



Periodontal status in nursing home residents in Split-Dalmatia County

DARIO BOJČIĆ¹
JELENA PRPIĆ²
IVAN PUHAR³
STJEPAN ŠPALJ²
DARIJE PLANČAK³

¹ Private dental practice Šime i Dario Bojčić, Split, Croatia

² School of Dental Medicine, Medical Faculty, Rijeka, Croatia; Clinic for Dental Medicine, Clinical Hospital Center Rijeka, Croatia

³ School of Dental Medicine, Zagreb, Croatia

Correspondence:

Jelena Prpić
School of Dental Medicine, Medical Faculty, Rijeka, Croatia; Clinic for Dental Medicine, Clinical Hospital Center Rijeka, Croatia
E-mail: jelena.horvat.prpic@gmail.com

List of abbreviations:

CPI – Community Periodontal Index
CAL – clinical attachment level

Abstract

Background and Purpose: Poor oral health in elderly people is accompanied by a high proportion of missing teeth, dental cavities, periodontal disease, xerostomia, and the occurrence of oral pre-malignant lesions and cancers. Available evidence suggests that the prevalence of periodontal diseases increases proportionally with age. The purpose of this study was to assess the prevalence and severity of periodontal diseases among nursing home residents in Split-Dalmatia County and to propose a program of public health measures.

Materials and Methods: Oral health status was assessed for 114 individuals aged 54–96 years. Prior to the examination, the participants filled out the questionnaire regarding age, gender, education, smoking, alcohol consumption, habits and oral hygiene maintenance. Periodontal condition was assessed using the Community Periodontal Index and clinical attachment level.

Results: Statistical analysis of the CPI showed that, for all the sextants, the most numerous group of subjects was the one with excluded sextants. Following those, the most numerous were the sextants with visible deposits of dental calculus. Statistical analysis of the CAL through the sextants showed that the excluded group was the most frequent finding, followed by the group with CAL of 4–5 mm.

Conclusions: Older persons often have poor oral health and frequently suffer from periodontal disease. We should encourage preventive examinations performed while the dentists need to put an effort to prevent the progression of periodontal disease and sustain the older people's quality of life, especially in nursing home residents.

INTRODUCTION

According to the Croatian 2011 census, the percentage of people older than 65 years was 17.7%. Following Međimurje and Zagreb County, Split-Dalmatia County was the third county with the smallest proportion of the elderly population (14.28%) (1,2).

The proportion of elderly population in the world rapidly increases, and so does the interest in their oral health. Oral health is an important part of general health, and involves the health of the oral cavity i.e. teeth, periodontal tissues, mucosa and salivary glands. Oral health in the elderly population is affected by genetic predisposition, lifestyle, dental care and systemic diseases (3). Poor oral health in elderly people is accompanied by a high proportion of missing teeth, dental cavities,

periodontal disease, xerostomia, and the occurrence of oral pre-malignant lesions and cancers (4). Periodontal diseases are a group of inflammatory diseases affecting the supporting tissues of the tooth i.e. cementum, periodontal ligament, gingiva and alveolar bone (5, 6). Clinical appearance of periodontium in the elderly reflects changes due to the aging process, but also the consequences of previous illnesses or injuries. Gingival recession appears with aging, and periodontal fibers and alveolar bone are lost. However, changes in periodontium that can be attributed solely to the aging in healthy individuals do not lead to tooth loss. Available evidence suggests that the prevalence of periodontal diseases increases proportionally with age, and that important risk factors for periodontal disease include poor oral hygiene, smoking, increased alcohol consumption, stress, and diabetes mellitus (7, 8).

Although the same problems occur in all elderly people, it seems that their occurrence is significantly greater in persons nursing home residents compared to those who live independently (9). It is therefore necessary to identify, treat and prevent the above mentioned diseases and disorders in order to increase the quality of life in elderly people. The purpose of this study was to determine the prevalence and severity of periodontal diseases among nursing home residents in Split-Dalmatia County, to compare the results with similar findings in Croatia and worldwide, and to propose a program of public health measures that can be implemented in nursing institutions, whose goal will be to prevent the development and progression of those diseases.

MATERIAL AND METHODS

Oral health status was assessed in the Nursing home for the elderly Split, which operates at two locations, during the period between September 2010 and July 2011, and included 114 individuals (71 women and 43 men) aged 54–96 years. Each participant was informed about the purpose of the research and examination protocol, and then signed an informed consent approved by the Ethics Committee, School of Dental Medicine in Zagreb. Prior to the examination, the participants themselves, or with the help of the examiner or the medical staff, filled out the questionnaire regarding their age, gender, education, smoking, alcohol consumption, habits and oral hygiene maintenance.

Periodontal condition was assessed using the Community Periodontal Index (CPI). For this purpose, a specially designed CPI probe with a 0.5 ball tip and the graduated markings on the 3.5 mm, 5.5 mm and 8.5 mm was used. For each of the six sextants (17–14, 13–23, 24–27, 37–34, 33–43, 44–47) CPI measures the following conditions:

- 0 (H) – healthy
- 1 (B) – bleeding on gentle probing
- 2 (C) – detection of supragingival or subgingival calculus deposits
- 3 (P1) – periodontal pocket 4–5 mm
- 4 (P2) – periodontal pocket 6 mm or more

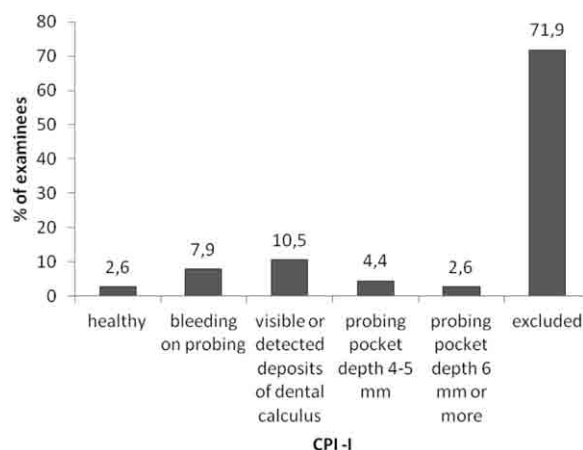


Figure 1. Values of CPI in the 1st sextant.

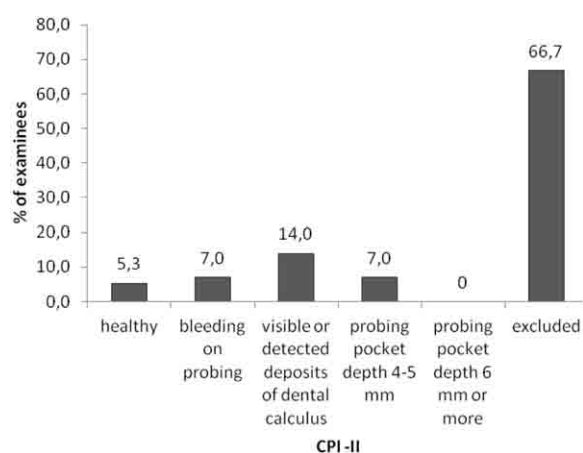


Figure 2. Values of the CPI index in the 2nd sextant.

Excluded sextant was coded as „X“. According to the World Health Organization, examination always included 10 teeth – 17, 16, 11, 26 and 27 in the upper jaw, and 47, 46, 31, 36 and 37 in the lower jaw. Molars were examined in pairs, with the highest value recorded for each sextant. Sextant was examined only in cases where at least two teeth were present. If no index tooth was present in the sextant, all the remaining teeth in that sextant were examined. Each index tooth was probed at six sites: mesio-buccal, mid-buccal, disto-buccal, mesio-lingual, mid-lingual, disto-lingual.

Simultaneously with the CPI measurements, clinical attachment level (CAL) was recorded for the each sextant. CAL was measured from the cement-enamel junction to the bottom of the pocket. According to the World Health Organization, CAL was assessed using the following criteria:

- 1 – 4–5 mm
- 2 – 6–8 mm
- 3 – 9–11 mm
- 4 – 12 mm or more
- X – excluded sextant

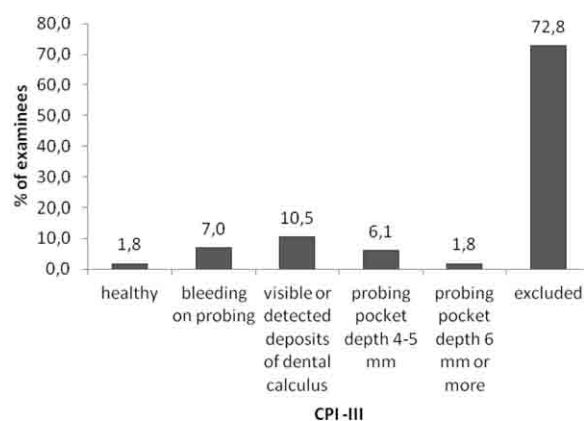


Figure 3. Values of the CPI index in the 3rd sextant.

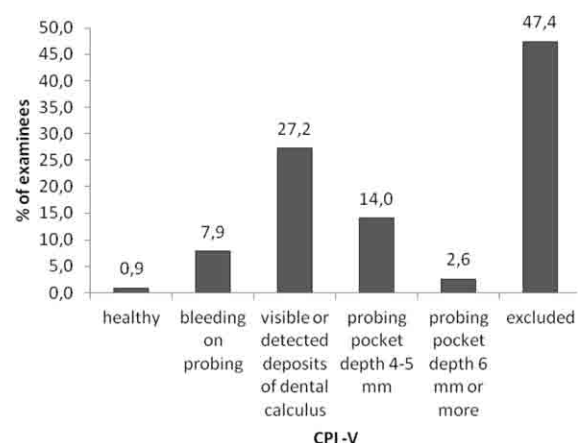


Figure 5. Values of the CPI index in the 5th sextant.

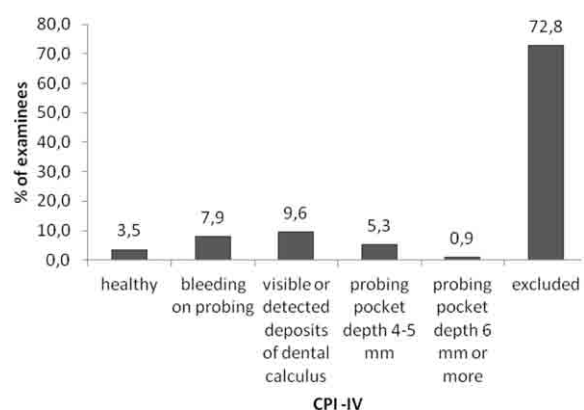


Figure 4. Values of the CPI index in the 4th sextant.

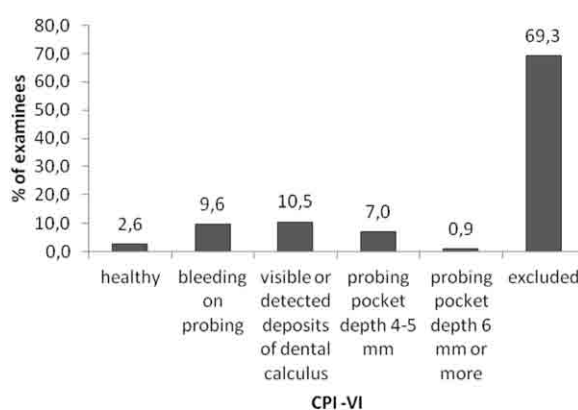


Figure 6. Values of the CPI index in the 6th sextant.

A statistical analysis of the obtained data was performed using software system SPSS for Windows (version 13.0, SPSS Inc., Chicago, Illinois, USA) and Microsoft Excel (versions 11, Microsoft Corporation, Redmond, WA, USA). Nominal variables were tested using χ^2 test. Normality of distribution of continuous variables was tested using Kolmogorov-Smirnov test. The probability of error was accepted at $\alpha < 0.05$, and the differences between groups were accepted as statistically significant at $p < 0.05$.

RESULTS

There were significantly more female subjects who participated in this investigation (71 females, 62.3% vs. 43 males, 37.7%) (χ^2 test=6.887; df=1; p=0.009). Most frequently they had only high school education (χ^2 test=56.526; df=3; p<0.001). The average age for all subjects was 79.03 ± 6.7 years. The youngest subject was 54, while the oldest was 96 years of age.

Statistical analysis of the CPI showed that, for all the sextants, the most numerous group of subjects was the one with excluded sextants (Figures 1, 2, 3, 4, 5 and 6). For all the subjects tested, the most frequent findings were the excluded sextants (χ^2 test=254.000; df=5; p<0.001). The

greatest number of teeth was registered in the fifth sextant. Following the excluded sextants, the most numerous were the sextants with visible deposits of dental calculus, and those with positive bleeding on probing.

Statistical analysis of the CAL through the sextants showed that the excluded group was consistently the most frequent finding, followed by the group with CAL of 4–5 mm (Figures 7, 8, 9, 10, 11 and 12).

DISCUSSION

Percentage of the older people in developed countries grows continuously. According to the 2001 census, one sixth of the Croatian population is above 65 years of age. Previously published investigations demonstrated a widely spread problem of oral health issues in nursing home residents. Some of the problems include poor oral hygiene, significant number of cavities, periodontal disease and lesions of oral mucosa, as well as a growing need of dental care and therapy (10, 11, 12).

This research was performed within the biggest nursing home of the Split-Dalmatia County, where the protégés were not only from the city of Split, but also from all

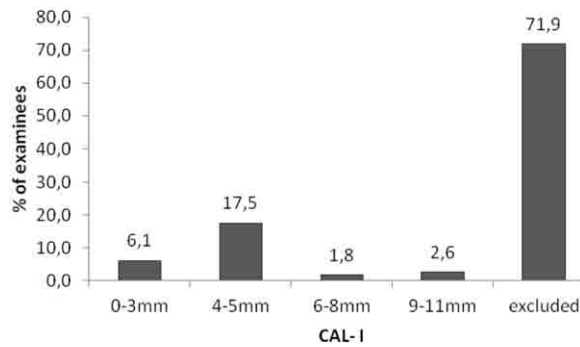


Figure 7. Clinical attachment loss in the 1st sextant.

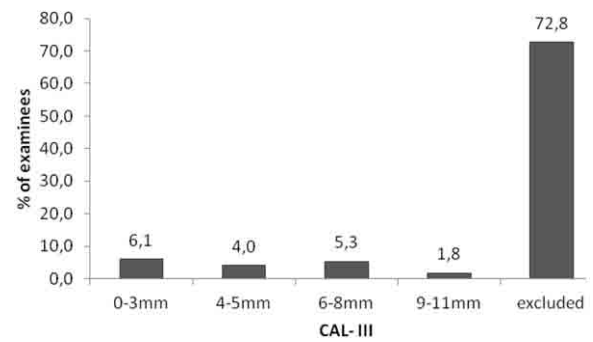


Figure 9. Clinical attachment loss in the 3rd sextant.

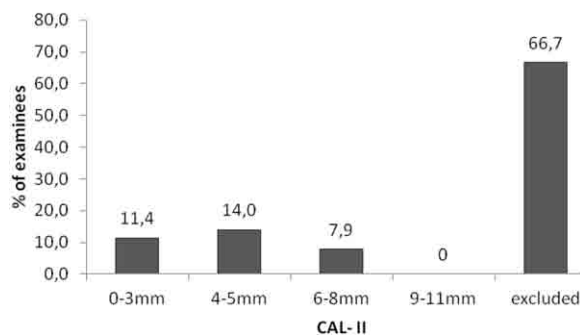


Figure 8. Clinical attachment loss in the 2nd sextant.

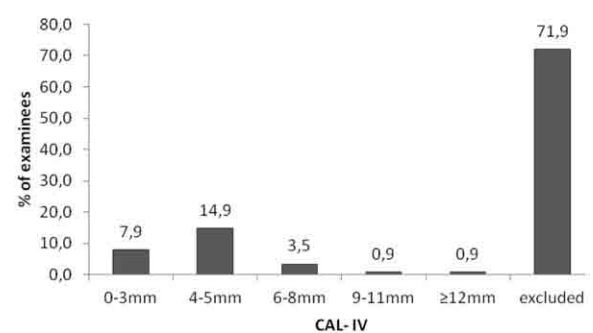


Figure 10. Clinical attachment loss in the 4th sextant.

parts of the County. Numerous protégés were born in the rural regions, while for many World War II or poverty suspended the education. Out of 114 subjects involved in the investigation, 44.7% graduated from high school, 39.5% completed only elementary school, while just slightly above 2% of the subjects graduated from college or university. In a similar investigation performed at the Dental Polyclinic Zagreb in 2009, subjects with high school diploma dominated (44% of females and 52% of males), while the percentage of subjects with college/university degree was slightly greater (13).

The values of the Community Periodontal Index were represented through the sextants. In all the sextants, the greatest percentage of teeth were excluded since there were <2 teeth per sextant. The least frequently excluded teeth were from the fifth sextant (47.4%), while the most frequently excluded teeth were from the third and fourth sextants (72.8%). The excluded sextants were followed by those with dental calculus deposits which were either obvious before or detected upon inspection. There were only a few healthy teeth, from 0.9% in the fifth to 5.3% in the second sextant. Investigation by Ferreira *et al.* showed that the greatest percentage of excluded teeth was 78.2%, while the included ones most frequently had probing pocket depths from 4 to 5 mm (14).

A Spanish investigation performed in 2005 included a total of 459 subjects. Bleeding on probing and calculus

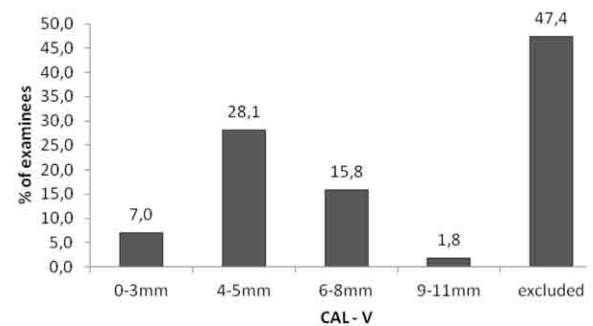


Figure 11. Clinical attachment loss in the 5th sextant.

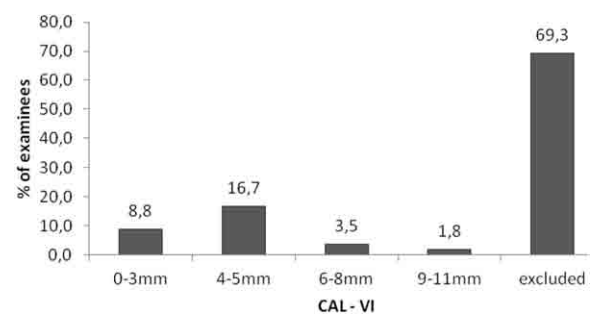


Figure 12. Clinical attachment loss in the 6th sextant.

were detected in 47% of the subjects, while 9% had periodontal pockets. Excluded sextants were fewer compared to our investigation (15). The results were quite similar regarding the CPI and clinical attachment loss, with prevalence of excluded sextants. Following those, most frequent were the teeth with CAL of 4–5 mm (range 14–28%). Such results were also reported by the researchers from the Dental Polyclinic Zagreb, where excluded sextants dominated (13). Brazilian group of investigators recorded the greatest frequency of CAL equaling 4–5 mm (47%) in the included sextants (14).

Older persons often have poor oral hygiene and suffer from periodontal disease, which predisposes them to root caries, tooth loss, speech and feeding difficulties, and potential aggravation of already existing chronic illnesses such as diabetes and cardiovascular diseases. Therefore it seems necessary to encourage preventive examinations performed by the dentists who, on the other hand, need to put an effort to prevent the progression of periodontal disease and sustain the older people's quality of life. Dentists of the National Health Network are able to successfully treat the cases of mild to moderate periodontitis, in cooperation with the general practitioners and through good communication with the patients. Special attention must be paid to the nursing home residents, since they have been shown to have poorer oral health care, coupled with the lack of regular control examinations at the dental office.

REFERENCES

- PETERSEN P E, YAMAMOTO T 2005 Improving the oral health of older people: the approach of the WHO Global Oral Health Program. *Community Dent Oral Epidemiol* 33: 81–92
- Popis stanovništva 2001 [Internet]. Zagreb: Državni zavod za statistiku Republike Hrvatske; 2001 [citirano 27.11.2012.]. Dostupno na: <http://www.dzs.hr/Hrv/censuses/Census2001/census.htm>
- TOPIĆ B 2005 Oralne bolesti vezane uz dob. U: Cekić-Arambašin A (ur.) Oralna medicina. Školska knjiga, Zagreb, str. 88–97
- PETERSEN P E, OGAWA H 2005 Strengthening the prevention of periodontal disease: the WHO approach. *J Periodontol* 76(12): 2187–93
- PIHLSTROM B L, MICHALOWICZ B S, JOHNSON N W 2005 Periodontal diseases. *Lancet* 366: 1809–20
- LANG N P, MOMBELLI A, ATTSTROM R 2004 Zubni plak i kamenac. In: Jorgić-Srdjak K, Plančak D, Bošnjak A (ed) Klinička parodontologija i dentalna implantologija. Nakladni zavod Globus, Zagreb, p 81–105
- MACK F, MOJON P, BUDTZ-JØRGENSEN E, KOCHER T, SPLIETH C, SCHWAHN C, BERNHARDT O, GESCH D, KORDASS B, JOHN U, BIFFAR R 2004 Caries and periodontal disease of the elderly in Pomerania, Germany: results of the Study of Health in Pomerania. *Gerodontology* 21(1): 27–36
- GAUTAM D K, JINDAL V, GUPTA S C, TULI A, KOTWAL B, THAKUR R 2011 Effect of cigarette smoking on the periodontal health status: A comparative, cross sectional study. *J Indian Soc Periodontol* 15(4): 383–7
- SHIP J A 2006 Bolesti usne šupljine u starijoj životnoj dobi. In: Mravak Stipetić M (ed) Burketova Oralna medicina. Dijagnoza i liječenje. Medicinska naklada, Zagreb, p 605–22
- MCMILLAN A S, WONG M C M, LO E C M, ALLEN P F 2003 The impact of oral diseases among institutionalized and non-institutionalized elderly in Hong Kong. *J Oral Rehab* 30: 46–54
- BOEHM T K, SCANNAPIECO F A 2007 The epidemiology, consequences and management of periodontal disease in older adults. *J Am Dent Assoc* 138: 26–33
- REED R, BRODER H L, JENKINS G, SPIVACK E, JANAL M N 2006 Oral health promotion among older persons and their care providers in a nursing home facility. *Gerodontology* 23: 73–8
- KLAIĆ B, OGRAJŠEK-ŠKUNCA D, ČATOVIĆ A, TOMEK-ROKSANDIĆ S, SZIROVICZA L, CEKIĆ-ARAMBAŠIN A, JORGIĆ-SRDJAK K, PLANČAK D, BAUČIĆ I, KOMAR D, ČELEBIĆ A, CAREK V 2012 Stanje oralnog zdravlja osoba starije dobi u gradu Zagrebu. Stomatološka poliklinika Zagreb, Zagreb.
- FERREIRA R C, MAGALHÃES C S, ROCHA E S, SCHWAMBACH C W, MOREIRA A N 2009 [Oral health among institutionalized elderly in Belo Horizonte, Minas Gerais State, Brazil]. *Cad Saude Publica* 25(11): 2375–85
- IGLESIAS CORCHERO A M, GARCÍA CEPEDA J R 2008 Oral health in people over 64 years of age, institutionalized in Centres for the Aged in the Vigo Health District Spain, 2005. *Med Oral Patol Oral Cir Bucal* 13(8): E523