 (91.1%)	40 (7.9%)	0.059	0.808
Female	200 (92.6%)	16 (7.4%)		
Age Groups				
21-30 years	162 (92.6%)	13 (7.4%)	2.735	0.434
31-40 years	232 (92.1%)	20 (7.9%)		
41-50 years	130 (94.9%)	7 (5.1%)		
51-60 years	140 (89.7%)	16 (10.3%)		
Rank				
Inspecter	71 (93.4%)	5 (6.6%)	0.599	0.936
Sub inspector	88 (91.7%)	8 (8.3%)		
Assistant Sub Inspector	106 (91.4%)	10 (8.6%)		
Head Constable	164 (93.2%)	12 (6.8%)		
Constable	235 (91.8%)	21 (8.2%)		
Total	665	55		

*The statistical test applied: Chi- Square Test; *P ≤ 0.05 indicates statistically* significant

Table: 15 Frequency distribution of perception of teeth and gums and knowledge on the presence of fluoride in their toothpaste KSRP personnel

Questions	Good	Fair	Poor	P-value
How would you describe the state of your teeth.	92 (12.8%)	302 (41.9%)	326 (45.3%)	0.001*
How would you describe the state of your gums.	0 (0%)	394 (54.7%)	326 (45.3%)	0.011*
Do you use a toothpaste that contains fluoride?	**Yes**	**No**	**I don't know**	**P-value**
	434 (60.3%)	46 (6.4%)	240 (33.3%)	0.001*

*The statistical test applied: Chi- Square Test; *P ≤ 0.05 indicates statistically* significant

Table: 16 Frequency distribution of dental problems during the past 12 months among KSRP personnel

Questions	Very often	Fairly often	Sometimes	No	P-value
Difficulty in biting foods	4 (0.6%)	72 (10.0%)	72 (10.0%)	572 (79.4%)	0.001*
Difficulty chewing foods	4 (0.6%)	24 (3.3%)	48 (6.7%)	644 (89.4%)	0.001*
Difficulty with speech/trouble pronouncing words	0 (%)	0 (%)	4 (0.6%)	716 (99.4%)	0.001*
Experienced dry mouth	5 (0.7%)	48 (6.7%)	190 (26.4%)	477 (66.3%)	0.001*
Felt embarrassed due to appearance of teeth	0 (%)	4 (0.6%)	72 (10.0%)	644 (89.4%)	0.001*
Felt tense because of problems with teeth or mouth	0 (%)	5 (0.7%)	24 (3.3%)	691 (96.0%)	0.001*
Have avoided smiling because of teeth	0 (%)	5 (0.7%)	23 (3.2%)	692 (96.1%)	0.001*
Had sleep that is often interrupted	2 (0.3%)	96 (13.3%)	72 (10.0%)	550 (76.4%)	0.001*
Have taken days off work	0 (0%)	7 (1.0%)	25 (3.5%)	688 (95.6%)	0.001*
Difficulty doing usual activities	3 (0.4%)	24 (3.3%)	23 (3.2%)	670 (93.1%)	0.001*
Felt less tolerant of spouse or people who are close to you	0 (0%)	0 (0%)	5 (0.7%)	715 (99.3%)	0.001*
Have reduced participation in social activities	0 (0%)	5 (0.7%)	24 (3.3%)	691 (96.0%)	0.001*

*The statistical test applied: Chi- Square Test; *P ≤ 0.05 indicates statistically* significant

Table: 17 Association between alcohol consumption for last 30 days and demographic variables among KSRP personnel

Demographic Variables	Did not drink	Less than one drink	One drink	Two drinks	X^2	P-value
Gender						
Male	180 (35.7%)	126 (25.0%)	171 (33.9%)	27 (5.4)	3.080	0.379
Female	86 (39.8%)	52 (24.1%)	62 (28.7%)	16 (7.4%)		
Age Groups						
21-30 years	76 (43.4%)	41 (23.4%)	48 (27.4%)	10 (5.7%)	8.067	0.527
31-40 years	81 (32.1%)	65 (25.8%)	34 (36.9%)	13 (5.2%)		
41-50 years	48 (35.0%)	34 (24.8%)	45 (32.8%)	10 (7.3%)		
51-60 years	61 (39.1%)	38 (24.4%)	47 (30.1%)	10 (6.4%)		
Rank						
Inspecter	13 (17.1%)	7 (9.2%)	53 (69.7%)	3 (3.9%)	65.381	0.001*
Sub inspector	26 (27.1%)	25 (26.0%)	38 (39.6%)	7 (7.3%)		
Assistant Sub Inspector	50 (43.1%)	28 (24.1%)	31 (26.7%)	7 (6.0%)		
Head Constable	72 (40.9%)	51 (29.0%)	44 (25.0%)	9 (5.1%)		
Constable	105 (41.0%)	67 (26.2%)	67 (26.2%)	17 (6.6%)		
Total	266 (36.9%)	178 (24.7%)	233 (32.4%)	43 (6.0%)		

*The statistical test applied: Chi- Square Test; *P ≤ 0.05 indicates statistically* significant

Table: 18 Association between smoking habit and demographic variables among KSRP personnel

Demographic Variables	Never	Every day	Several times a week	Once a week	Several times a month	Seldom/ never	P-value
Gender							
Male	320 (63.5%)	44 (8.7%)	29 (5.8%)	22 (4.4%)	34 (6.7%)	55 (10.9%)	0.722
Female	147 (68.1%)	18 (8.3%)	7 (3.2%)	10 (4.6%)	14 (6.5%)	20 (9.3%)	
Age Groups							
21-30 years	123 (70.3%)	12 (6.9%)	6 (3.4%)	6 (3.4%)	10 (5.7%)	18 (10.3%)	0.941
31-40 years	157 (62.3%)	24 (9.5%)	16 (6.3%)	12 (4.8%)	16 (6.3%)	27 (10.7)	
41-50 years	82 (59.9%)	13 (9.5%)	6 (4.4%)	8 (5.8%)	12 (8.8%)	16 (11.7%)	
51-60 years	105 (67.3%)	13 (8.3%)	8 (5.1%)	6 (3.8%)	10 (6.4%)	14 (9%)	
Rank							
Inspecter	36 (47.4%)	14 (18.4%)	7 (9.2%)	5 (6.6%)	5 (6.6%)	9 (11.8%)	0.032*
Sub inspector	54 (56.3%)	6 (6.3%)	9 (9.4%)	7 (7.3%)	8 (8.3%)	12 (12.5%)	
Assistant Sub Inspector	78 (67.2%)	7 (6.0%)	6 (5.2%)	5 (4.3%)	9 (7.8%)	11 (9.5%)	
Head Constable	122 (69.3%)	14 (8.0%)	5 (2.8%)	8 (4.5%)	13 (7.4%)	14 (8.0%)	
Constable	177 (69.1%)	21 (8.2%)	9 (3.5%)	7 (2.7%)	13 (5.1%)	29 (11.3%)	
Total	467 (64.9%)	62 (8.6%)	36 (5.0%)	32 (4.4%)	48 (6.7%)	75 (10.4%)	

*The statistical test applied: Chi- Square Test; *P ≤ 0.05 indicates statistically* significant

Table: 19 Association between tobacco chewing habit and demographic variables among KSRP personnel

Demographic Variables	Never	Every day	Several times a week	Once a week	Several times a month	Seldom	P-value
Gender							
Male	369 (73.2%)	17 (3.4%)	53 (10.5%)	18 (3.6%)	27 (5.4%)	20 (4.0%)	0.053*
Female	136 (63%)	13 (6.0%)	32 (14.8%)	13 (6.0%)	16 (7.4%)	6 (2.8%)	
Age Groups							
21-30 years	113 (64.6)	12 (6.9%)	25 (14.3%)	8 (4.6%)	11 (6.3%)	6 (3.4%)	0.797
31-40 years	179 (71.0%)	9 (3.6%)	26 (10.3%)	13 (5.2%)	16 (6.3%)	9 (3.6%)	
41-50 years	102 (74.5%)	2 (1.5%)	16 (11.7%)	5 (3.6%)	6 (4.4%)	6 (4.4%)	
51-60 years	111 (71.2%)	7 (4.5%)	18 (11.5%)	5 (3.2%)	10 (6.4%)	5 (3.2%)	
Rank							
Inspecter	66 (86.8%)	0 (0%)	1 (1.3%)	1 (1.3%)	2 (2.6%)	6 (7.9%)	0.001*
Sub inspector	80 (83.3%)	0 (0%)	4 (4.2%)	4 (4.2%)	5 (5.2%)	3 (3.1%)	
Assistant Sub Inspector	92 (79.3%)	0 (0%)	8 (6.9%)	5 (4.3%)	7 (6.0%)	4 (3.4%)	
Head Constable	111 (63.1%)	8 (4.5%)	32 (18.2%)	8 (4.5%)	12 (6.8%)	5 (2.8%)	
Constable	156 (60.9%)	22 (8.6%)	40 (15.6%)	13 (5.1%)	17 (6.6%)	8 (3.1%)	
Total	505 (70.1%)	30 (4.2%)	85 (11.8%)	31 (4.3%)	43 (6.0%)	26 (3.6%)	

*The statistical test applied: Chi- Square Test; *P ≤ 0.05 indicates statistically* significant

Table: 20 Association between prevalence of oral mucosal lesions with demographic variables of KSRP personnel

Demographic Variables	Leukoplakia	Oral Submucous fibrosis	Ulcerations	No lesions	P-value
Gender					
Male	28 (5.6%)	26 (5.2%)	10 (2.0%)	440 (87.3%)	0.069
Female	6 (2.8%)	4 (1.9%)	4 (1.9%)	202 (93.5%)	
Age Groups					
21-30 years	2 (1.1%)	1 (0.6%)	3 (1.7%)	169 (96.6%)	0.001*
31-40 years	10 (4.0%)	4 (1.4%)	6 (2.4%)	232 (92.1%)	
41-50 years	11 (8.0%)	10 (7.3%)	2 (1.5%)	114 (83.2%)	
51-60 years	11 (7.1%)	15 (9.6%)	3 (1.9%)	127 (81.4%)	
Rank					
Inspecter	5 (6.6%)	5 (6.6%)	2 (2.6%)	64 (84.2%)	0.614
Sub inspector	6 (6.3%)	4 (4.2%)	2 (2.1%)	84 (87.5%)	
Assistant Sub Inspector	8 (6.9%)	4 (3.4%)	1 (0.9%)	103 (88.8%)	
Head Constable	4 (2.3%)	8 (4.5%)	6 (3.4%)	158 (89.8%)	
Constable	11 (4.3%)	9 (3.5%)	3 (1.2%)	233 (91.0%)	
Total	34 (4.7%)	30 (4.2%)	14 (1.9%)	642(89.2%)	

*The statistical test applied: Chi- Square Test; *P ≤ 0.05 indicates statistically* significant

Table: 21 Association between site of oral mucosal lesions and demographic variables of KSRP personnel

Demographic Variables	Lips	Buccal mucosa	Floor of mouth	Tongue	Gingival/ Alveolar ridge	P-value
Gender						
Male	16 (3.2%)	38 (7.5%)	3 (0.6%)	4 (0.8%)	3 (0.6%)	0.155
Female	5 (2.3%)	6 (2.8%)	0 (0%)	2 (09%)	1 (0.5%)	
Age Groups						
21-30 years	3 (1.7%)	1 (0.6%)	0 (0%)	2 (1.1%)	0 (0%)	0.001*
31-40 years	4 (1.6%)	10 (4.0%)	0 (0%)	3 (1.2%)	3 (1.2%)	
41-50 years	7 (5.1%)	14 (10.2%)	1 (0.7%)	1 (0.7%)	0 (0%)	
51-60 years	7 (4.5%)	19 (12.2%)	2 (1.3%)	0 (0%)	1 (0.6%)	
Rank						
Inspecter	3 (3.9%)	7 (9.2%)	1 (1.3%)	0 (0%)	1 (1.3%)	0.711
Sub inspector	3 (3.1%)	7 (7.3%)	0 (0%)	1 (0%)	1 (1.0%)	
Assistant Sub Inspector	4 (3.4%)	8 (6.9%)	1 (0.9%)	0 (0%)	0 (0%)	
Head Constable	5 (2.8%)	7 (4.0%)	1 (0.6%)	4 (2.3%)	1 (0.6%)	
Constable	6 (2.3%)	15 (5.9%)	0 (0%)	1 (0.4%)	1 (0.4%)	
Total	21 (2.9%)	44 (6.1%)	3 (0.4%)	6 (0.8%)	4 (0.6%)	

*The statistical test applied: Chi- Square Test; *P ≤ 0.05 indicates statistically* significant

Table: 22 Association between treatment needs and demographic variables of KSRP personnel

Demographic Variables	No treatment	Preventive/ routine treatment	Prompt treatment required	Immediate treatment required	Referred for comprehensive evaluation	P-value
Gender						
Male	47 (9.3%)	234 (46.4%)	120 (23.8%)	57 (11.3%)	46 (9.1%)	0.361
Female	21 (9.7%)	103 (47.7%)	54 (25.0%)	14 (6.5%)	24 (11.1%)	
Age Groups						
21-30 years	14 (8.0%)	86 (49.1%)	51 (29.1%)	9 (5.1%)	15 (8.6%)	0.068
31-40 years	27 (10.7%)	123 (48.8%)	47 (18.7%)	33 (13.1%)	22 (8.7%)	
41-50 years	11 (8.0%)	65 (47.4%)	34 (24.8%)	16 (11.7%)	11 (8.0%)	
51-60 years	16 (10.3%)	63 (40.4%)	42 (26.9%)	13 (8.3%)	22 (14.1%)	
Rank						
Inspecter	7 (9.2%)	41 (53.9%)	18 (23.7%)	10 (13.2%)	0 (0%)	0.085
Sub inspector	12 (12.5%)	46 (47.9%)	19 (19.8%)	13 (13.5%)	6 (6.3%)	
Assistant Sub Inspector	7 (6.0%)	44 (37.9%)	34 (29.3%)	14 (12.1%)	17 (14.7%)	
Head Constable	16 (9.1%)	84 (47.7%)	43 (24.4%)	13 (7.4%)	20 (11.4%)	
Constable	26 (10.2%)	122 (47.7%)	60 (23.4%)	21 (8.2%)	27 (10.5%)	
Total	68 (9.4%)	337 (46.8%)	174 (24.2%)	71 (9.9%)	70 (9.7%)	

*The statistical test applied: Chi- Square Test; *P ≤ 0.05 indicates statistically* significant

Table: 23 Multiple linear regression analysis of DMFT by other variables

Parameters	**Coefficient r**	**SE**	***t***	***p*-value**	**Adjusted R^2**
Dependent variable: DMFT					
Constant	-	2.366	3.031	0.003	
Gender	0.001	0.296	0.031	0.975	0.055
Age	0.001	0.012	0.022	0.982	
Rank	0.197	0.091	4.676	0.001*	
Oral hygiene aid	0.111	0.543	2.261	0.024*	
Brushing habit	0.050	0.346	-1.039	0.299	
Frequency of dental visit	0.223	0.168	-1.977	0.048*	
Sugar Consumption	0.010	0.110	-0.264	0.792	
Patient perception on oral hygiene	0.190	0.642	-1.737	0.083	
Smoking habit	0.006	0.067	-0.148	0.883	
Tobacco Chewing	0.036	0.068	-0.956	0.339	
Alcohol consumption	0.060	0.124	-1.469	0.142	

*SE: Standard error; The statistical analysis used: Multiple linear regression; Level of significance: *P ≤ 0.05 is considered statistically significant.*

Table: 24 Multiple linear regression analysis of PPD by other variables

Parameters	Coefficient r	SE	*t*	*p*-value	Adjusted R^2
Dependent variable: PPD					
Constant	-	0.378	0.523	0.601	0.030
Gender	-0.006	0.002	-0.128	0.898	
Age	-0.011	0.047	-0.225	0.822	
Rank	0.109	0.014	2.548	0.011*	
Oral hygiene aid	-0.055	0.087	-1.096	0.274	
Brushing habit	-0.066	0.055	-1.367	0.172	
Frequency of dental visit	0.173	0.027	1.516	0.130	
Sugar Consumption	-0.008	0.018	-0.216	0.829	
Patient perception on oral hygiene	0.180	0.102	1.623	0.105	
Smoking habit	0.022	0.011	0.568	0.570	
Tobacco Chewing	0.037	0.011	0.965	0.335	
Alcohol consumption	0.007	0.020	0.163	0.870	

*SE: Standard error; The statistical analysis used: Multiple linear regression; Level of significance: *P ≤ 0.05 is considered statistically significant.*

Table: 25 Multiple linear regression analysis of BOP by other variables

Parameters	**Coefficient r**	**SE**	***t***	***p*-value**	**Adjusted R^2**
Dependent variable: BOP					
Constant		1.640	0.102		0.085
Gender	0.018	-0.405	0.686	0.534	
Age	0.016	0.336	0.737	0.493	
Rank	0.143	3.369	0.001	0.334	
Oral hygiene aid	0.025	-0.511	0.610	0.001*	
Brushing habit	0.065	-1.341	0.180	0.294	
Frequency of dental visit	0.051	-0.452	0.652	0.420	
Sugar Consumption	0.001	0.027	0.979	0.223	
Patient perception on oral hygiene	0.074	-.677	0.498	0.934	
Smoking habit	0.018	0.470	0.638	0.631	
Tobacco Chewing	0.071	1.850	0.065	0.921	
Alcohol consumption	0.010	-0.239	0.811	0.203	

*SE: Standard error; The statistical analysis used: Multiple linear regression; Level of significance: *P ≤ 0.05 is considered statistically significant.*

Figure 1: Distribution of KSRP personnel

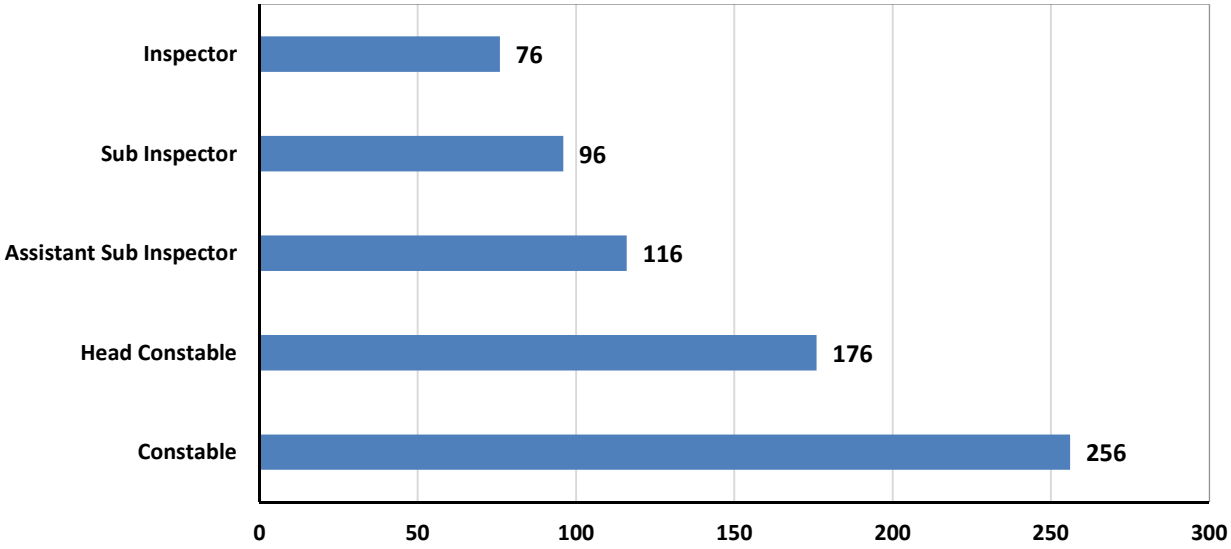


Figure 2: Distribution of KSRP personnel by gender

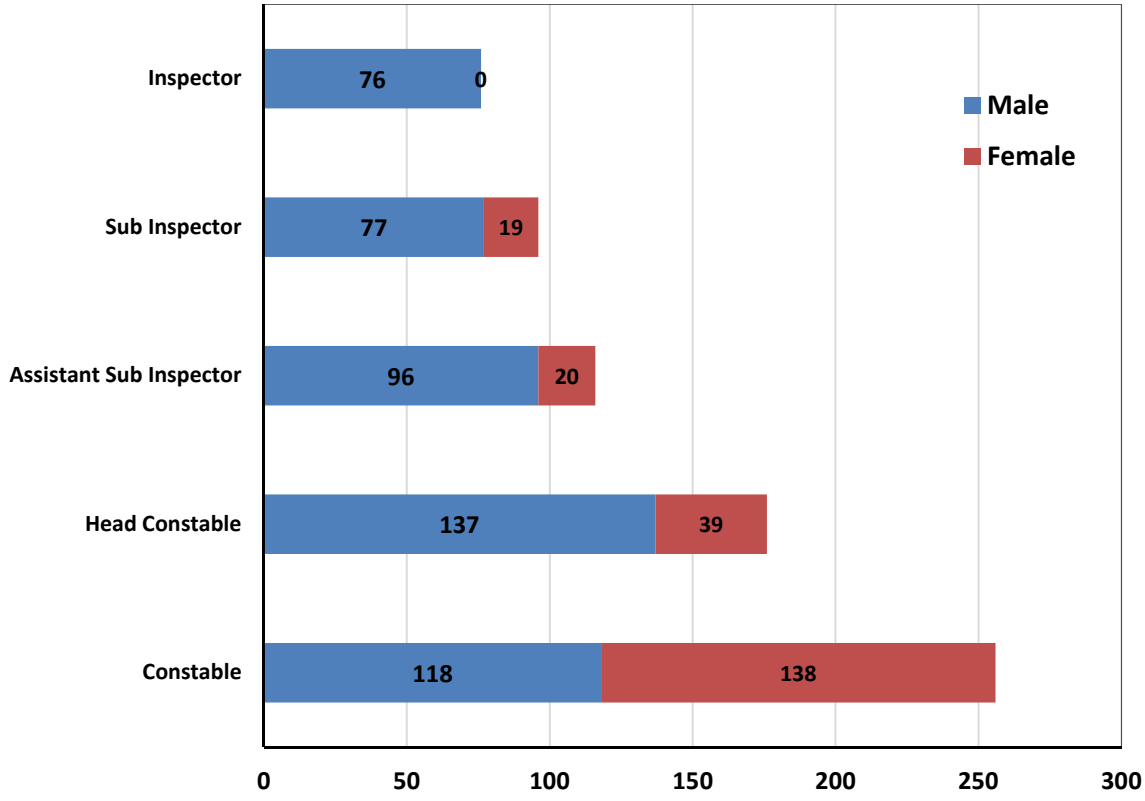


Figure 3: Distribution of KSRP personnel by age group

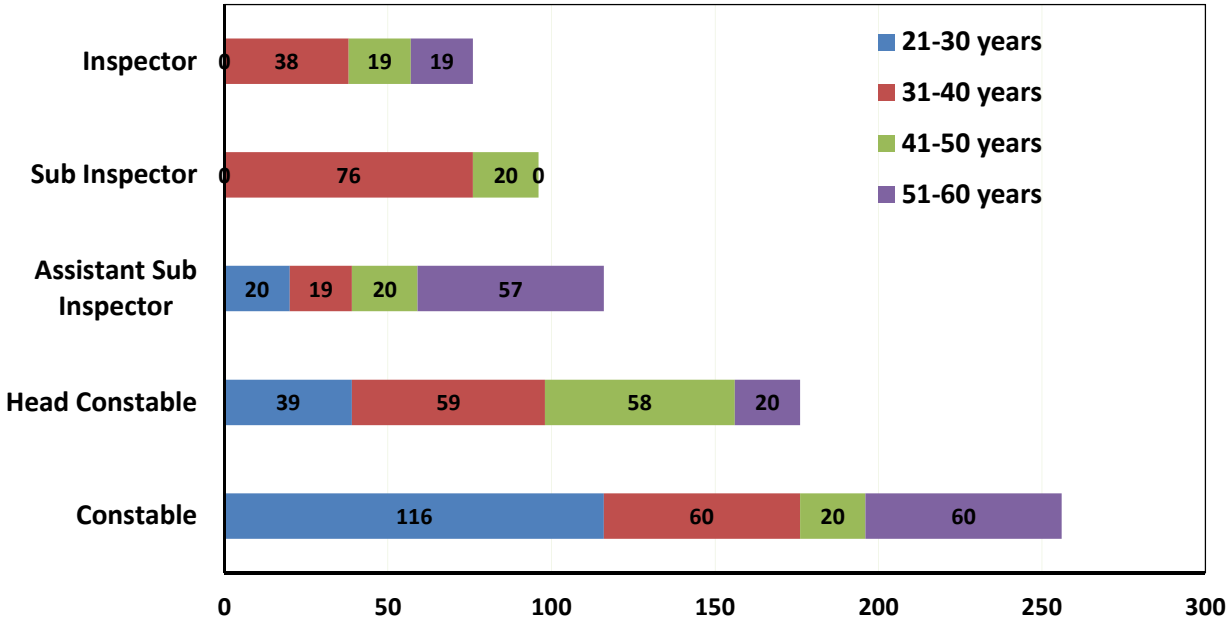


Figure 4: Prevalence of dental caries based on demographic variables of KSRP personnel

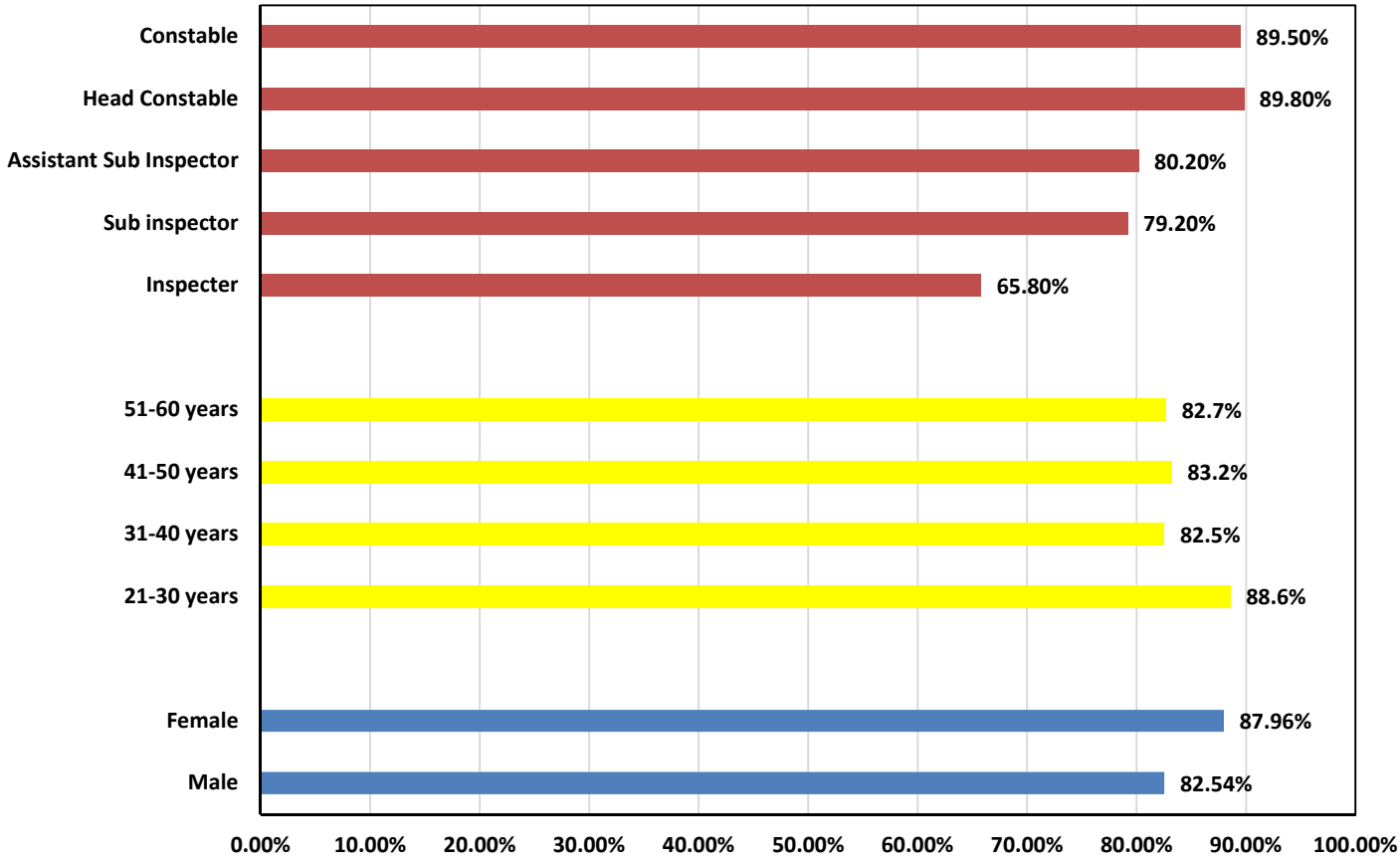


Figure 5: Comparison of mean DMFT, DT, MT and FT based on gender among KSRP personnel

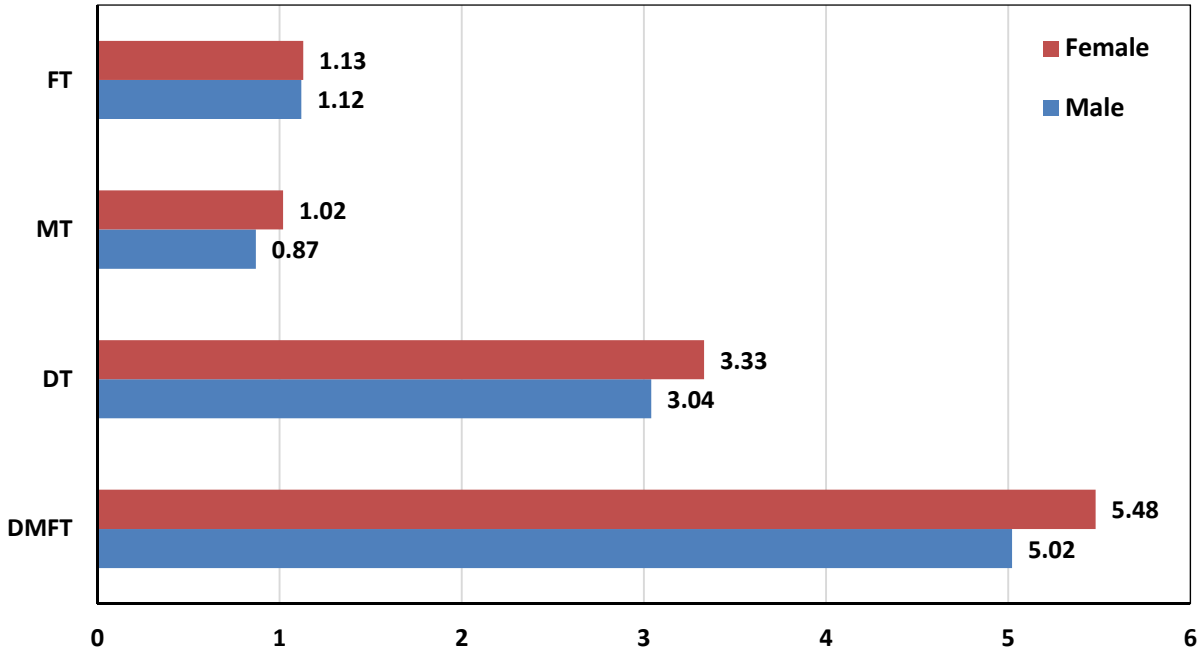


Figure 6: Comparison of mean DMFT, DT, MT and FT based on age groups among KSRP personnel

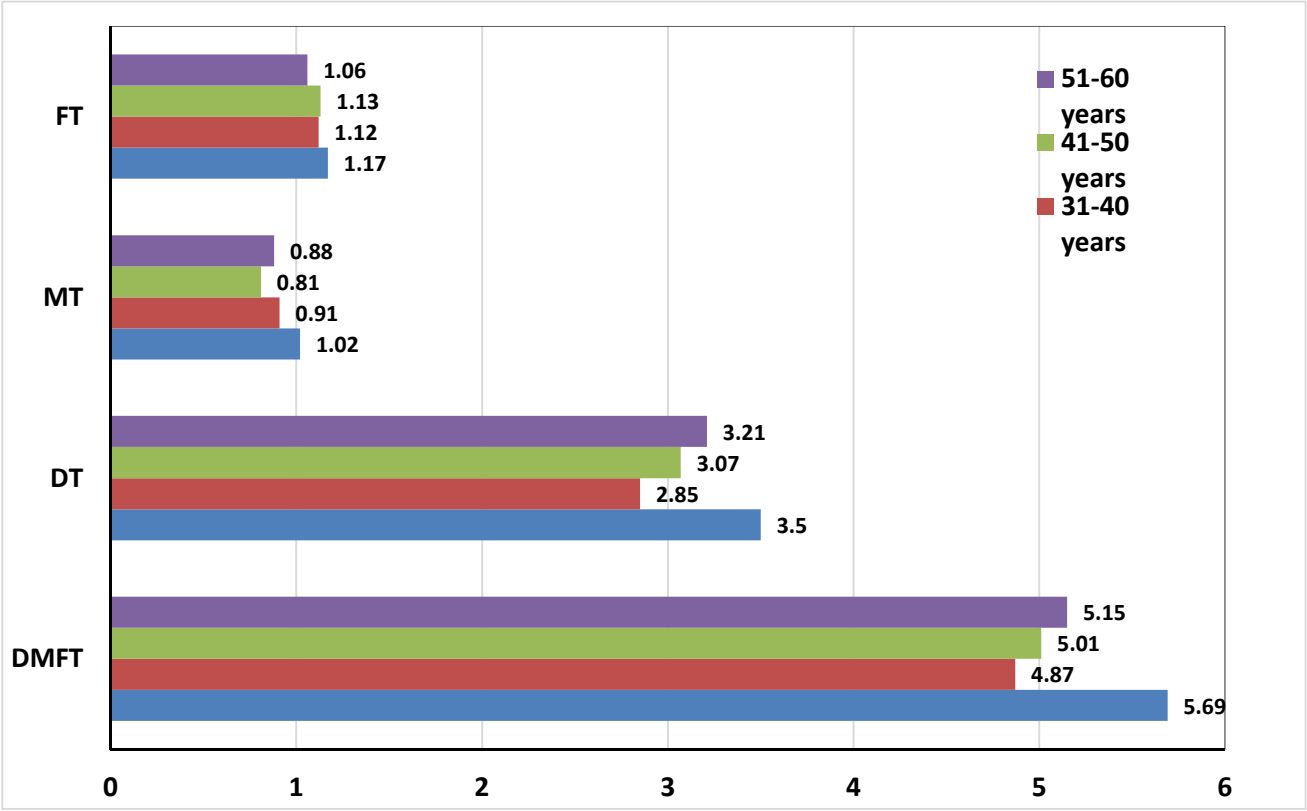


Figure 7: Comparison of mean DMFT, DT, MT and FT based on Rank of KSRP personnel

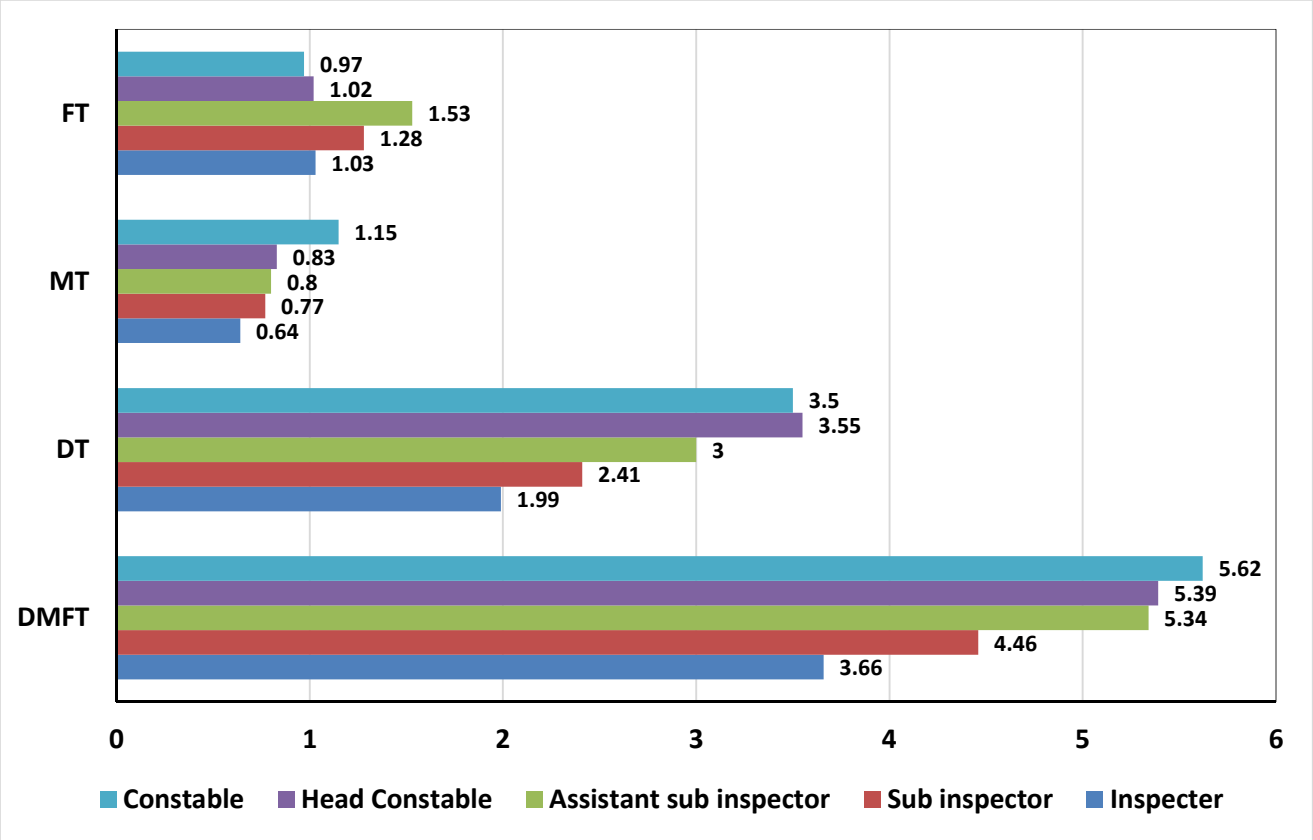


Figure 8: Prevalence of BOP based on demographic variables of KSRP personnel

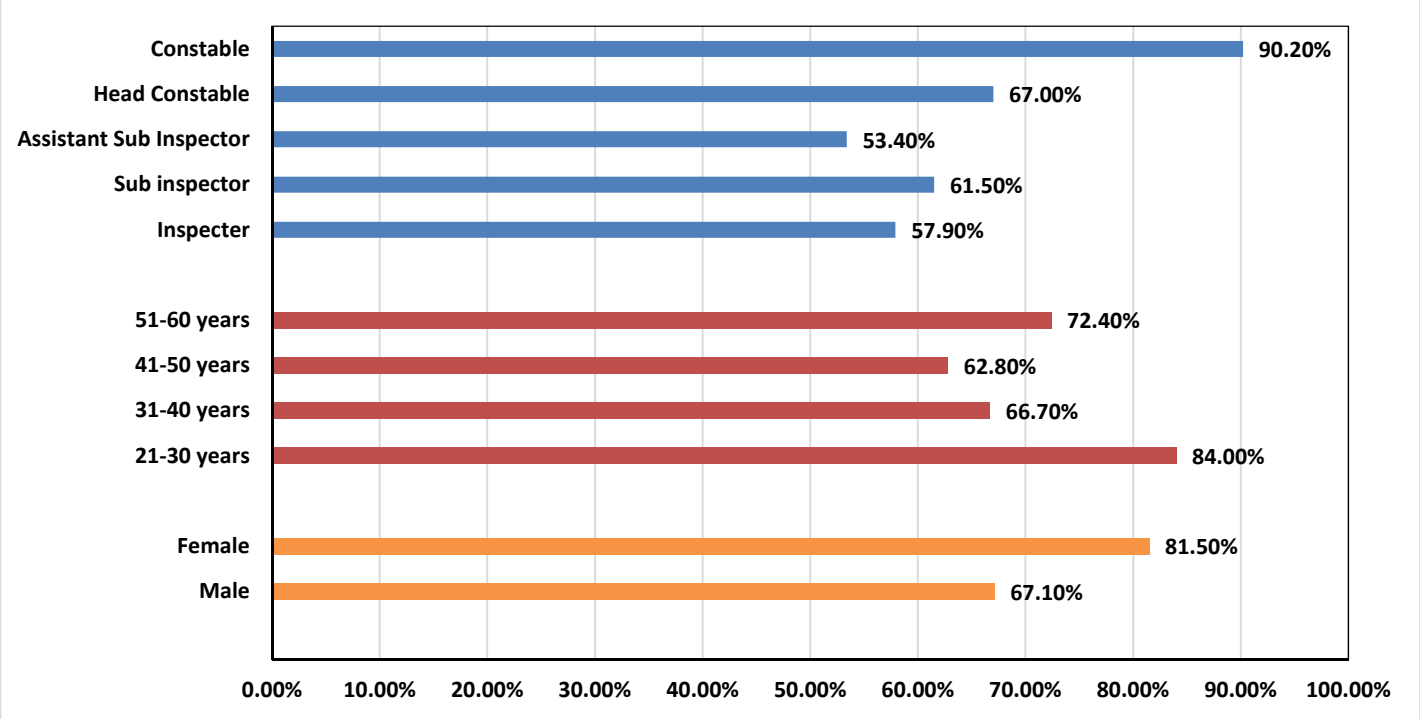


Figure 9: Prevalence of PPD based on demographic variables of KSRP personnel

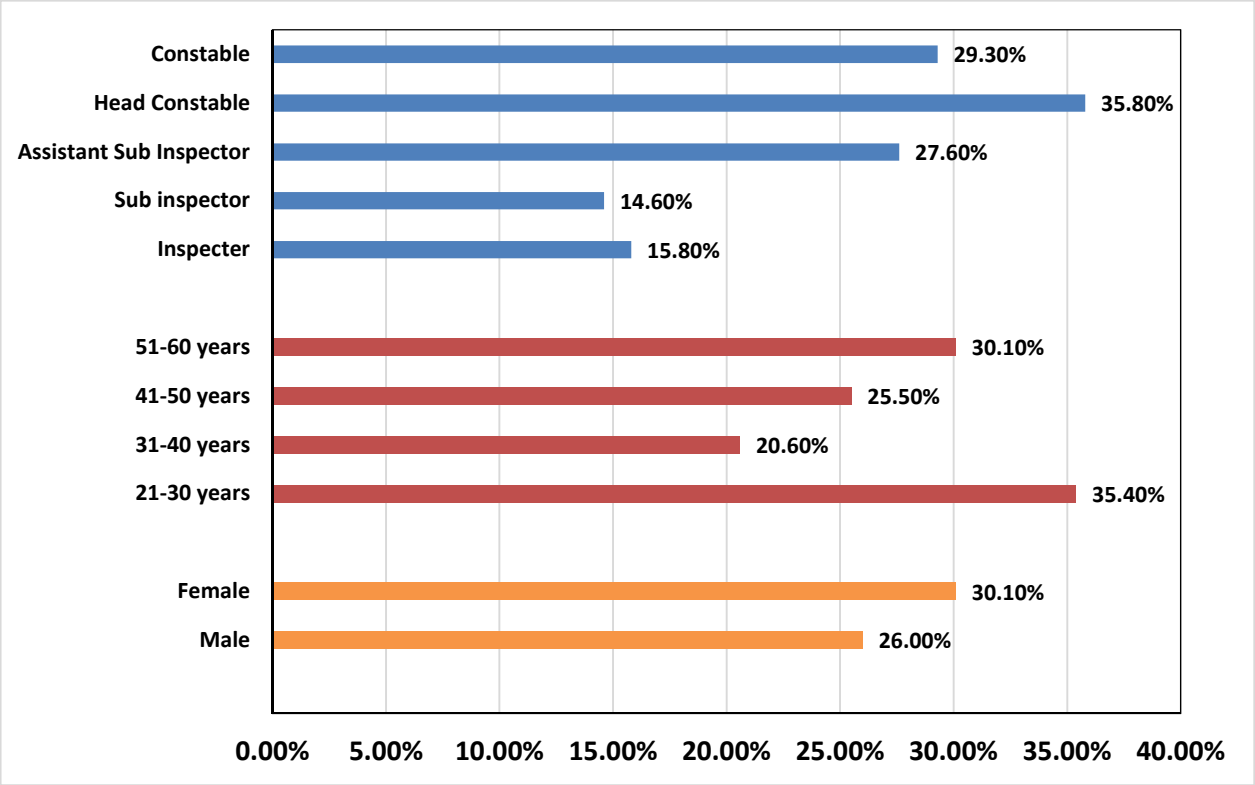


Figure 10: Prevalence of erosion based on demographic variables of KSRP personnel

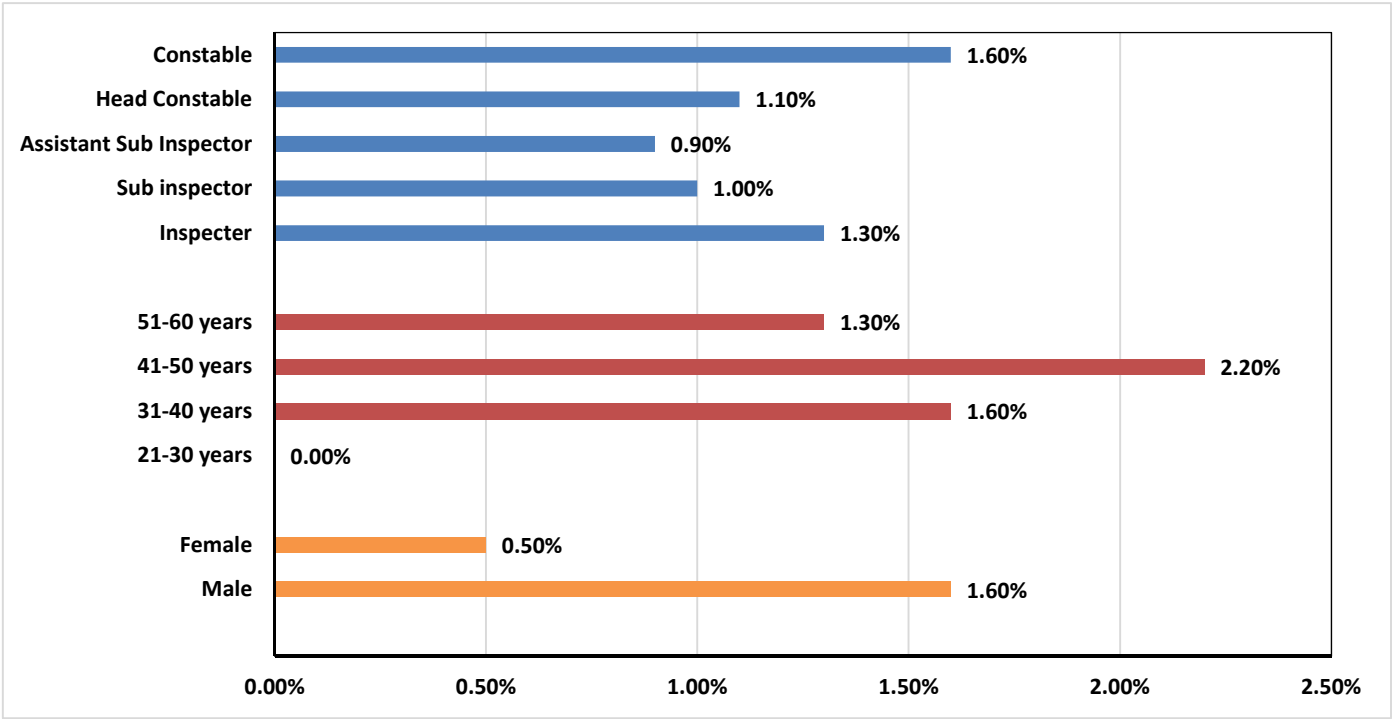


Figure 11: Prevalence of trauma based on demographic variables of KSRP personnel

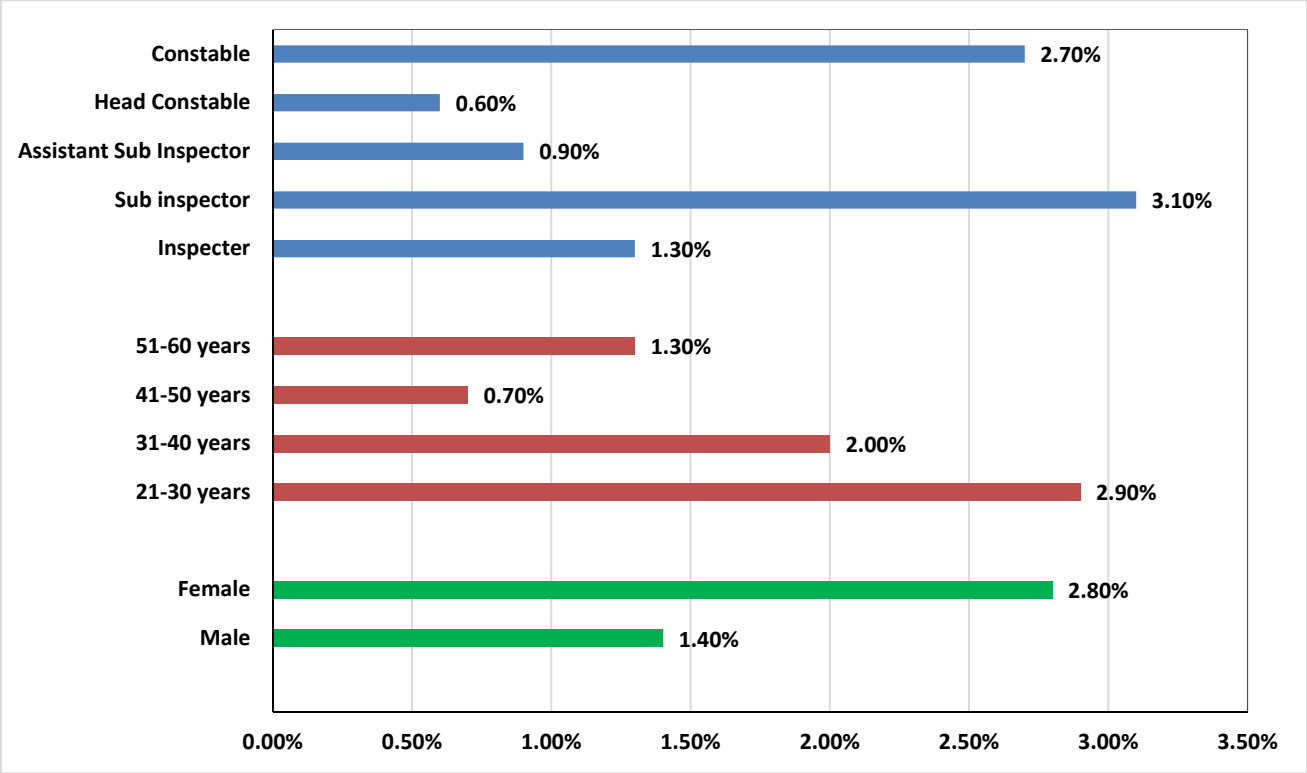


Figure 12: Frequency of toothbrushing among KSRP personnel

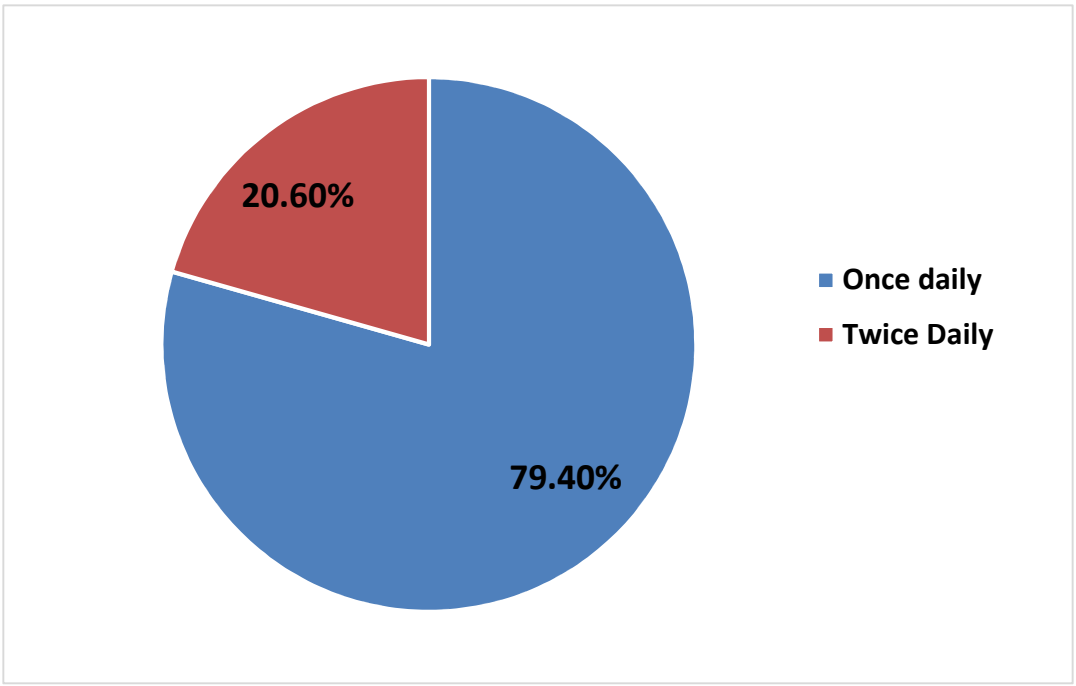


Figure 13: Mode of toothbrushing among KSRP personnel

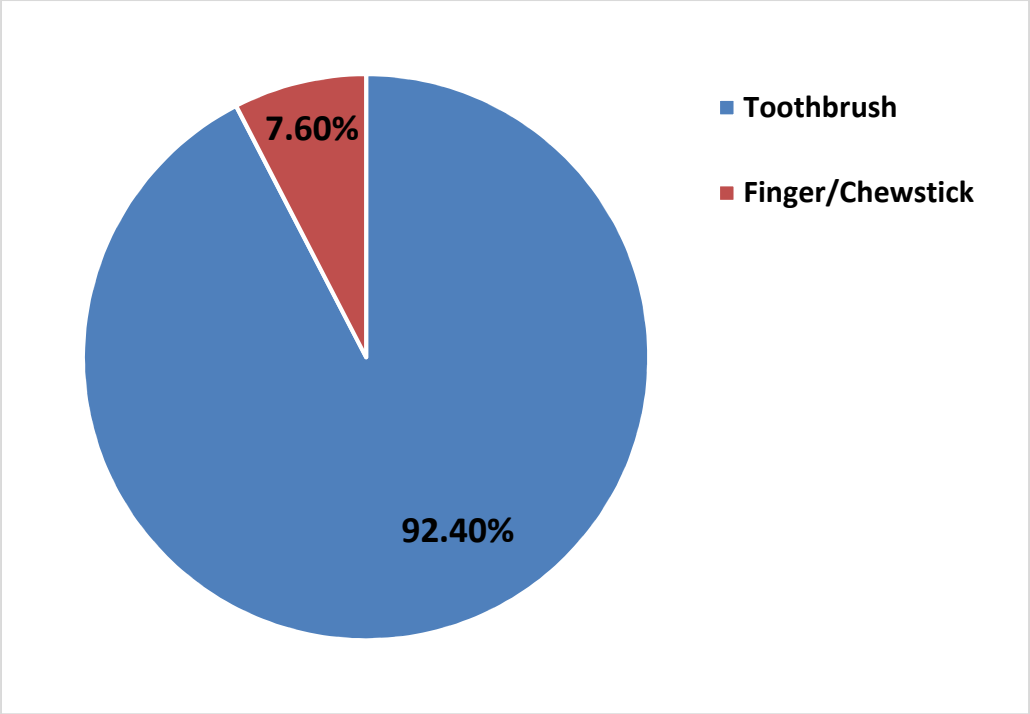


Figure 14: Distribution of last dental visit among KSRP personnel

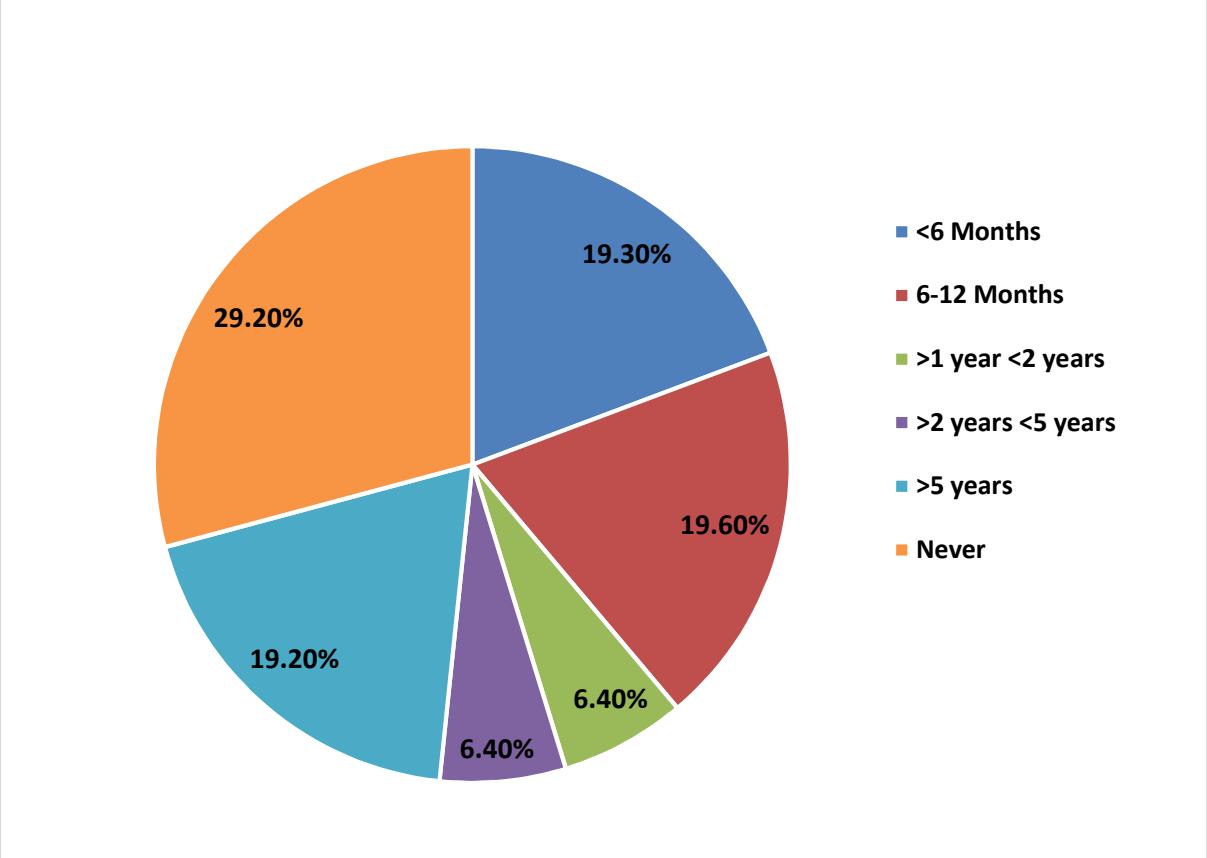


Figure 15: Reason for last dental visit among KSRP personnel

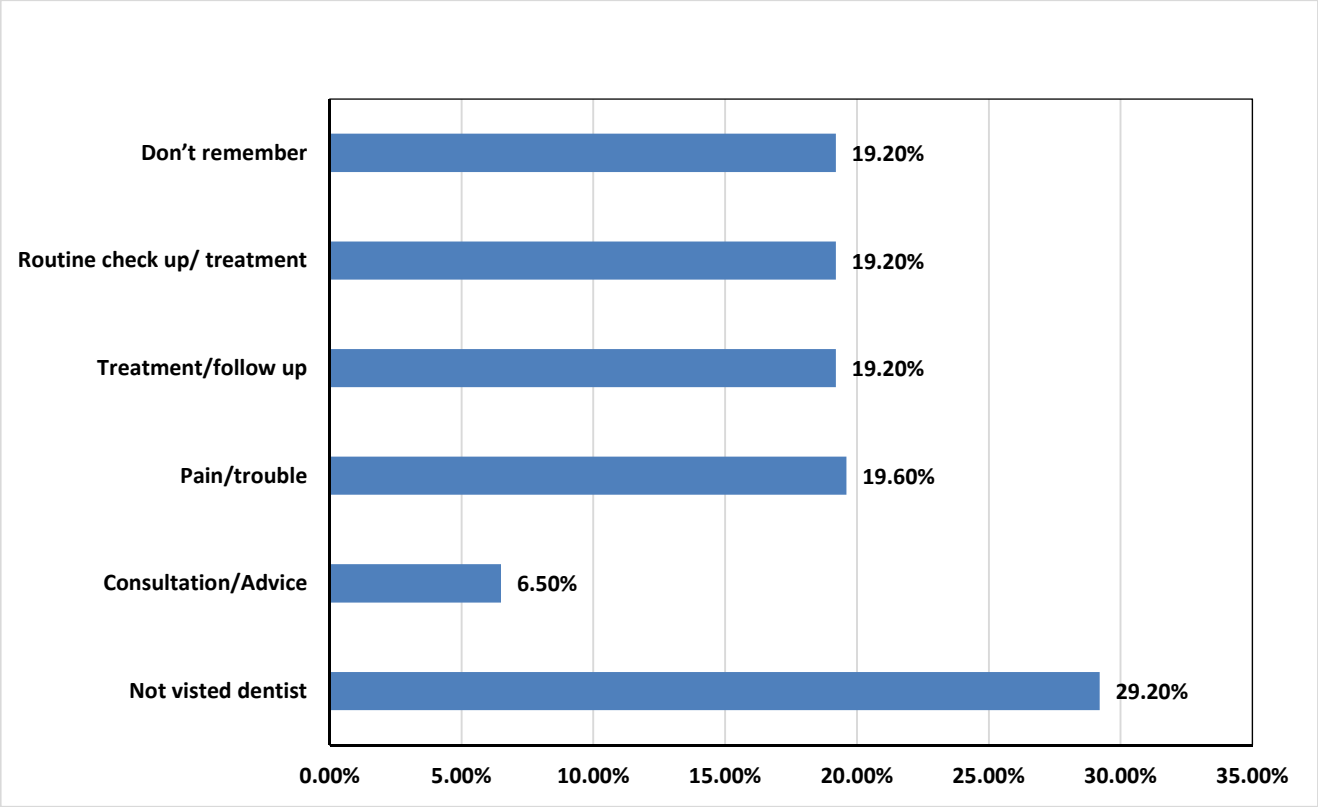


Figure 16: Usage of dentures among KSRP personnel

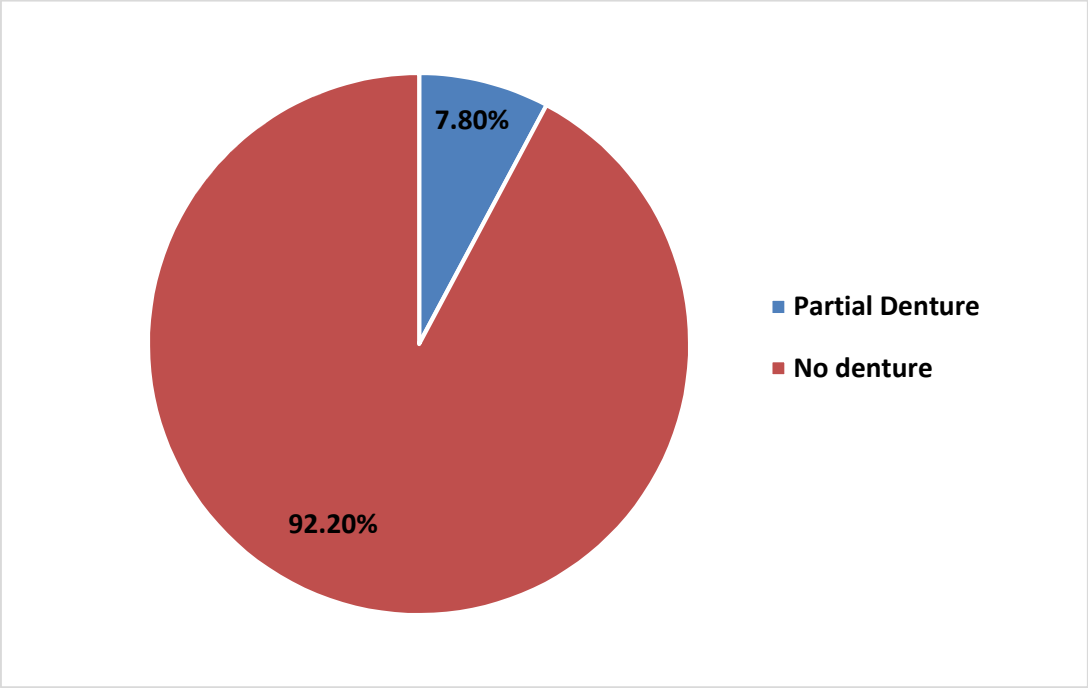


Figure 17: Frequency of alcohol consumption in last 30 days among KSRP personnel

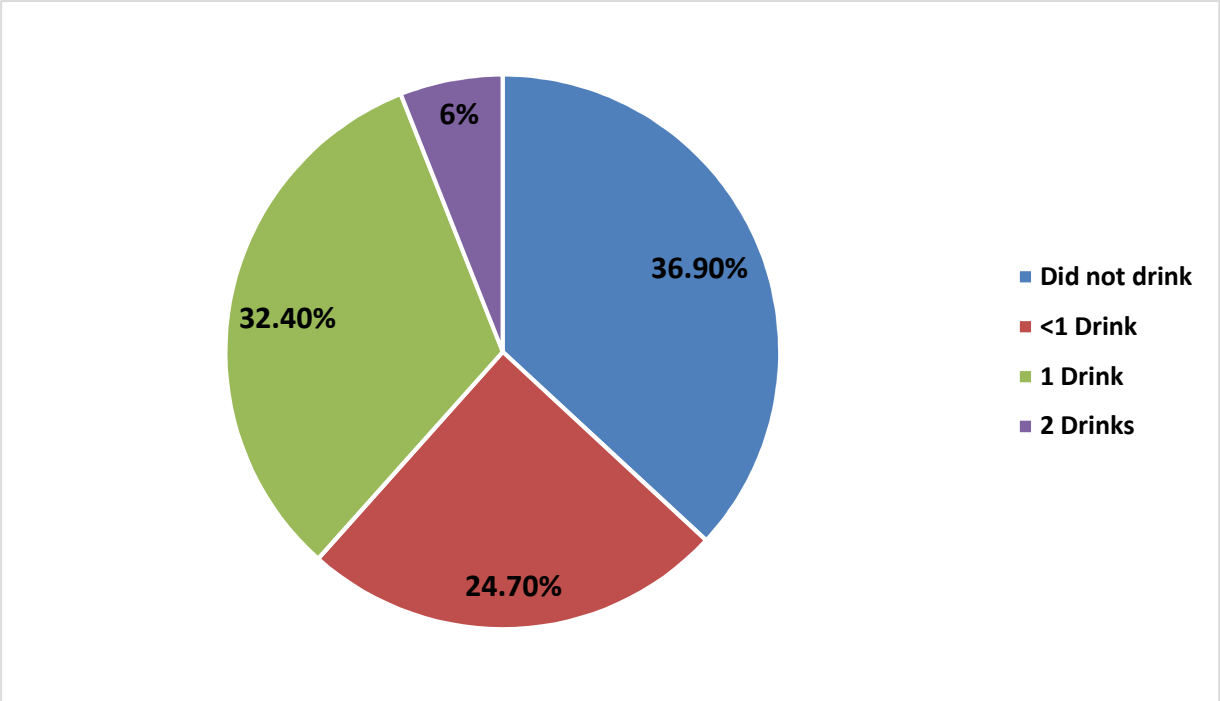


Figure 18: Frequency of smoking habit among KSRP personnel

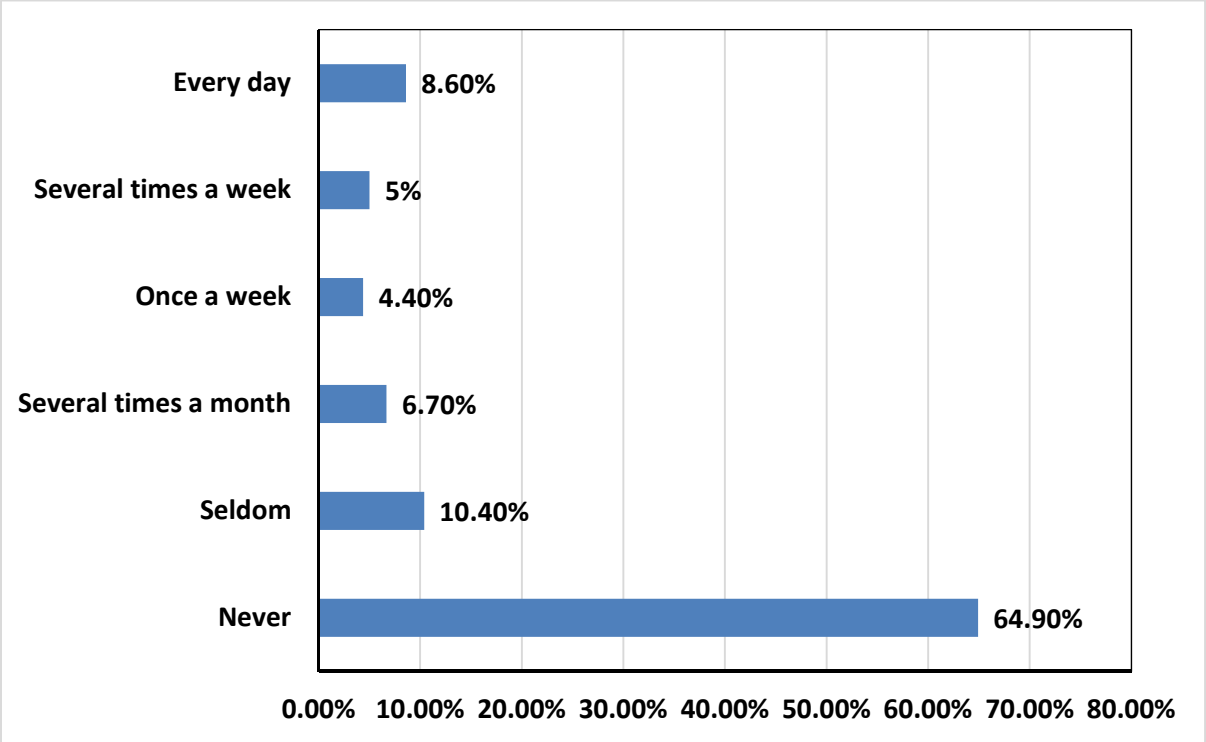


Figure 19: Frequency of tobacco chewing habit among KSRP personnel

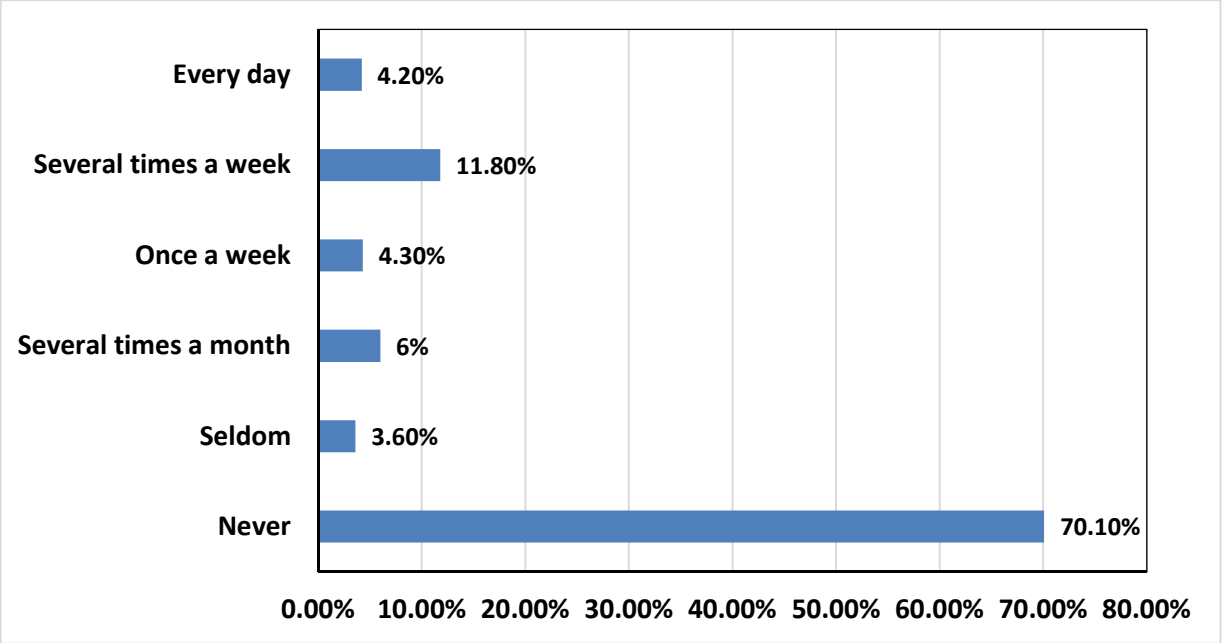


Figure 20: Distribution of oral mucosal lesions among KSRP personnel

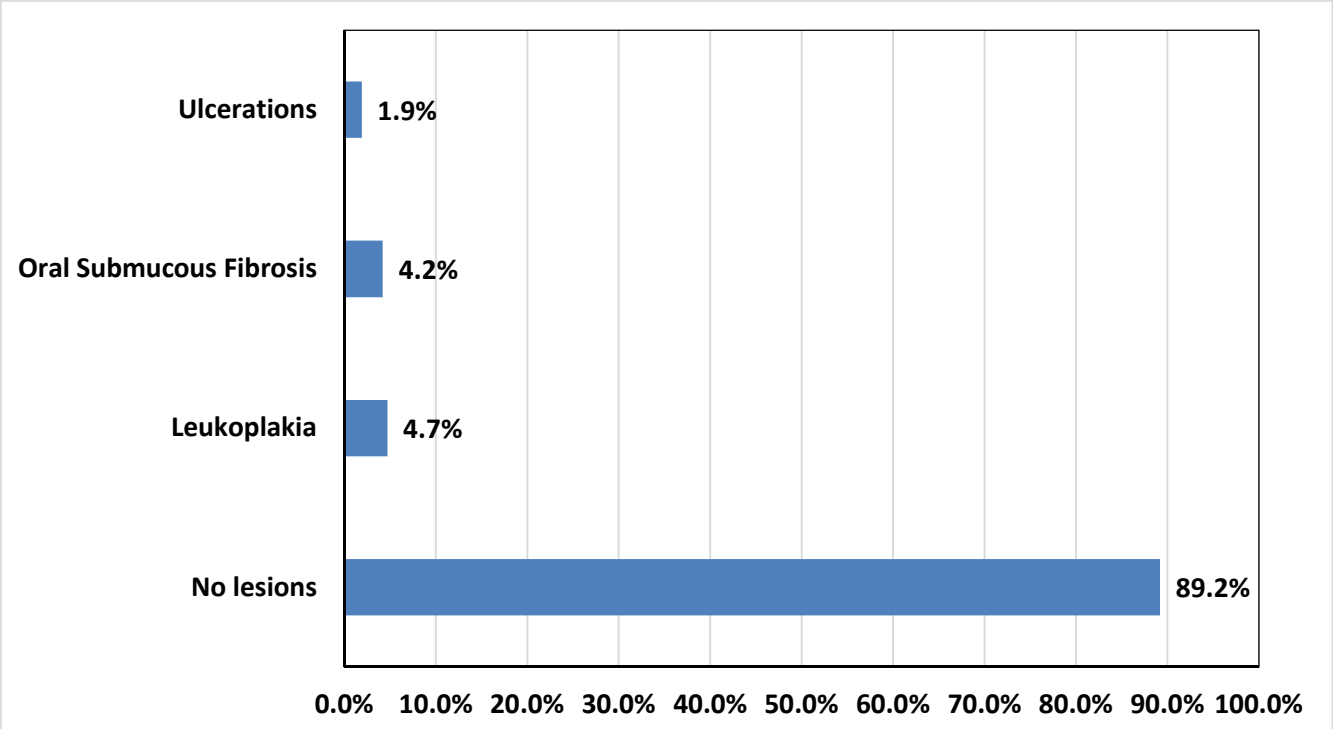


Figure 21: Distribution of the site of oral mucosal lesions among KSRP personnel

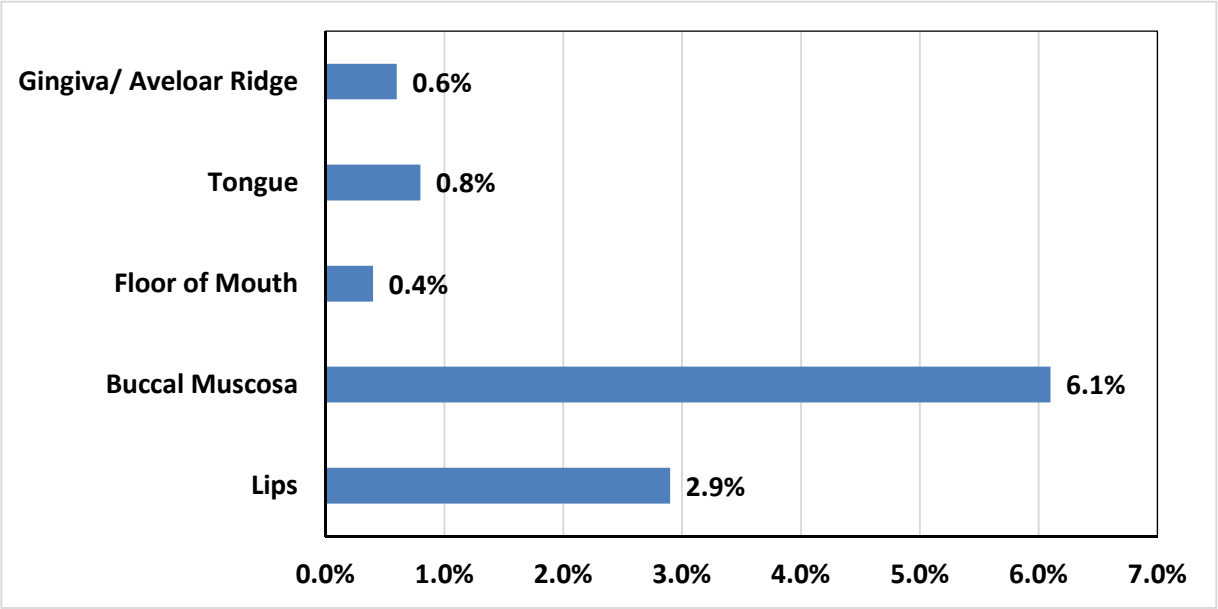
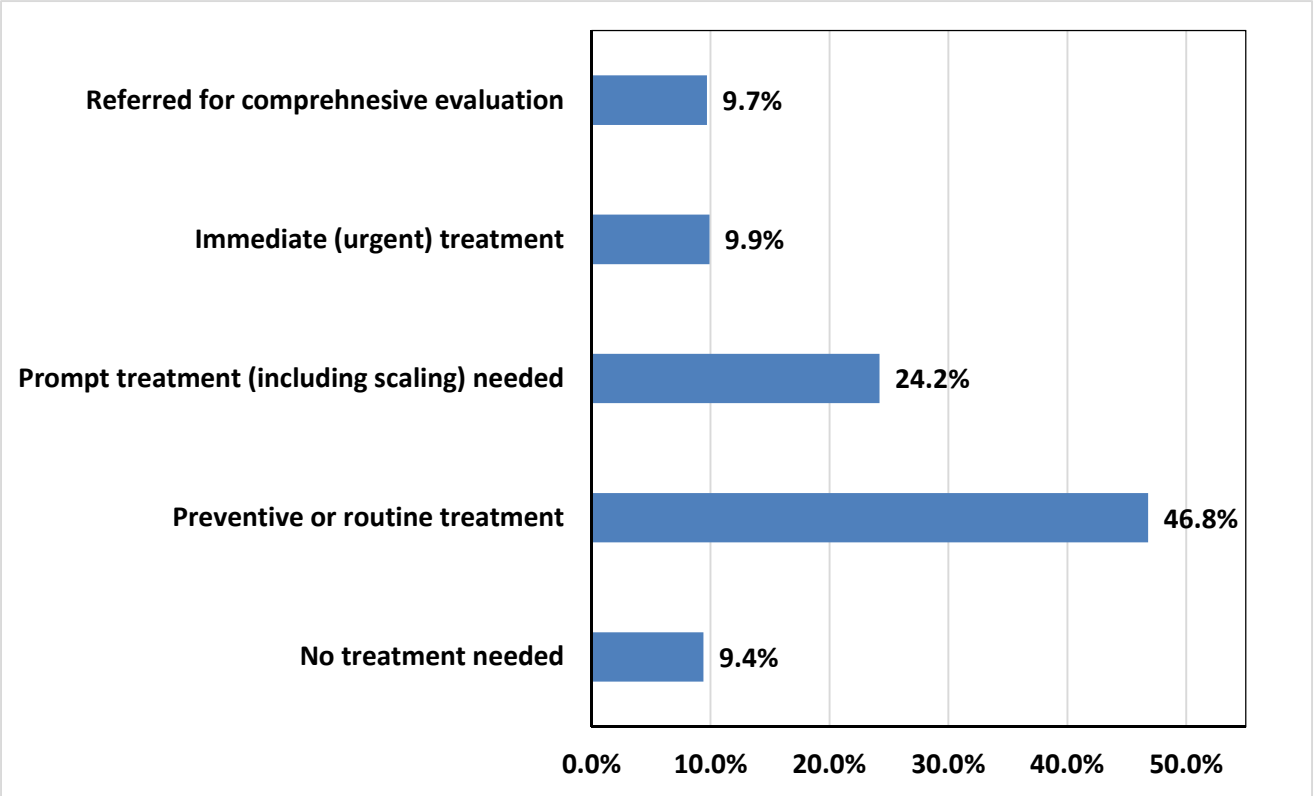


Figure 22: Treatment needs among KSRP personnel



DISCUSSION

The present study was conducted to evaluate the oral health status and treatment requirements of KSRP personnel stationed in Belagavi, Karnataka. Understanding the oral health of this specific population is crucial not only for their overall well-being but also for ensuring optimal performance in their duties. By assessing factors such as prevalence of dental caries, periodontal diseases, and other oral conditions, as well as identifying treatment needs, this study provides valuable insights into the oral health challenges faced by KSRP personnel. The findings of this research can potentially inform targeted oral health interventions and policies tailored to address the specific needs of this population, ultimately contributing to their overall health and quality of life.

Study population

The current study population comprised of KSRP personnel stationed in Belagavi, Karnataka. KSRP functions as a vital element within the socio-political ecosystem of Karnataka, India. Established in 1948, this armed reserve force serves as a crucial instrument for maintaining public order and social stability. The KSRP's composition and deployment reflect a systemic approach to security. With battalions strategically stationed across the state, they are adept at responding to a range of situations, from managing large-scale events to quelling civil unrest. Their training equips them for counter-insurgency operations and disaster relief efforts, highlighting their adaptability within the state's social landscape.[59] Recognizing the importance of understanding the oral health status and treatment requirements of this specific population, the present study enrolled 720 participants encompassing five Ranks,

categorized into four distinct age groups. Notably, these participants are stationed within the 2nd battalion of the KSRP unit throughout the study duration.

Gender of the personnel

The overwhelming majority of participants in this study are males, reflecting the predominant gender composition within the KSRP unit in Belagavi. This gender disparity aligns with broader trends observed in law enforcement agencies, where male representation tends to outweigh that of females. The prevalence of males in this study population likely mirrors the general demographics of the KSRP force, where historically, men have constituted the majority of personnel. This gender skew may be attributed to various factors, including traditional societal norms dictating gender roles, historical trends in recruitment practices within the law enforcement sector, and perhaps the nature of duties typically associated with police work, which may be perceived as more aligned with male attributes. The gender disparity observed in this study was similar to that of those seen in study by Bhalla et al.[10] Basavaraj et al.[23] and Singh et al.[60].

Age of the personnel

The present study recruited participants across a broad age range (21-60 years) to reflect the demographics of KSRP personnel in Belagavi (minimum recruitment age: 19-25 years; retirement age: 60 years mandated by the Karnataka government). This inclusive approach ensured that the study captured data from individuals throughout their entire KSRP career, as police personnel typically retire by 60. To investigate potential age-related variations in oral health, the study then categorized participants into four distinct age groups: 21-30 years, 31-40 years, 41-50 years, and 51-60 years.

This classification enables the examination of oral health conditions and treatment needs among various age groups within the KSRP workforce. The age of the participants in this study were similar to that observed in the study by Dhilip et al.[24], Singh et al.[60] and Bhalla at al.[10]

Ranks of the personnel

In this study, officers from five distinct ranks within the law enforcement apparatus, including inspectors, sub-inspectors, assistant sub-inspectors, head constables, and constables, were recruited, each with specific responsibilities crucial to the organization's functioning. Inspectors, positioned at the apex, orchestrate operational endeavours, set strategic direction, and ensure policy implementation. Sub-inspectors, operating under inspectors, translate directives into plans, oversee daily operations, and support constables and assistant sub-inspectors. Assistant sub-inspectors serve as communication conduits, aid in plan execution, and maintain information flow. Head constables supervise constables, maintain discipline, and uphold procedures, linking constables and superiors. Constables execute tasks, respond to emergencies, investigate, and enforce law and order. Each rank plays a vital role in maintaining public safety and ensuring effective law enforcement.[14,16]

Oral hygiene practices of the personnel

In this study, the oral hygiene practices among the KSRP personnel were examined, revealing that the majority of participants reported brushing their teeth only once daily, reflecting a potential discrepancy from recommended oral hygiene standards. Furthermore, it was found that the majority of individuals utilized toothbrushes rather than finger or chewsticks for oral hygiene maintenance, aligning

with contemporary dental care practices. Alarmingly, one-fourth of the study population indicated that they had not received any form of dental care, suggesting a notable gap in access to dental services among this population. The study found that among the participants who had visited a dentist, the majority had done so within the past year. However, a significant proportion (19.2%), had not visited a dentist in over five years, highlighting potential disparities in accessing timely dental care. The reasons cited for the last dental visit varied, with a notable portion seeking dental care due to pain, indicating a reactive approach to oral health management, while others reported follow-up treatment and routine check-ups, underscoring a mix of preventive and therapeutic dental care-seeking behaviours among the study population. The existing literature suggests no previous studies assessing the oral hygiene practices of police personnel in India. Furthermore, the findings of the present study was in contrast with Farago et al.[33] in Hungary police students, however, it aligned with the study by Sreenivasan et al.[61] and Paul et al.[62] among Indian adults. These findings collectively underscore the importance of promoting regular oral hygiene practices and improving access to dental care services among KSRP personnel to ensure optimal oral health outcomes within this occupational group.

Perception of oral health among the personnel

In this study, a significant portion of the surveyed police personnel reported their teeth and gums to be in fair or poor condition, reflecting prevalent oral health concerns within this population. Furthermore, a majority of the participants believed their toothpaste contained fluoride. This aligned with the findings from the study by Jensen et al.[63] in Finland where the self-reported daily use of fluoride toothpaste was high. A large proportion of personnel also expressed uncertainty regarding the presence

of fluoride content in their toothpaste. This uncertainty highlights potential gaps in knowledge among police personnel regarding oral health practices and the importance of fluoride in dental care. These findings underscore the importance of tailored oral health education programs targeted at police personnel, to improve awareness and promote optimal oral hygiene practices.

Frequency of sugar intake among the personnel

The study's findings unveiled a concerning trend indicating that a majority of the personnel exhibited a high intake of sugar. Despite a notable consumption of fruits among the participants, there was also significant consumption of sugary products such as biscuits, jams, and other confectioneries. Furthermore, the daily consumption of hot beverages, including tea and coffee, was reported to be relatively high. This pattern of sugar intake poses a considerable risk factor for dental caries development among the personnel. The frequent consumption of sugary foods and beverages provides an optimal environment for oral bacteria to thrive, leading to the demineralization of tooth enamel and subsequent caries development. The findings aligned with those reported by Agrawal.[64] Khan et al.[65] and Rajesh et al.[66] among Indian population. These findings highlights the importance of promoting healthier dietary habits among KSRP personnel and the importance of dietary interventions aimed at reducing sugar intake.

Self-reported dental problems and use of denture among personnel

In this study, it was found that the majority of the personnel reported no significant dental problems, suggesting a decreased perceived need for dental treatment among them. However, some of the individuals did encounter specific challenges; some experienced difficulty while biting food and occasional episodes of dry mouth, while

others reported more persistent issues such as interrupted sleep due to dental problems. These findings were in contrast with those reported by Motghare et al.[67] and Bommireddy et al.[68],as they reported higher proportion of these self-reported dental problems in Indian adults. These perceived dental issues were recorded over the past 12 months. These findings underscore the diversity of dental concerns among the personnel, ranging from mild discomfort to more disruptive symptoms affecting daily life. Despite experiencing these issues, there appears to be a trend where the perceived dental problems lead to less frequent visits to the dentist. This reluctance to seek dental care may be attributed to various factors, including fear of dental procedures, financial constraints, or simply underestimating the importance of regular dental check-ups. However, it's crucial to emphasize the importance of routine dental examinations in addressing and preventing potential oral health issues.

The study revealed a notably low proportion of denture users among the personnel, with the majority utilizing partial dentures. These findings aligned with those reported by Moreno-Quispe et al.[30] among Peruvian police personnel and Mishra et al.[69] among Indian adults. This observation suggests that while some individuals may require dental prosthetics, such as dentures, their usage remains relatively uncommon within this population.

Dental caries among personnel

Among the KSRP personnel, the overall prevalence of dental caries was found to be high. When rank of the personnel is considered, the head constables and constables had high caries, while inspectors had the least prevalence of caries among them. These findings aligned with previous studies conducted among police personnel

by Santhosh et al.[14] and Basavaraj et al.[23], however it was contradicting that of Singh et al.[60], who reported a lower prevalence among police personnel in Bhopal city.

When Caries experience (DMFT) among KSRP personnel was examined, it was observed that lower-ranked personnel displayed significantly higher caries experience compared to their higher-ranked counterparts. These findings aligned with those reported by Basavaraj et al.[23], but was in contrast with Singh et al.[60]. This observed difference could be attributed to various factors. One plausible explanation is that lower-ranked personnel may face elevated levels of occupational stress, coupled with limited access to preventive dental care services, potentially predisposing them to a higher incidence of dental caries and untreated dental issues, as seen in industrial workers.[70] Socioeconomic disparities may also play a role, with lower-ranked individuals potentially encountering financial barriers that impede regular dental check-ups and treatment.[71] Additionally, differences in oral health knowledge and hygiene practices across ranks could contribute to variations in caries experience.[72] Furthermore, lifestyle factors prevalent among lower-ranked personnel, such as suboptimal oral hygiene habits, may further exacerbate the risk of dental problems.[73] Addressing these disparities necessitates targeted interventions aimed at improving access to preventive dental care, enhancing oral health literacy, and promoting healthier behaviours across all ranks within the KSRP.

The analysis of DT and MT scores revealed a consistent trend wherein lower-ranked personnel exhibited significantly higher scores compared to their higher-ranked counterparts, such as inspectors. However, a notable deviation emerged when considering FT scores, where higher-ranked personnel demonstrated significantly higher scores than lower-ranked individuals. This discrepancy suggests a potential

inequality in access to dental care services among lower-ranked officials. The elevated DT and MT scores among lower-ranked personnel imply a greater prevalence of untreated dental caries and tooth loss within this subgroup, likely stemming from limited access to preventive and restorative dental treatments. Conversely, the higher FT scores among higher-ranked personnel suggest a greater utilization of dental services, potentially facilitated by better access to oral healthcare resources. These findings aligned with those reported by Basavaraj et al.[23] among police personnel in Ghaziabad city. Addressing this disparity in access to dental care is imperative to ensure equitable oral health outcomes across all ranks within the personnel population.

Periodontal disease among the personnel

The study revealed an overall prevalence of periodontal diseases, including BOP and PPD were 71.4% and 27.2%, respectively. Consistently, across ranks, a pattern similar to that observed with dental caries emerged, with lower-ranked officials exhibiting a higher prevalence of these periodontal diseases compared to their higher-ranked counterparts. This disparity in periodontal disease prevalence suggests potential factors similar to dental caries causing oral health disparities within this population. Likely contributors to periodontal disease prevalence could include variations in oral hygiene practices, dietary habits, and access to preventive dental care services. These findings aligned with that reported by Santhosh et al.[14], however it was in contrast with those reported by Bhalla et al.[10] and Basavaraj et al.[23]

Erosion and trauma among the personnel

The prevalence of trauma and erosion among the population was significantly lower in the studied population, with lower ranked personnels exhibiting the highest

prevalence of the same. This was in contrast with other blue collared workers such as factory workers.[74] and other adult population in Karnataka.[75]

Deleterious habits among the personnel

The majority (37%) of participants refrained from alcohol consumption, with varying proportions reporting different levels of intake over the past 30 days. When considering the distribution by rank, a significant number of personnel abstained from drinking. However, a noticeable trend emerged, indicating higher alcohol consumption among personnel with higher ranks. These findings aligned with global studies in police personnel by Davey et al.[76] in Australia and Irizar et al.[77] in United Kingdom. This disparity in alcohol consumption between ranks may be attributed to various factors, including occupational stress, social pressures, and access to disposable income among higher-ranked personnel, as alcohol tends to be a relatively expensive option, potentially making it more accessible to those in higher-ranking positions.

The majority (65%) of participants did not report a smoking habit, while a smaller percentage indicated occasional or daily smoking. When examining smoking habits by rank, a significant number of personnel reported of not smoking. However, there was a noticeable pattern suggesting a higher prevalence of smoking among personnel with higher ranks. Specifically, a proportionately larger number of assistant sub-inspectors, sub-inspectors, and inspectors had daily smoking habit. This disparity in smoking habits between ranks may be influenced by several factors associated with higher-ranking positions. These findings aligned with those reported by Phan et al.[78] and Basaza et al.[79] among police personnel.

Majority (70%) of participants did not report a tobacco chewing habit, with only a smaller percentage indicating various frequencies of usage. Specifically, daily tobacco chewing was predominantly observed among constables, while other higher ranked personnel reported rare usage. This observed pattern of tobacco chewing habits among different ranks may be attributed to several factors, including stress levels, job pressures, and social dynamics inherent to law enforcement environments. Lower-ranked personnel, facing potentially higher levels of occupational stress and pressure, may be more inclined to resort to tobacco as a coping mechanism compared to their higher-ranked counterparts. Additionally, the relatively lower disposable income among lower-ranked personnel might make tobacco, being more economical, a more accessible option for them in comparison to higher-ranked personnel. These findings aligned with those reported by Sukumar et al.[80] among Indian adults, however it was in contrast with Singh et al.[18] who found a higher tobacco usage among Indian personnel in Bhopal city.

Oral mucosal lesions among the personnel

The prevalence of oral lesions including leukoplakia, oral submucous fibrosis, and ulcerations was observed to be higher among lower-ranked personnel compared to their higher-ranked counterparts. Specifically, leukoplakia was noted in 4.7% of the personnel, oral submucous fibrosis in 4.2%, and ulcerations in 1.9%. These findings were in contrast with those reported by Bhatnagar et al.[81] among Indian adults, however it aligned with the study by Chandroth et al.[82] in fishermen population of Kutch. The distribution of these lesions across different anatomical sites of the oral mucosa revealed the buccal mucosa as the most commonly affected site (6.1%), followed by the lips (2.9%), tongue (0.8%), gingiva/alveolar ridge (0.6%), and floor of the mouth

(0.4%). These findings were in contrast with the study Chandroth et al.[82] among fishermen population of Kutch. There was a mild discrepancy in prevalence rates of the lesions between lower and higher-ranked personnel, which could be potentially attributed to their tobacco chewing habits. Lower-ranked officers, facing potentially higher levels of occupational stress and pressure, may resort to tobacco chewing as a coping mechanism, thereby increasing their risk of developing oral lesions. Furthermore, socioeconomic factors such as limited access to healthcare and preventive services among lower-ranked personnel may contribute to delayed diagnosis and management of these oral lesions, further exacerbating their prevalence in this subgroup.

Treatment needs of the personnel

A significant portion of the KSRP personnel required preventive or routine dental treatments, indicating a prevalent need for ongoing oral health maintenance within the population. This demand for preventive care could be attributed to factors such as inadequate oral hygiene practices, dietary habits high in sugars, or a lack of regular dental check-ups, all of which can contribute to the development of dental issues over time. Furthermore, prompt treatments like scaling were necessary for a notable portion of personnel, suggesting the presence of underlying dental conditions requiring immediate attention to prevent further deterioration. These conditions may include gingivitis or early-stage periodontal disease, which can progress if left untreated. Additionally, some personnel required immediate treatment, indicating the presence of acute dental problems such as severe tooth decay or abscesses, requiring urgent intervention to alleviate pain and prevent complications. Conversely, minor proportion of personnel required no treatment, it may be attributed to factors such as diligent oral

hygiene practices, regular dental check-ups, and a lower susceptibility to dental issues due to favourable lifestyle habits. These findings aligned with those reported by Bhalla et al.[10] among police personnel in Mathura city and Bhardwaj et al. among police personnel in Shimla city. Overall, these findings underscore the diverse dental treatment needs among the participants and highlight the importance of preventive dental care measures in maintaining optimal oral health and preventing the progression of dental problems.

Referrals

Upon completion of the oral health examinations, all personnel were provided with referral cards containing a 20% concession for selective treatments at either the KLE Vishwanath Katti Institute of Dental Sciences or any of the eight satellite centres associated with the Department of Public Health Dentistry. This incentive aimed to encourage timely follow-up visits for necessary dental care within a three-month window. Additionally, individuals identified with oral mucosal lesions received immediate referrals to the KLE hospital for comprehensive diagnosis and treatment planning, ensuring swift intervention and management of any potential oral health concerns. Furthermore, oral health education and tobacco counselling was given to all participants, offering guidance on oral hygiene practices and preventive measures to promote long-term oral health maintenance. These initiatives collectively aimed to empower individuals to prioritize their oral health and access necessary dental services promptly.

Limitation of the study

The present study has certain limitations inherent to its cross-sectional design. The reliance on cross-sectional data inherently limits the ability to establish temporal relationships between variables, including oral health status and potential contributing factors. As such, while associations between variables can be identified, causal inferences cannot be drawn. This limitation underscores the necessity for future longitudinal studies to elucidate the temporal sequence of events and better understand the causal pathways underlying oral health outcomes among police personnel. Moreover, the study's exclusive focus on a single time point may overlook dynamic changes in oral health status and treatment needs over time, thereby providing only a snapshot of the situation within the KSRP personnel. Additionally, the use of a questionnaire to collect data on oral hygiene and deleterious habits may introduce response bias and social desirability bias, potentially impacting the accuracy and reliability of the findings. Furthermore, the study's narrow geographic scope, limited to one battalion in Belagavi, may not adequately capture the diversity and variability present across different battalions within the force, thereby limiting the generalizability of the results.

These limitations highlight the need for future research endeavours to adopt more robust study designs, such as longitudinal studies encompassing multiple time points and broader geographic coverage. Such approaches would not only facilitate the examination of temporal relationships and causal pathways but also provide a more comprehensive understanding of oral health disparities and treatment needs among police personnel.

RECOMMENDATIONS

The recommendations that can be given for the maintenance of oral health among the employees of KSRP personnel are based on the fact that "Prevention is better than cure". These personnel have poorer oral health than the general population and need specific attention. Most dental diseases can be avoided by diligently following oral hygiene practices at home. Therefore, organizing dental programs in the KSRP unit, like regular check-up camps and implementing preventive procedures for the personnel, can go a long way in addressing the issues concerning oral health.

Prevention of oral health diseases can be achieved by the following ways:

Education and Motivation: Given the unique occupational demands and challenges faced by KSRP personnel, tailored health promotion programs should be developed to educate and motivate them to improve their oral hygiene practices. These programs should emphasize the importance of maintaining oral health and provide practical guidance on effective oral hygiene techniques. Sensitization sessions in large groups, small group discussions, and individual counseling sessions should be organized to ensure comprehensive coverage and personalized support for KSRP personnel.83"

Research: Conducting in-depth longitudinal research to understand the specific oral health needs and challenges of KSRP personnel is imperative. This research should explore factors influencing oral hygiene maintenance and oral health status among KSRP personnel, including the impact of occupational stress, dietary habits, and access to dental care services.

Treatment: Immediate attention should be given to addressing the unmet treatment needs of KSRP personnel. Efforts should focus on overcoming barriers to

seeking dental care, such as time constraints, fear of dental procedures, and financial concerns. Establishing a supportive and welcoming environment in dental clinics, improving administrative efficiency, and ensuring cost-effective treatment options are essential steps to enhance access to preventive and curative dental services for KSRP personnel.[84]

Targeted interventions at various levels of prevention:

Primary Level: Health promotion efforts should prioritize personalized diet counseling and education sessions tailored to the dietary habits and preferences of KSRP personnel. These sessions should emphasize on the importance of reducing sugar consumption and adopting a balanced diet for optimal oral health, as the frequency of sugar consumption among this population was found to be high. Oral health education involving the right toothbrushing habits and frequency should be conducted often.84 Furthermore, comprehensive education on the harmful effects of tobacco use and strategies for tobacco cessation should be provided to KSRP personnel. Specific protection involving sealant application should be carried out as a preventive measure among this population.

Secondary Level: Regular oral health check-up camps should be conducted at KSRP facilities to facilitate early detection and prompt treatment of oral health issues. Specialized screening protocols should be implemented to identify premalignant lesions and associated malignancies among KSRP personnel, with timely referrals to tertiary cancer hospitals for further evaluation and management.

Tertiary Level: Efforts should focus on implementing preventive and rehabilitative interventions to minimize the impact of dental diseases on the overall well-being of KSRP personnel. This includes identifying treatment modalities to preserve masticatory function and quality of life among personnel with dental diseases.

Additionally, personnel with missing teeth should be provided with comprehensive prosthetic solutions to restore oral function and aesthetics, thereby improving their overall oral health and quality of life.[83]

FUTURE SCOPE

The future scope of this study encompasses a wide array of oral health interventions aimed at addressing the specific needs and challenges identified among KSRP personnel.

1. There is a significant opportunity to implement preventive treatments such as scaling and sealant programs targeted at reducing the incidence of dental caries within the KSRP population. These interventions can be integrated into existing healthcare programs to ensure regular access to preventive dental care services for personnel.

2. There is a pressing need for tobacco cessation programs tailored to the unique requirements of KSRP personnel, given the documented prevalence of tobacco use among this population group. These programs should focus on raising awareness about the harmful effects of tobacco use, providing support for tobacco cessation efforts, and implementing policies to restrict tobacco access within KSRP facilities.

3. There is immense potential for the conduct of interventional and longitudinal studies to evaluate the effectiveness of various oral health interventions and track oral health outcomes among KSRP personnel over time. These studies can provide valuable insights into the long-term impact of preventive treatments and behavioral interventions on oral health status, enabling the development of evidence-based strategies to promote oral health and well-being within the KSRP force.

4. The findings of this study could assist policymakers and other stakeholders in integrating oral healthcare into existing health programs accessible to these individuals.

5. A Public-Private Partnership (PPP) initiative should be established to address the oral health challenges faced by the KSRP personnel. Through this collaboration, the KSRP personnel receive access to comprehensive oral health services provided by both

public and private sectors. By leveraging the resources and expertise of both sectors, this PPP initiative strives to promote better oral health practices and enhance the overall well-being of the KSRP personnel.

Overall, the future scope of this study holds promise for advancing oral health initiatives and improving the overall oral health outcomes of KSRP personnel through targeted interventions and rigorous research endeavours.

CONCLUSION

The current study aimed to evaluate the oral health status and treatment requirements of 720 personnel within the KSRP unit of Belagavi. The following conclusions were derived from the study:

- The majority of personnel in KSRP belonged to the middle age group, with a significant predominance of male employees compared to females.
- The prevalence of dental caries among KSRP personnel was high and this was the most prevalent dental disease recorded among this population.
- There was a disparity in the caries experience (DMFT) of the personnel. As the lower ranked personnel had higher caries experience compared to higher ranked personnel.
- There was a high prevalence of bleeding on probing among the personnel, however the prevalence of periodontal pockets was relatively low.
- Erosion and trauma had lower prevalence among the KSRP personnel.
- The oral hygiene practices such as toothbrushing and visit to the dentist among the personnel were not up to the required standards.
- There was high frequency of sugar intake among this population, which mainly included hot beverages like tea and coffee.
- There was a moderate prevalence of deleterious habits such as alcohol consumption, smoking and tobacco chewing. There was a disparity in behavior among personnel: higher-ranked officials tended to consume more alcohol and had increased smoking habit, whereas lower-ranked personnel favored chewable tobacco.

- There was a moderate prevalence of oral mucosal lesions when compared to previous in other parts of India especially among the lower ranked personnel. It could be related to the increased tobacco consumption habit. Among the oral mucosal lesions, leukoplakia, a whitish plaque or patch on the buccal mucosa, was most commonly seen, followed closely by Oral Submucous Fibrosis.
- When assessing treatment needs, it was found that the majority of personnel required preventive or routine dental care such as scaling and restorations, while some needed immediate treatment. However, only a small number of personnel required no treatment at all.
- The study's findings recommend the need to prioritize oral health education, preventive dental treatments, and longitudinal research concerning the KSRP personnel.

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ANNEXURES I – ETHICAL CLEARANCE

Research and Ethics Committee
KLE VK INSTITUTE OF DENTAL SCIENCES
A Constituent Unit of KLE Academy of Higher Education & Research
Accredited 'A' Grade by NAAC Placed in Category 'A' by MHRD (GoI)
Nehru Nagar, Belagavi - 590 010, Karnataka State
☎: 0831-2470362 Web: http://www.kledental-bgm.edu.in
FAX: 0831-2470640 E-mail:principal@kledental-bgm.edu.in

Sl. No.: 1577

CERTIFICATE

EC/NEW/INST/2021/2435
Research & Ethics Committe

This is to Certify that the synopsis titled

Assessment of Oral Health Status and Treatment Needs of Karnataka State Reserve Police, Belagavi District : A Cross - Sectional Study *Submitted by*

Dr. REG NO: IL0221003 *P. G. Student / Staff, Guided by* *from Department of* Public Health Dentistry *has been critically evaluated by committee members and granted ethical clearance to conduct the above mentioned study*

Date : 30/3/24

Member Secretary
Research and Ethical Committee
KLEVK Institute of Dental Sciences
Belagavi

MEMBER SECRETARY
Research & Ethical Committee
KLEVK Institute of Dental Sciences

Chairman
Research and Ethical Committee
KLEVK Institute of Dental Sciences
Belagavi

Chairman

ANNEXURES II – PERMISSION TO CONDUCT STUDY

KAHER's K L E
VISHWANATH KATTI
INSTITUTE OF DENTAL SCIENCES,
Nehru Nagar, Belagavi - 590010
Dept of Public Health Dentistry

Date: 04-04-2022

From,

Professor and Head,
Department Of Public Health Dentistry,
KLE V.K Institute of Dental Sciences,
Belagavi- 590010
Karnataka.

To,

Karnataka State Reserve Police
Belagavi
Karnataka.

(Through Proper Channel)

Sub: Permission for conducting study

Respected Sir,

This is to kindly bring to your notice that **IL022100**, Postgraduate student from Department of Public Health Dentistry, KLE VKIDS, Belagavi would like to conduct a study entitled "**Assessment of Oral Health Status and Treatment Needs of Karnataka State Reserve Police, Belagavi District – a Cross-Sectional Study**" among Karnataka State Reserve Police (KSRP). The study comprises of assessment of their oral health status, distribution of questionnaire and collection of oral health data. Kindly give consent & provide permission for the same.

Thanking You.

Permission by After May 10th

ಪಡೆಂಕಿ ವಿಜಿರ ನಾಯಕರು
ಪೋಲೀಸ್ ಪಡೆ ಕೆ. ಎಸ್. ಆರ್. ಪಿ. ಬೆಳಗಾವಿ

Professor and Head
Department of Public Health Dentistry
KLE VKIDS

ANNEXURES III – INFORMED CONSENT FORM

DEPARTMENT OF PUBLIC HEALTH DENTISTRY

CONSENT FORM

Date:

I, REG NO: IL0221003 asking for your volunteered participation in my study entitled "Assessment of Oral Health Status and Treatment Needs of Karnataka State Reserve Police, Belagavi District: A Cross-Sectional Study" under the guidance of Dr. XXXX. The maximum time required for oral examination will not be more than 20 minutes and questions will be asked about your personal and oral hygiene habits. Your confidentiality will be maintained. If you have any questions about this study, feel free to contact.

Primary Investigator: Dr. REG NO: IL0221003 (Dental postgraduate student), KAHER'S KLE V.K. Institute of Dental Sciences, Belagavi.

Voluntary participation:

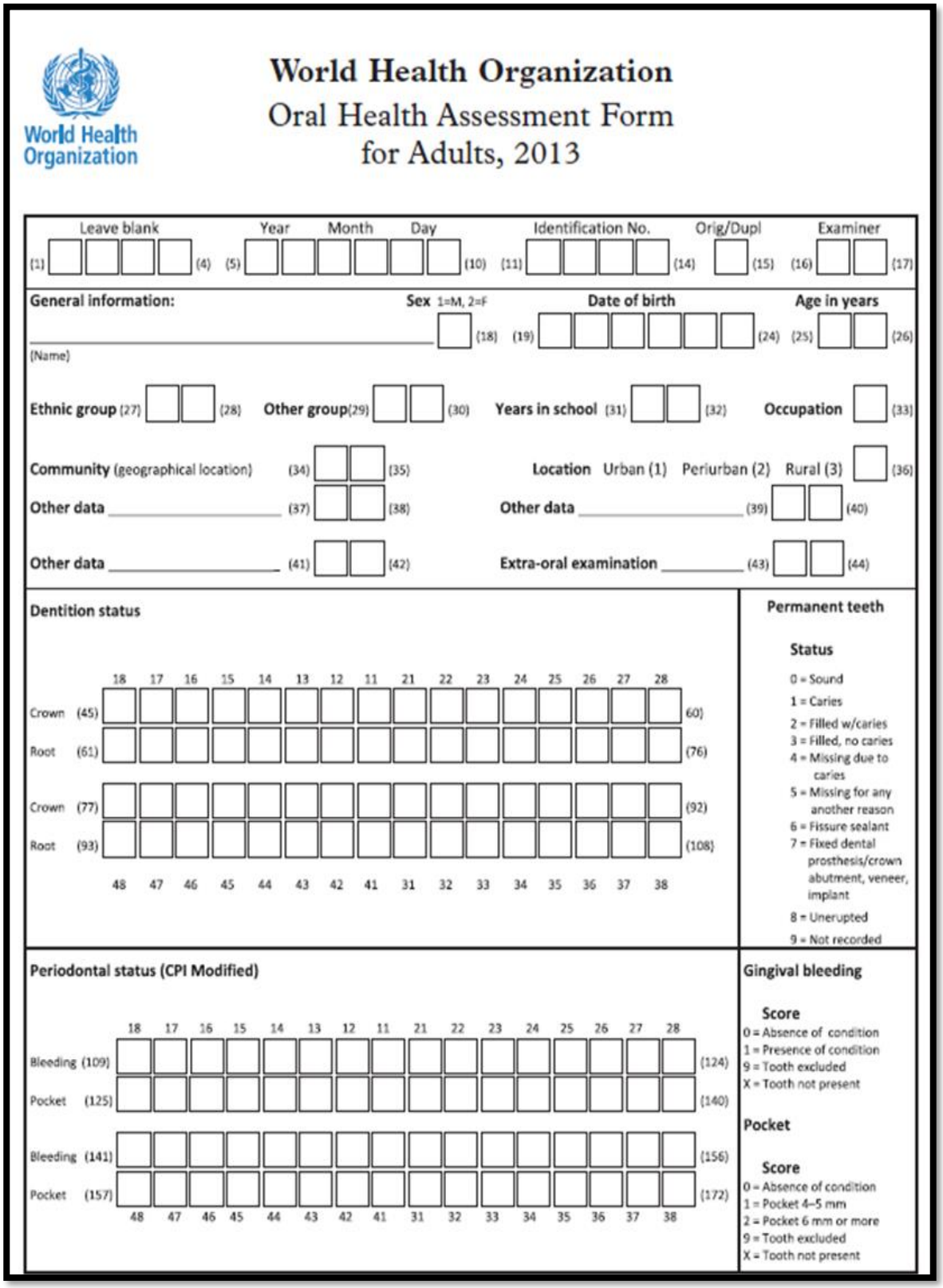
Participation in the study is completely voluntary. If you decide not to participate, there will be no negative consequences. Kindly be aware that if you decide to participate, you may stop participating at any given point of time, and you may decide not to answer any specific question.

By signing this form, I am attesting that I have read and understood the information above and I freely give my consent/assent.

(Signature) Witness:

(Signature)

ANNEXURES IV – WHO Oral Health Assessment Form (2013)



World Health Organization

Oral Health Assessment Form for Adults, 2013

Leave blank (1) (4) | Year Month Day (5) (10) | Identification No. (11) (14) | Orig/Dupl (15) | Examiner (16) (17)

General information: Sex 1=M, 2=F (18) | Date of birth (19) (24) | Age in years (25) (26)

(Name)

Ethnic group (27) (28) | **Other group** (29) (30) | **Years in school** (31) (32) | **Occupation** (33)

Community (geographical location) (34) (35) | **Location** Urban (1) Periurban (2) Rural (3) (36)

Other data (37) (38) | **Other data** (39) (40)

Other data (41) (42) | **Extra-oral examination** (43) (44)

Dentition status

	18	17	16	15	14	13	12	11	21	22	23	24	25	26	27	28	
Crown (45)																	(60)
Root (61)																	(76)
Crown (77)																	(92)
Root (93)																	(108)
	48	47	46	45	44	43	42	41	31	32	33	34	35	36	37	38	

Permanent teeth

Status

0 = Sound
1 = Caries
2 = Filled w/caries
3 = Filled, no caries
4 = Missing due to caries
5 = Missing for any another reason
6 = Fissure sealant
7 = Fixed dental prosthesis/crown abutment, veneer, implant
8 = Unerupted
9 = Not recorded

Periodontal status (CPI Modified)

	18	17	16	15	14	13	12	11	21	22	23	24	25	26	27	28	
Bleeding (109)																	(124)
Pocket (125)																	(140)
Bleeding (141)																	(156)
Pocket (157)																	(172)
	48	47	46	45	44	43	42	41	31	32	33	34	35	36	37	38	

Gingival bleeding

Score

0 = Absence of condition
1 = Presence of condition
9 = Tooth excluded
X = Tooth not present

Pocket

Score

0 = Absence of condition
1 = Pocket 4–5 mm
2 = Pocket 6 mm or more
9 = Tooth excluded
X = Tooth not present

Loss of attachment

Severity
0 = 0–3 mm
1 = 4–5 mm Cemento-enamel junction (CEJ) within black band
2 = 6–8 mm CEJ between upper limit of black band and 8.5 mm ring
3 = 9–11 mm CEJ between 8.5 mm and 11.5 mm ring
4 = 12 mm or more CEJ beyond 11.5 mm ring
X = Excluded sextant
9 = Not recorded

* Not recorded under 15 years of age

Index teeth

17/16 11 26/27
(173) ☐☐☐ (175)
(176) ☐☐☐ (178)
47/46 31 36/37

Enamel fluorosis ☐ (179)

Severity
0 = Normal
1 = Questionable
2 = Very mild
3 = Mild
4 = Moderate
5 = Severe
8 = Excluded (crown, restoration, "bracket")
9 = Not recorded (unerupted tooth)

Dental erosion

Severity ☐ (180)

0 = No sign of erosion
1 = Enamel lesion
2 = Dentinal lesion
3 = Pulp involvement

Number of teeth affected

(181) ☐☐ (182)

Dental trauma

Status ☐ (183)

Number of teeth affected

(184) ☐☐ (185)

0 = No sign of injury
1 = Treated injury
2 = Enamel fracture only
3 = Enamel and dentine fracture
4 = Pulp involvement
5 = Missing tooth due to trauma
6 = Other damage
9 = Excluded tooth

Oral mucosal lesions

☐ (186)
☐ (187)
☐ (188)

☐ (189)
☐ (190)
☐ (191)

Condition

0 = No abnormal condition
1 = Malignant tumour (oral cancer)
2 = Leukoplakia
3 = Lichen planus
4 = Ulceration (aphthous, herpetic, traumatic)
5 = Acute necrotizing ulcerative gingivitis (ANUG)
6 = Candidiasis
7 = Abscess
8 = Other condition (specify if possible)
9 = Not recorded

Location

0 = Vermillion border
1 = Commissures
2 = Lips
3 = Sulci
4 = Buccal mucosa
5 = Floor of the mouth
6 = Tongue
7 = Hard and/or soft palate
8 = Alveolar ridges/gingiva
9 = Not recorded

Denture(s)

Upper ☐ (192) **Lower** ☐ (193)

Status

0 = No denture
1 = Partial denture
2 = Complete denture
9 = Not recorded

Intervention urgency ☐ (194)

0 = No treatment needed
1 = Preventive or routine treatment needed
2 = Prompt treatment (including scaling) needed
3 = Immediate (urgent) treatment needed due to pain or infection of dental and/or oral origin
4 = Referred for comprehensive evaluation or medical/dental treatment (systemic condition)

ANNEXURES V – WHO Oral Health Questionnaire for Adults (2013)

World Health Organization

Oral Health Questionnaire for Adults

Identification number	Sex		Location		
	Male	Female	Urban	Periurban	Rural
1. ☐☐☐☐ (1 4)	☐ 1	☐ 2	☐ 1	☐ 2	☐ 3

2. **How old are you today?** _____ (Years)

3. **How many natural teeth do you have?**
- No natural teeth ☐ 0
- 1–9 teeth ☐ 1
- 10–19 teeth ☐ 2
- 20 teeth or more ☐ 3

4. **During the past 12 months, did your teeth or mouth cause any pain or discomfort?**
- Yes ☐ 1
- No ☐ 2
- Don't know ☐ 9
- No answer ☐ 0

5. **Do you have any removable dentures?**

	Yes 1	No 2
A partial denture?	☐	☐
A full upper denture?	☐	☐
A full lower denture?	☐	☐

6. **How would you describe the state of your teeth and gums? Is it "excellent", "very good", "good", "average", "poor", or "very poor"?**

	Teeth	Gums
Excellent	☐ 1	☐ 1
Very good	☐ 2	☐ 2
Good	☐ 3	☐ 3
Average	☐ 4	☐ 4
Poor	☐ 5	☐ 5
Very poor	☐ 6	☐ 6
Don't know	☐ 9	☐ 9

7. **How often do you clean your teeth?**
- Never ☐ 1
- Once a month ☐ 2
- 2–3 times a month ☐ 3
- Once a week ☐ 4
- 2–6 times a week ☐ 5
- Once a day ☐ 6
- Twice or more a day ☐ 7

8. **Do you use any of the following to clean your teeth?** (Read each item)

	Yes 1	No 2
Toothbrush	☐	☐
Wooden toothpicks	☐	☐
Plastic toothpicks?	☐	☐
Thread (dental floss)	☐	☐
Charcoal	☐	☐
Chewstick/miswak	☐	☐
Other	☐	☐
Please specify	☐	☐

9.

	Yes	No
a) **Do you use toothpaste to clean your teeth**	☐ 1	☐ 2
b) **Do you use a toothpaste that contains fluoride?**	☐ 1	☐ 2
Don't know	☐ 9	

10. **How long is it since you last saw a dentist?**
- Less than 6 months ☐ 1
- 6–12 months ☐ 2
- More than 1 year but less than 2 years ☐ 3
- 2 years or more but less than 5 years ☐ 4
- 5 years or more ☐ 5
- Never received dental care ☐ 6

11. **What was the reason of your last visit to the dentist?**
- Consultation/advise ☐ 1
- Pain or trouble with teeth, gums or mouth ☐ 2
- Treatment/ follow-up treatment ☐ 3
- Routine check-up/treatment ☐ 4
- Don't know/don't remember ☐ 5

12. **Because of the state of your teeth or mouth, how often have you experienced any of the following problems during the past 12 months?**

	Very often 4	Fairly often 3	Some-times 2	No 1	Don't know 0
(a) Difficulty in biting foods	☐	☐	☐	☐	☐
(b) Difficulty chewing foods	☐	☐	☐	☐	☐
(c) Difficulty with speech/trouble pronouncing words	☐	☐	☐	☐	☐
(d) Dry mouth	☐	☐	☐	☐	☐
(e) Felt embarrassed due to appearance of teeth	☐	☐	☐	☐	☐
(f) Felt tense because of problems with teeth or mouth	☐	☐	☐	☐	☐
(g) Have avoided smiling because of teeth	☐	☐	☐	☐	☐
(h) Had sleep that is often interrupted	☐	☐	☐	☐	☐
(i) Have taken days off work	☐	☐	☐	☐	☐
(j) Difficulty doing usual activities	☐	☐	☐	☐	☐
(k) Felt less tolerant of spouse or people who are close to you	☐	☐	☐	☐	☐
(l) Have reduced participation in social activities	☐	☐	☐	☐	☐

13. **How often do you eat or drink any of the following foods, even in small quantities?**
(Read each item)

	Several times a day 6	Every day 5	Several times a week 4	Once a week 3	Several times a month 2	Seldom /never 1
Fresh fruit	☐	☐	☐	☐	☐	☐
Biscuits, cakes, cream cakes	☐	☐	☐	☐	☐	☐
Sweet pies, buns	☐	☐	☐	☐	☐	☐
Jam or honey	☐	☐	☐	☐	☐	☐
Chewing gum containing sugar	☐	☐	☐	☐	☐	☐
Sweets/candy	☐	☐	☐	☐	☐	☐
Lemonade, Coca Cola or other soft drinks	☐	☐	☐	☐	☐	☐
Tea with sugar	☐	☐	☐	☐	☐	☐
Coffee with sugar	☐	☐	☐	☐	☐	☐

(Insert country-specific items)

14. **How often do you use any of the following types of tobacco?**
(Read each item)

	Every day 6	Several times a week 5	Once a week 4	Several times a month 3	Seldom 2	Never 1
Cigarettes	☐	☐	☐	☐	☐	☐
Cigars	☐	☐	☐	☐	☐	☐
A pipe	☐	☐	☐	☐	☐	☐
Chewing tobacco	☐	☐	☐	☐	☐	☐
Use snuff	☐	☐	☐	☐	☐	☐
Other	☐	☐	☐	☐	☐	☐

Please specify _____

15. **During the past 30 days, on the days you drank alcohol, how many drinks did you *usually drink per day*?**

- Less than 1 drink ☐ 0
- 1 drink ☐ 1
- 2 drinks ☐ 2
- 3 drinks ☐ 3
- 4 drinks ☐ 4
- 5 or more drinks ☐ 5
- Did not drink alcohol during the past 30 days ☐ 9

16. **What level of education have you completed?**

- No formal schooling ☐ 1
- Less than primary school ☐ 2
- Primary school completed ☐ 3
- Secondary school completed ☐ 4
- High school completed ☐ 5
- College/university completed ☐ 6
- Postgraduate degree ☐ 7

(Insert country-specific categories)

That completes our questionnaire
Thank you very much for your cooperation!

Year	Month	Day	Interviewer	District	Country
☐☐	☐☐	☐☐	☐☐	☐☐	☐☐☐