International Journal for Modern Trends in Science and Technology, 9(02): 214-220, 2023

ISSN: 2455-3778 online
DOI: https://doi.org/10.46501/IJMTST0902039
Available online at: http://www.ijmtst.com/vol9issue02.html

The Effects of Narcotic Drug and Cigarette on Oral Lesions and Caries

Arshia Nadali

Medical university of silesia

To Cite this Article
Arshia Nadali. The Effects of Narcotic Drug and Cigarette on Oral Lesions and Caries. International Journal for Modern Trends in Science and Technology 2023, 9(02), pp. 214-220. https://doi.org/10.46501/IJMTST0902039

Article Info
Received: 18 January 2023; Accepted: 16 February 2023; Published: 24 February 2023.

ABSTRACT

There is a lot of talk in the dental community about occurrence of oral lesions and caries due to narcotic drug use, because generally the issue of narcotic drug use is of particular importance. Therefore, the objective of this work is to understand what the most obvious oral lesions and tooth caries are and the dentist can diagnose them. Materials and Methods: To carry out this bibliographic study, scientific article searching is conducted by referring to a scientific database. Findings were studied only to capture the items that were consistent with the selected issue. Findings: Information sources confirmed the relation between poor general health status and more specifically, the poor condition of oral and dental health. Conclusion: The most associated manifestations of caries are tooth loss and cancerous oral lesions. These observations were present in most of the cases studied. All of these are consequences of narcotic drugs and lifestyles that have been studied by drug users.

KEYWORDS: - Narcotic drugs, Oral lesions, Tooth caries, Narcotic drug use.

1. LITERATURE REVIEW

Oral diseases represent a public health problem that has gained increasingly importance in social awareness. This matter, in addition to the reducing quality of life due to the loss of dental parts [1,2], due to the increasing evidence of a potential impact on overall health that exposure to gum infection is the most important oral disease [3,4]. This particular disease is known for its involvement and potential impact on public health processes, a feedback mechanism has been suggested, for example, in the relationship between oral and dental infection and uncontrolled caries, with both diseases feeding off each other's deregulation [5].A recent systematic review highlights this fact and points to the need to take measures in the dental environment at the level of smoking cessation, sugar reduction and weight control in patients at risk for disease or a combination of the following diseases: Periodontal disease, tooth caries, diabetes, cardiovascular disease and some cancers [6]. A recent cohort study recorded a synergistic effect between periodontal disease and smoking on the increased risk of lung cancer, somewhat beyond the sum of the independent effects [7]. A recent review of the literature demonstrates periodontal disease and tobacco use as risk factors for rheumatoid arthritis [8], while a review of other literature demonstrated a relation between periodontal disease and coronary heart disease with chronic renal disease [9].

However, confirming the causal relationship between systemic conditions and chronic oral diseases requires further research beyond biologically acceptable mechanisms that, despite their abundance [10], have

failed to demonstrate this causality [11], such as the relationship between narcotic drug use and periodontitis and caries. . Due to the complexity of chronic oral and systemic diseases, there is still a restriction to the ability of identifying specific environmental causes and the host's sensitivity to adverse health consequences, especially if these diseases are dependent on multiple factors, if they occur after prolonged exposure, or related to subtle disorders and subclinical stages of the disease. In order to overcome this problem, epidemiological surveillance is considered as the current method of public health, which highlights paying attention to the risks, resources and related routes of exposure and health consequences [12].

The objective of this study was to provide an insight into the prevalence of periodontitis, caries and peri-implant pathology and to compare their prevalence inferentially between healthy and systemically injured patients using an epidemiological surveillance system established in a private oral rehabilitation group.

This prospective open cohort study was performed in four clinical centers of Iran. This study was approved by an independent ethics committee (Health Ethics Committee, License No. 005/2012). The study population included patients over 18 years of age of both genders. The study population is higher with the average socio-economic status.

Study inclusion criteria were patients with natural teeth or dental implants, gum and oral infections and were followed up in four centers. Study exclusion criteria were patients under 18 years of age and patients without natural teeth or dental implants and patients with removable prosthesis. Examinations were performed by 22 trained physicians. The reliability evaluation of annual dental examinations was performed with 30 patients for each pathology, (periodontitis, caries and pathology, etc.). Overall inter rater reliability was estimated using the weighted mean of the binary reliability estimates of inter rater. The inter rater reliability results for weight kappa scores during the three year follow up for drug-induced gingivitis and intraoral disease were 0.84, 0.83 and 0.84, respectively. For caries, it was 0.88, 0.89 and 0.87, and for peri-implant pathology it was 0.85, 0.84 and 0.83. The epidemiological surveillance study was performed with the inclusion and follow up of patients between 6 months. A total of 1000 patients were observed during the follow up study, each patient having different follow up periods. The increase and number of clinic visits varies.

At each clinical visit, a digital form is completed and sent to the database. Completed information included observation dates, physician identification, and patient information. Independent variables were: code, age (by year), gender, systemic problems (presence and identification or absence). This information was collected through a history questionnaire with a set of medications or patient treatments that were updated in each clinical session according to the protocol.

The dependent variables were: oral infectious disease (presence or absence), caries (presence or absence), peri-implant pathology (presence or absence), gingivitis (presence or absence) and mucositis (presence or absence) given to the following definitions:

According to the American Academy of Periodontology, periodontitis was defined as inflammation of the gums and adjacent adhesions with loss of clinical adhesions and loss of adjacent supporting bone [13]. According to WHO criteria, caries was defined as decay lesions of dentin cavities or the presence of a new repair [14]. Peri-implant pathology was defined as the presence of peri-implant envelopes, vertical bone loss, and loss of connectivity [15] in implants with at least one year of follow up. Gingivitis was defined as gum inflammation in the absence of clinical adhesion loss [16]. Mucositis was defined as inflammation of the mucosa dental peri-implant without symptoms of vertical bone or loss of connectivity [15].

2. STATISTICAL ANALYSIS

Descriptive and inferential analysis of data was carried out. The prevalence of each chronic or acute disease (dependent variables) was calculated. The prevalence of malignant conditions was calculated in terms of general health, ie: hepatitis, cardiovascular conditions, thyroid conditions, diabetes, rheumatic status (rheumatoid arthritis, osteoarthritis, fibromyalgia, osteoporosis), oncological conditions, inflammatory conditions (Crohn's disease, multiple sclerosis) neurological disorders (Parkinson's disease, Alzheimer's disease, sclerosis, epilepsy), autoimmune conditions (lupus), HIV, renal disease, genetic conditions (trisomy 21),

syndromes (Sjogren's syndrome, Meniere syndrome), and smoking habits (present or absent). The list of conditions was decided based on the possible impact of oral disease. Respiratory conditions were not considered due to the reported effect of cariogenic or periodontal pathogens on respiratory diseases and not vice versa [17]. The relationship between systemic status and prevalence of each oral disease was estimated through multivariate conditional regression models. For each oral disease, two models were estimated: a general model with age variables (</= 48 years,> 48 years), gender, and systemic status (healthy, one systemic status, more than one systemic status) as potential predictors. And another specific disease model with age, gender, hepatitis, cardiovascular condition, thyroid condition, diabetes, rheumatic conditions, HIV+, oncological conditions, inflammatory conditions, neurological conditions, autoimmune conditions, renal conditions, genetic conditions, syndromes and smoking habits as potential predictors. Variables were introduced at once (not step by step). Raw and adjusted odds ratios (OR) with 95% confidence intervals (95% CI) were estimated in both models for each oral disease [18]. Sensitivity analysis was performed to evaluate the effect of "follow up length" on the results, without significant changes in the correlation matrix, or risk indicators in the direction and magnitude for each of the three chronic oral diseases after adjustment. The fit of the model was evaluated by Hosmer and Lemeshow tests. A significance level of 5% was determined. Attributable fractions (AF) are impact criteria to show the percentage of cases that may be prevented if the exposure to the risk factor is suppressed [19].

3. RESULTS

A total of 1000 patients were observed during the follow up period between 6 months last year, including 415 female (41.1%) and 585 male (58.9). Percent with an average age of 48.5 years (standard deviation 15.6 years).

Due to acute conditions, gum and tooth disease due to narcotic drug use was 53.7% (n = 1000). While for mucositis, the prevalence was calculated to be 55.6%. About 142 patients (65.6%), at least one of them had acute oral disease. In total, 250 patients (23%) were free of any acute or chronic disease. The number of patients with at least one chronic oral disease was in accordance with 303 (46.5%).

In total, (23%) were free of any acute or chronic disease. The number of patients with at least one chronic oral disease was in accordance with (46.5%) and (53.5%) were free of chronic oral disease. The total number of patients with periodontitis was 347, which corresponds to a prevalence of 17.6%. Periodontitis occurred in 781,180 patients with systemic problems (23.4%) and 127,167 patients without systemic conditions (13.8%), (Table 1). Given to the multivariate regression analysis for periodontitis, the overall model was revealed, age> 48 years [OR = 2.64, 95% confidence interval (2.44; 2.87)], female gender OR = 1.46, 95% confidence interval (CI) (1.36; 1.58), the presence of a systemic condition OR = 1.25, 95% CI (1.14; 1.37) and smoking OR = 1.90, 95% CI (1.74; 2.07) as risk indicators. While in the specific systemic status model, age> 48 years OR = 2.67, 95% CI (2.46; 2.91)], male gender OR = 1.44, 95% CI (1.33; 1.56), diabetes OR = 1.49, 95% confidence interval (CI) (1.24; 1.79), HIV+ OR = 4.37, 95% CI (1.05; 18.24) and smoking habits OR = 1.90, 95% CI (1.74; 2.07) were revealed as risk indicators (Table 3). The presence of a systemic condition resulted in an attributable fractions of 12.2%, while smoking habits, diabetes, and HIV+ attributable components were, 5%37, and 1.2%, respectively (Table 3). Tooth decay was diagnosed in 7263 patients, indicating a prevalence of 36.6%. Tooth decay occurred in 781,308 patients with systemic problems (38.3%) and 127.45 patients without systemic diseases (35.4%), (Table 1).

	Periodontitis Prevalence	Caries prevalence	Peri-implant pathology prevalence
Global sample	3497/19868=17.6%	7263/19868=36.6%	1652/11863=13.9%
Healthy	1657/12007=13.8%	4255/12007=35.4%	729/5875=12.4%
Systemic condition	1840/7861=23.4%	3008/7861=38.3%	921/5988=15.3%
Hepatitis	32/144=22%	49/144=34%	16/106=15.1%
Cardiovascular	747/3061=24.4%	1125/3061=36.8%	394/2845=13.9%
Thyroid	134/630=21.3%	241/630=38.3%	71/566=12.5%
Diabetes	195/624=31.2%	251/624=40.2%	92/583=15.8%
Rheumatologic	144/698=20.6%	230/698=33%	103/693=14.9%
HIV	11/21=52.4%	11/21=52.4%	6/27=22.2%
Oncological	77/343=22.4%	130/343=37.9%	46/321=14.3%
Inflammatory	10/74=13.5%	26/74=35.1%	9/46=19.6%
Neurologic	30/140=21.4%	71/140=50.7%	15/120=12.5%
Autoimmune	8/58=13.8%	20/58=34.5%	4/43=9.3%
Renal	2/21=9.5%	8/21=38.1%	1/17=5.9%
Genetic	3/11=27.3%	5/11=45.5%	2/7=28.6%
Syndrome	2/14=14.3%	8/14=57.1%	2/12=16.6%
More than one systemic condition	398/1526=26.1%	592/1526=38.8%	259/1532=16.9%
Smoking habits	951/3872=24.6%	1548/3872=40%	498/2536=19.6%

(Table 1) Chronic oral and dental diseases according to the systemic status of patients due to narcotic drug use

According to multivariate regression analysis for tooth decay, the overall model was revealed, age> 48 years OR = 0.78, 95% CI (0.73; 0.83) as a protective factor, and male gender OR = 1.08, 95% CI (1.02); 1.14), existence of a systemic state OR = 1.12, 95% confidence interval (CI) (1.04; 1.21)], existence of more than one systemic state OR = 1.27, 95% CI (1.10; 1.46) and smoking OR = 1.18, 95% confidence interval (CI) (1.09; 1.27) as risk indicators. While in the specific systemic status model, age> 48 years OR = 0.78, 95% CI (0.74; 0.84) as protective factor and male gender OR = 1.06, 95% CI (1.01; 1.13), cardiovascular condition OR = 1.10, 95% CI (1.01; 1.20)], diabetes [OR = 1.24, 95% CI (1.05; 1.46), neurological status [OR = 1.84, 95% CI (1.32; 2.57) and smoking habits [OR = 1.18 95% confidence interval (CI) (1.09; 1.27) was revealed as risk indicators (Table 2). The presence of systemic conditions resulted in a combined attributable fractions of 6.7%, while smoking habits, cardiovascular status, diabetes, and neurological conditions were 7%, 3%, 1.7%, and 1.3%, respectively (Table 2).

Variables	Odds ratio (OR) Crude values (95% CI)	p-value	Odds ratio (OR) Adjusted values (95% CI)	p-value	Attributable fraction[c]
Age		p<0.001		p<0.001	
< 48 years	1.0 (reference)		1.0 (reference)		
> 48 years	2.62 (2.43;2.83)		2.64 (2.44;2.87)[a,b]		
Gender		p<0.001		p<0.001	
Female	1.0 (reference)		1.0 (reference)		
Male	1.44 (1.34;1.55)		1.46 (1.36;1.58)[a,b]		
Systemic status		p<0.001		p<0.001	
Healthy	1.0 (reference)		1.0 (reference)		
One systemic condition	1.92 (1.78;2.07)		1.25 (1.14;1.37)[a]		12.2%
More than one systemic condition	1.86 (1.59;2.19)		1.12 (0.95;1.32)[a]		
Smoking		p<0.001		p<0.001	
Non-smoker	1.0 (reference)		1.0 (reference)		
Smoker	1.72 (1.58;1.87)		1.90 (1.74;2.07)[a,b]		37%
Systemic status					
Hepatitis	1.34 (0.90;1.99)	p=0.145	1.02 (0.67;1.53)[b]	p=0.943	
Cardiovascular	1.65 (1.51;1.81)	p<0.001	1.10 (0.99;1.22)[b]	p=0.065	
Thyroid	1.28 (1.05;1.55)	p=0.014	1.16 (0.95;1.42)[b]	p=0.148	
Diabetes	2.20 (1.85;2.61)	p<0.001	1.49 (1.24;1.79)[b]	p<0.001	5%
Rheumatologic	1.23 (1.02;1.48)	p=0.033	0.96 (0.79;1.16)[b]	p=0.664	
HIV+	9.38 (2.34;37.51)	p=0.002	4.37 (1.05;18.24)[b]	p=0.043	1.2%
Oncologic	1.36 (1.06;1.76)	p=0.018	1.09 (0.84;1.42)[b]	p=0.507	
Inflammatory	0.73 (0.38;1.42)	p=0.357	0.78 (0.40;1.55)[b]	p=0.477	
Neurologic	1.28 (0.85;1.92)	p=0.234	1.19 (0.78;1.80)[b]	p=0.424	
Autoimmune	0.75 (0.36;1.58)	p=0.447	0.79 (0.37;1.69)[b]	p=0.544	
Renal	0.49 (0.12;2.12)	p=0.341	0.40 (0.09;1.76)[b]	p=0.225	
Genetic	1.76 (0.47;6.62)	p=0.406	2.37 (0.60;9.39)[b]	p=0.218	
Syndrome	0.78 (0.18;3.49)	p=0.745	0.79 (0.17;3.64)[b]	p=0.765	

(Table 2) Multivariate analysis and attributable fractions for risk indicators

Peri-implant pathology was diagnosed in 152 patients, indicating a prevalence of 13.9%. Peri-implant pathology occurred in 588.91 patients with systemic problems (15.3%) and 575.79 patients without systemic involvement (12.4%), (Table 2). According to multivariate regression analysis for peri-implant pathology, the overall model showed that age> 48 years OR = 1.87, 95% CI (1.64; 2.14) and smoking OR = 1.84, 95% CI (1.64; 2.07) as risk indicators; while in the specific systemic status model, age> 48 years OR = 1.87, 95% confidence interval CI (1.64; 2.13) and smoking habits OR = 1.84, 95% CI (1.64; 2.07) were revealed as risk indicators. . Existence of smoking habits resulted in a 39% attributable fractions.

4. DISCUSSION

According to the authors, this was the first epidemiological surveillance study designed for dentistry, which also recorded data on three major oral diseases. The objective of present study was to provide an insight into the prevalence of three major oral diseases in a population pursued in a private rehabilitation center. Epidemiological surveillance plays an important role in clinical practice. Its main objective is to provide ongoing technical guidance to health professionals who are responsible for deciding on the implementation of disease control measures, and for this purpose, up-to-date information on the occurrence of these diseases as well as the factors that cause conditions in the population are defined. Alternatively, epidemiological surveillance is an important tool for planning, organizing and implementing health services as well as normalizing related technical activities [12]. This is especially important for non-communicable diseases such as periodontitis, caries or peri-implant pathology, which are usually treated in a private office. The present study was conducted in a private setting, although the sample size and large distribution based on different regions of the territory, due to the higher estimated socio-economic status of the study population, do not represent the total population of country. According to a cross-sectional national study by the Ministry of Health, the adult population for attending private offices was estimated at 40.6% and 59% in less than a year and between 54.3% and 80.4% in one to two years, year [20]. This ensures a cautious interpretation of the results. The estimated prevalence limit in the adult population of periodontitis and dental caries was 10.8% -15.3% and 32.4% -98.1%, respectively [20]. The prevalence of oral and dental diseases varied according to each category. The prevalence of periodontitis recorded in the present study was 17.6%, slightly higher than the previously published threshold (10-15%) in national [20] and international [21] studies, a difference that may be explained by the study

environment. A private rehabilitation center with increasing demand for fixed prosthesis rehabilitation with implants, in addition, a significant relation of age> 48 years, gender, and the presence of a systemic disease with the prevalence of periodontitis suggests caution when administering these patients, given the approximately 10% higher prevalence recorded in this study compared to healthy patients. A meta-analytic study examining the relationship between periodontal disease and CVD in observational studies, which showed that the overall adjusted risk of brain stroke was 1.47 to 2.63 times higher in people with periodontitis than in those without periodontitis (prospective and retrospective studies, respectively) 3]. In addition, the harmful relation of smoking habits with a 90% increase in the probability of periodontitis recorded in the present study was previously reported in a study of smoking-related periodontitis in many countries, which accounted for 74.8% of periodontitis cases to smoking [22].

The prevalence of dental caries was the highest among the three chronic diseases (36.6%) and represented the main oral disease in the study sample in the range of a national population study (32.4% - 98.1%) [13].

A lower prevalence of peri-implant pathology (13.9%) was recorded compared to recent systematic reviews (18.8% -22%) [25,26]. This difference is probably related to the higher follow up period recorded in the systematic reviews compared to the 3 years of the present study. The present study recorded the detrimental effect of smoking habits on the prevalence of peri-implant pathology when adjusted for age, gender, and systemic conditions. A systematic review that estimated the overall prevalence of peri-implant diseases in general and high-risk patients recorded a higher prevalence of peri-implant diseases in smokers [25]. A recent cross-sectional study evaluating the prevalence of peri-implant diseases and its associated factors showed a prevalence ratio of 2.25 for patients with systemic disease and 2.94 for patients taking the drug, a ratio that after multiple logistics regression analysis remained significant. Drug use has been adjusted for other variables of interest with a prevalence ratio of 1.23 [27].

However, underlying factors such as lifestyle may play an important role in the risk of oral and dental disease. This association between lifestyle factors and tooth decay and periodontitis has been previously recommended. The results of a recent consensus (based on a narrative review) on the interaction of lifestyle, behavior, or systemic diseases with tooth decay and periodontal disease suggest diet and smoking as potential risk factors for caries and periodontal disease [28]. In addition, there is strong evidence of an relation between lifestyle factors (such as diet, smoking, alcohol abuse, physical inactivity) and systemic diseases such as diabetes [29,30] cardiovascular disease [29], or cancer [29,31] was previously reported. This association should initiate programs that promote healthy lifestyle behaviors, not only to reduce the incidence of important systemic conditions but also to reduce the potential for oral disease. Prevalence figures for the three chronic oral diseases indicate their burden on the population, with approximately 46.5% of the group affected by at least one chronic oral pathology. Given that 65.6% of the samples with acute conditions (gums and mucositis) were at increased risk of chronic disease, the importance of the epidemiological approach in the prevention and control of oral diseases can be confirmed, in this epidemiological condition. The monitoring system of this approach can have a positive effect on the result by identifying the risk factors for the occurrence of diseases, the possibility of determining the risk profile of each patient and providing customized care appropriate to the patients. An example of this epidemiological approach is the "Accurate Medical Initiative", described by the National Institutes of Health as an emerging approach to preventing and treating disease by considering individual changes in individuals' genes, environment, and lifestyle, to accelerate our understanding of individual diversity and its impact on the onset, progression, prevention and treatment of disease [33].

5. CONCLUSION

Due to the limitations of this study, it can be concluded that the incidence of major oral and dental diseases due to the use of narcotic drugs is high in this private office and there is a significant difference between healthy and systemically unhealthy patients. Smoking habits was the only factor associated with all chronic oral diseases, and suppressing it could potentially have greater health benefits by reducing the incidence of dental caries, periodontitis, and peri-implant pathology.

Conflict of interest statement

Authors declare that they do not have any conflict of interest.

REFERENCES

[1] C.M. Stanford, Dental implants. A role in geriatric dentistry for the general practice?, J. Am. Dent. Assoc. 138(2007) S34-S40.

[2] F.N. Hugo, J.B. Hilgert, L.M. de Sousa, J.A. Cury, Oral status and its association with general quality of life in older independent-living south-Brazilians, Community. Dent. Oral. Epidemiol. 37 (2009) 231-240.

[3] G.S. Sfyroeras, N. Roussas, V.G. Saleptsis, C. Argyriou, A.D. Giannoukas, Association between periodontal disease and stroke, J. Vasc. Surg. 55 (2012) 1178-1184.

[4] M. Ogrendik, Rheumatoid arthritis is an autoimmune disease caused by periodontal pathogens, Int. J. Gen. Med. 6 (2013) 383–386.

[5] A.N. Gurav, Periodontal therapy -- an adjuvant for glycemic control, Diabetes. Metab. Syndr. 6 (2012) 218-223.

[6] R.J. Genco, F.D. Genco, Common risk factors in the management of periodontal and associated systemic diseases: the dental setting and interprofessional collaboration, J. Evid. Based. Dent. Pract. 14 (2014) S4-S16.

[7] X. Mai, M.J. LaMonte, K.M. Hovey, N. Nwizu, J.L. Freudenheim, M. Tezal, F. Scannapieco, A. Hyland, C.A. Andrews, R.J. Genco, J. Wactawski-Wende, History of periodontal disease diagnosis and lung cancer incidence in the Women's Health Initiative Observational Study, Cancer. Causes. Control. 25 (2014) 1045-1053.

[8] J.U. Scher, W.A. Bretz, S.B. Abramson, Periodontal disease and subgingival microbiota as contributors for rheumatoid arthritis pathogenesis: modifiable risk factors?, Curr. Opin. Rheumatol. 26 (2014) 424-429.

[9] M.A. Fisher, W.S. Borgnakke, G.W. Taylor, Periodontal disease as a risk marker in coronary heart disease and chronic disease, Curr. Opin. Nephrol. Hypertens. 19 (2010) 519-526.

[10] M. Kumar, L. Mishra, R. Mohanty, R. Nayak, "Diabetes and gum disease: the diabolic duo", Diabetes. Metab. Syndr. 8 (2014) 255-258. doi:10.1016/j.dsx.2014.09.022.

[11] G.E. Salvi, B. Carollo-Bittel, N.P. Lang, Effects of diabetes mellitus on periodontal and peri-implant conditions: update on associations and risks, J. Clin. Periodontol. 35 (2008) 398-409. doi: 10.1111/j.1600-051X.2008.01282.x.

[12] Ministério da Saúde, Secretaria de Vigilância em Saúde, Guia de vigilância epidemiológica, sixth ed., Ministério da Saúde, Secretaria de Vigilância em Saúde, Brasília (Brasil), 2005.

[13] American Academy of Periodontology, Parameter on plaque-induced gingivitis, J. Periodontol. 71(2000) S853-S858.

[14] World Health Organization, Oral health surveys: basic methods, fifth ed., World Health Organization, Geneva (Switzerland), 2013.

[15] M. de Araújo Nobre, A. Mano Azul, E. Rocha, P. Maló, Risk factors of peri-implant pathology, Eur. J. Oral. Sci. 123 (2015) 131-139.

[16] American Academy of Periodontology, Parameter on plaque-induced gingivitis, J. Periodontol. 71 (2000) S851-S852.

[17] A. Azarpazhooh, J.L. Leake, Systematic review of the association between respiratory diseases and oral health, J. Periodontol. 77 (2006) 1465-1482.

[18] N. Pearce, Effect measures in prevalence studies, Environ. Health. Perspect. 112 (2004) 1047-1050.

[19] K.J. Rothman, S. Greenland, C. Poole, T.J. Lash, Causation and causal inference, in: K.J. Rothman, S. Greenland (Eds.), Modern Epidemiology, 2nd ed., Lippincott Williams & Wilkins, Philadelphia, 1998, pp. 6-20.

[20] R. Calado, C.S. Ferreira, P. Nogueira, P. Melo, III Estudo Nacional de Prevalência das Doenças Orais, Direção-Geral da Saúde, Lisboa (Portugal), 2015.

[21] P.N. Papapanou, Epidemiology of periodontal diseases: an update, J. Int. Acad. Periodontol. 1 (1999) 110-116.

[22] S.L. Tomar, S. Asma, Smoking-attributable periodontitis in the United States: findings from NHANES III. National Health and Nutrition Examination Survey, J. Periodontol. 71 (2000) 743-751.

[23] X. Cao, D. Wang, J. Zhou, H. Yuan, Z. Chen, The relationship between dental caries and metabolic syndrome among 13,998 middle-aged urban Chinese, J. Diabetes. (2016) doi: 10.1111/1753-0407.12424.

[24] A.V. Ritter, J.S. Preisser, C.P. Puranik, Y. Chung, J.D. Bader, D.A. Shugars, S. Makhija, W.M. Vollmer, A Predictive Model for Root Caries Incidence, Caries. Res. 50 (2016) 271-278.

[25] M.A. Atieh, N.H. Alsabeeha, C.M. Faggion Jr, W.J. Duncan, The frequency of periimplant diseases: a systematic review and meta-analysis, J. Periodontol. 84 (2013) 15861598.

[26] J. Derks, C. Tomasi, Peri-implant health and disease. A systematic review of current epidemiology, J. Clin. Periodontol. 42 (2015) S158-S171.

[27] B.C. Gurgel, S.C. Montenegro, P.M. Dantas, A.L. Pascoal, K.C. Lima, P.D. Calderon, Frequency of peri-implant diseases and associated factors, Clin. Oral. Implants. Res. (2016), doi: 10.1111/cir.12944.

[28] I.L. Chapple, P. Bouchard, M.G. Cagetti, G. Campus, M.C. Carra, F. Cocco, L. Nibali, P. Hujoel, M.L. Laine, P. Lingstrom, D.J. Manton, E. Montero, N. Pitts, H. Rangé,

N. Schlueter, W. Teughels, S. Twetman, C. Van Loveren, F. Van der Weijden, A.R. Vieira, A.G. Schulte, Interaction of lifestyle, behaviour or systemic diseases with dental caries and periodontal diseases: consensus report of group 2 of the joint EFP/ORCA workshop on the boundaries between caries and periodontal diseases, J. Clin. Periodontol. 44 (2017) S39-S51.

[29] K. Strong, C. Mathers, S. Leeder, R. Beaglehole, Preventing chronic diseases: how many lives can we save?, Lancet. 366 (2005) 1578– 1582.

[30] L. Schwingshackl, G. Hoffmann, A.M. Lampousi, S. Knüppel, K. Iqbal, Schwedhelm C, A. Bechthold, S. Schlesinger, H. Boeing, Food groups and risk of type 2 diabetes mellitus: a systematic review and meta-analysis of prospective studies, Eur. J. Epidemiol. 2017 Apr 10. doi: 10.1007/s10654-017-0246-y.

[31] N. Khan, F. Afaq, H. Mukhtar, Lifestyle as risk factor for cancer: Evidence from human studies, Cancer. Lett. 28 (2010) 133-143. doi: 10.1016/j.canlet.2009.12.013. Epub 2010 Jan 18.

[32] National Institutes of Health, All of US research program, https://www.nih.gov/research-training/allofus-research-program/, 2015 (accessed 17.11.16).

[33] National Institutes of Health, Precision Medicine Initiative (PMI) Working Group, http://acd.od.nih.gov/pmi.htm/, 2016 (accessed 17.11.16).

[34] A. Sheiham, W.P. James, Diet and dental caries: The pivotal role of free sugars reemphasized, J. Dent. Res. 94 (2015) 1341-7.

[35] H. Zimmermann, N. Zimmermann, D. Hagenfeld, A. Veile, T.S. Kim, H. Becher, Is frequency of tooth brushing a risk factor for periodontitis? A systematic review and metaanalysis, Community. Dent. Oral. Epidemiol. 43 (2015) 116-27.

[36] S. Renvert, G.R. Persson, Periodontitis as a potential risk factor for peri-implantitis, J. Clin. Periodontol. 36 (2009) 9S-14S.

[37] M. Gerritsen, N. Berndt, L. Lechner, H. de Vries, A. Mudde, C. Bolman, SelfReporting of Smoking Cessation in Cardiac Patients: How Reliable Is It and Is Reliability Associated With Patient Characteristics?, J. Addict. Med. 9 (2015) 308-316. doi:10.1097/ADM.0000000000000137.