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Assessment of the periodontal health of police officers at the University of Kinshasa, Democratic Republic of the Congo

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ABSTRACT

Introduction
The profession of law enforcement involves demanding working conditions and schedules, which may lead to psychological stress, lifestyle modifications and neglect of oral hygiene. These factors can negatively affect the periodontal health of police officers.

Purpose
This study aimed to assess the periodontal health of police officers at the University of Kinshasa (POUK), with particular attention to oral hygiene practices and lifestyle factors, including smoking.

Methods
This descriptive cross-sectional study involved POUK officers aged 18 years and above and was conducted over two years and six months. Each participant underwent an interview followed by a periodontal clinical examination performed by a single trained and calibrated examiner. Plaque Index (PI), Bleeding on Probing (BOP), Pocket Depth (PD) and Clinical Attachment Loss (CAL) were recorded and assessed. Intra-examiner reliability was verified to ensure consistency. Descriptive and bivariate analyses were carried out using IBM SPSS version 20.0, applying a 95% confidence interval.

Results
Of the 240 POUK officers examined, 96.3% were men and 3.8% were women, with most aged between 30 and 40 years. All officers (100%) reported practising oral hygiene, and 97.9% used a manufactured toothbrush. A total of 77.9% brushed their teeth once daily. More than half (53.3%) used hard-bristle toothbrushes, and 81.7% used the horizontal brushing technique. None reported using adjunctive oral hygiene measures. Mean CAL and PPD were 1.3 mm and 5 mm, respectively. Mean PI and BOP were 70.5% and 23.1%, respectively. Overall, 63.7% had a CPI score of 3. There was a strong association between periodontal disease and smoking (X^2 = 43.444, $p < 0.001$), as well as poor oral hygiene (X^2 = 14.594, $p = 0.002$).

Conclusion
A high prevalence of periodontal disease and inadequate oral hygiene practices were observed among police officers at the University of Kinshasa. These findings highlight the need for oral health education and targeted periodontal disease control programmes to improve oral health and enhance the performance of police personnel.

INTRODUCTION

Periodontal health refers to a condition characterised by the absence of clinical signs and symptoms of periodontal disease. Periodontal disease is a chronic, multifactorial pathology triggered by the interaction between bacterial plaque and the host immune response. Gingivitis is a mild and completely reversible form of the disease when treated promptly and appropriately. Periodontitis is an advanced and irreversible condition that damages the tooth-supporting tissues and represents a leading cause of tooth loss (Łasica et al., 2024; Luis Munoz-Carrillo et al., 2020; Mariotti & Hefti, 2015).

The literature indicates that gingivitis is almost universally present, whereas approximately 5–20% of the global population suffers from severe periodontitis (Kassebaum et al., 2014).

Certain occupations—particularly those involving restrictive or demanding working conditions, such as law enforcement—may expose individuals to psychological stress and unfavourable lifestyle changes. These may include increased tobacco and alcohol use, poor dietary habits, inadequate oral hygiene, and reduced adherence to dental care, all of which may contribute to the initiation and progression of periodontal disease (Majeed et al., 2020; Corridore et al., 2023).

Periodontal disease is a prevalent condition among law enforcement officers, as highlighted in studies conducted globally. Research by Majeed et al. (2020) in Pakistan, Kalbande et al. (2019) in India, and Guirassy et al. (2020) in Africa reported high periodontal disease prevalence among police personnel, with rates ranging from 56.8% to 99.8% (Kalbande et al., 2019; Majeed et al., 2020; Guirassy et al., 2020).

Despite this global evidence, there is a notable lack of data on the periodontal health of law enforcement officers in the Democratic Republic of Congo, and no studies have specifically assessed university police officers. This population is particularly important to study, as police work often involves high occupational stress, irregular schedules, and limited access to preventive healthcare—factors that may increase susceptibility to oral diseases. To address this gap, the present study evaluated the periodontal health of police officers at the University of Kinshasa.

METHODS

Study Area

The study was conducted at the University of Kinshasa (UNIKIN), located on the heights of Mont-Amba in the municipality of Lemba. The site covers an area of approximately 400 hectares and includes a 421-hectare agro-pastoral farm dedicated to teaching, research, and innovation. The campus has a hilly topography and houses several faculties and services, including the university police responsible for internal security. Its accessibility and the specific working conditions of the security officers make it a relevant setting for assessing their periodontal health.

Study Design

This was a descriptive cross-sectional study conducted within the University of Kinshasa police facilities from March 2022 to September 2024.

Study Population and Sampling Technique

The recruitment process included all police officers at the University of Kinshasa aged 18 years or older who consented to participate, regardless of gender. Participants with a history of systemic diseases known to affect periodontal health, or those undergoing active periodontal treatment, were excluded. Convenience sampling was used, as it allowed the inclusion of the greatest possible number of officers during the study period, thereby improving the feasibility of data collection within the available time and resource constraints.

Clinical Examination and Data Collection

Administrative authorisation was obtained from the police hierarchy. Each participant received a brief explanation of the study before the interview, during which socio-demographic and oral hygiene data were collected. A periodontal clinical examination followed to record gingival bleeding, soft deposits, periodontal pocket depth, and clinical attachment loss.

Periodontal pocket depth and clinical attachment loss were assessed at six sites per tooth (O'Leary et al., 1972) using a Hu-Friedy PCP10 periodontal probe (Chicago, Illinois, USA). Plaque and bleeding indices were calculated using six Ramfjord teeth (16, 21, 24, 36, 41, 44) as described by

O'Leary et al. (1972). The Community Periodontal Index (CPI) was used to assess periodontal disease severity (Cutress, 1987). Periodontal conditions were categorised as gingivitis (CPI scores 1–2), mild to moderate periodontitis (CPI score 3), and severe periodontitis (CPI score 4). Oral hygiene status was assessed using the Silness and Löe Index (Silness & Löe, 1964). All measurements were performed by a single trained and calibrated examiner, and data were recorded on individual forms bearing each participant's identifier.

Examiner Reliability

To ensure measurement consistency, intra-examiner reliability was evaluated before and throughout the study through repeated examinations on 10% of the sample. Agreement was assessed using Cohen's kappa coefficient, which yielded a value of 0.82, indicating substantial reliability.

Data Analysis

Data were entered and analysed using the Statistical Package for the Social Sciences (SPSS) (IBM SPSS Statistics for Windows, Version 20.0; Armonk, NY, USA). Univariate analysis examined the individual characteristics of each variable. The Kolmogorov-Smirnov test was used to assess the normality of quantitative variables. Associations between categorical variables were evaluated using the Chi-square test, with a 95% confidence interval. A p-value of <0.05 was considered statistically significant.

Ethical Approval

The Ethics Committee of the Faculty of Dentistry, University of Kinshasa, approved the study. A clear and concise explanation of the study's purpose was provided to participants, and all collected data were handled with strict confidentiality.

RESULTS

A total of 240 police officers from the University of Kinshasa were recruited for this study.

Table 1:
Socio-demographic characteristics of the study population

Variables	Frequency (n = 240)	%
Age		
< 30 years	55	22.9
30–49 years	153	63.7
≥ 50 years	32	13.3
Sex		
Male	231	96.3
Female	9	3.8
Marital status		
Single	129	53.8
Married	104	43.3
Divorced	4	1.7
Widowed	3	1.3
Educational level		
Primary	4	1.7
Secondary	205	85.4
Higher/University	31	12.9

Table 1 shows that most of the officers were aged 30–49 years (63.7%). The mean age was 36.4 ± 9.7 years. Almost all the participants were male (96.3%). More than half of the study population (53.8%) were single. Most officers had a secondary level of education (85.4%).

Table 2:
Population distribution by oral hygiene habits

Variables	Frequency (n = 240)	%
Oral hygiene practice		
Yes	240	100
Brush type		
Manufactured	235	97.9
Traditional	5	2.1
Brushing frequency		
Once daily	187	77.9
Twice daily	53	22.1
Brushing technique		
Vertical	14	5.8
Horizontal	196	81.7
Combined	30	12.5
Bristle type		
Soft	3	1.3
Medium	109	45.4
Hard	128	53.3
Interdental care		
None	240	100

Table 2 demonstrates that all officers reported practising oral hygiene. The majority (97.9%) used manufactured toothbrushes. Most participants (77.9%) brushed once daily. The horizontal brushing technique was used by 81.7%. More than half (53.3%) used hard-bristle

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toothbrushes. No officer used interdental or adjunctive oral hygiene aids.

Table 3:
Periodontal clinical characteristics of the study population

Variables	Mean ± SD	Range
Periodontal pocket depth	5 ± 1 mm	4–10 mm
Attachment loss	1.3 ± 0.1 mm	1–5 mm
Plaque index	70.5 ± 19%	25–100%
Bleeding on probing	23.1 ± 14%	3–65%

Table 3 shows a mean periodontal pocket depth of 5 ± 1 mm and a mean attachment loss of 1.3 ± 0.1 mm. The mean plaque index was 70.5%, and the mean bleeding on probing was 23.1%.

Table 4:
Population distribution by CPI index

CPI Score	Description	Frequency	%
0	Healthy periodontium	0	0.0
1	Bleeding on probing	0	0.0
2	Calculus	54	22.5
3	Pocket 4–5 mm	153	63.7
4	Pocket ≥ 6 mm	33	13.8
Total		**240**	**100**

Table 4 indicates that 63.7% of officers had a CPI score of 3.

Table 5:
Association between oral hygiene, smoking and periodontal disease

Variables	Gingivitis n (%)	Periodontitis n (%)	X^2	p
Oral hygiene				
Good	2 (100%)	0 (0.0%)	14.594	0.002*
Acceptable	2 (50%)	2 (50%)		
Insufficient	5 (55.6%)	4 (44.4%)		
Poor	46 (20.4%)	179 (79.6%)		
Tobacco use				
Yes	23 (41.8%)	158 (85.4%)	43.444	0.000*
No	32 (58.2%)	27 (14.6%)		

*Significant association at $p < 0.05$

Table 5 demonstrates that poor oral hygiene and smoking were strongly associated with periodontal disease ($p = 0.002$ and $p = 0.000$). Periodontitis was observed in 79.6% of those with poor oral hygiene and 85.4% of smokers.

DISCUSSION

Analysis of socio-demographic factors

The study showed a marked predominance of men (96.3%), consistent with the findings of Aishwarya et al. (2015), where men represented 95.6% of the study population. This reflects sociocultural norms in which policing is traditionally viewed as a male profession, particularly in Africa, where women may be discouraged due to the physical demands, exposure to violence and long working hours.

The most represented age group was 30–49 years (63.7%), similar to findings by Kane et al. (2022) and Guirassy et al. (2020) in Mali.

Assessment of oral hygiene practices

All officers reported practising oral hygiene, a finding consistent with Kane et al. (2022), who reported 85.9% adherence among Malian special forces.

Most officers brushed once daily (77.9%), higher than the 53% reported by Janani et al. (2022). The horizontal brushing technique was overwhelmingly preferred (81.7%), consistent with findings from Aishwarya et al. (2015) and Kane et al. (2022). Hard-bristle brushes were used by 53.3% of officers. No interdental care was reported, unlike Janani et al. (2022), where flossing (71%) and mouthwash use (70%) were common.

These results highlight knowledge gaps in oral hygiene practices, supporting the need for targeted oral health education programs.

Association of oral hygiene and tobacco use with periodontal disease

The mean plaque index was high (70%), and poor oral hygiene was significantly associated with periodontal disease severity. Lertpimonchai et al. (2017) similarly found that poor oral hygiene increases periodontitis risk by two- to five-fold.

Despite a low bleeding on probing score (23.1%), this may be attributed to the high prevalence of tobacco use, which reduces gingival bleeding by causing vascular alterations (Mittal et al., 2024). Tobacco use was strongly associated with periodontal disease ($p = 0.000$).

Periodontal disease prevalence

Periodontitis prevalence was 77.5%, with pocket depths ranging from 4–10 mm, similar to Guirassy et al. (2020), who reported 69.5%. Chronic occupational stress may contribute to this high prevalence (Corridore et al., 2023).

Limitations

Convenience sampling may limit generalisability. Self-reported oral hygiene practices may be inaccurate, and findings may not reflect the periodontal status of police officers elsewhere.

CONCLUSION

Most police officers at the University of Kinshasa demonstrated inadequate oral hygiene habits and poor periodontal health. Oral hygiene, tobacco use and periodontal disease were strongly associated. There is an urgent need for targeted oral health education, tobacco cessation initiatives and workplace oral health programmes.

Recommendations

1. Provide oral hygiene education and training for university police officers.
2. Implement tobacco cessation programmes with counselling and awareness campaigns.
3. Promote oral health prevention programmes through mass media and workplace services.

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Ethical Approval: Ethical approval for the study was granted by the Ethics Committee of the Faculty of Dentistry, University of Kinshasa.

Conflicts of Interest: None declared.

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