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SMOKING AND ORAL DISEASES - PERIODONTITIS

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This dissertation thesis has been done to obtain the Ph.D. degree at the Department of Hygiene and Preventive Medicine, Faculty of Medicine in Hradec Králové, Charles University in Prague, Czech Republic.

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1. INTRODUCTION

Tobacco represents the single most preventable cause of death in the world. Of 260 million deaths which occurred in the developing world between 1950 and 2000, it is estimated that 50 million were due to smoking. Globally, smoking related mortality is set to rise from 3 million annually (1995 estimate) to 10 million annually by 2030, with 70 % of these deaths occurring in developing countries (10). Since 1970, smoking prevalence among men has slightly decreased, but among women, teenagers and children, smoking has increased dramatically. Sixty percent of children are exposed to Environmental Tobacco Smoke (ETS) at their homes (17).

Portuguese introduced tobacco to India 400 years ago. Ever since, Indians have used tobacco in various forms. Two hundred years after the introduction of tobacco to India, the British introduced commercially produced cigarettes to India and established tobacco production in the country. Sixty five percent of all men and 33 % of all women in India use tobacco in some form. In 1997, World Health Organization (WHO) reported the prevalence of tobacco habits in India to be: Bidis (34 %), Cigarettes (31 %), Chewing tobacco (19 %), Hookah (9 %), Cigars-cheroots (5 %) and Snuff (2 %). But the data reported by Cancer Patients' Aid Association of India in 2004 reveals the prevalence to be: Cigarettes (20 %), Bidis (40 %) and the remaining 40 % is consumed as Chewing tobacco, Pan Masala, Snuff, Gutkha, Mishri and Tobacco toothpaste (7). Recent shifts in global tobacco consumption indicate that an estimated 930 million of the world's 1.1 billion smokers live in developing countries, with 182 million in India alone. By the year 2020, it is predicted that tobacco will account for 13 % of all deaths in India (24).

Czech Republic is among the ten countries with the highest rate of cigarette consumption worldwide. According to 2005 estimates by WHO, 31.1 % males and 20.1 % females smoke in Czech Republic (9). Along with overall rise in cigarette smoking, there has been a significant increase in the reported cases of periodontitis in the country.

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The infection or inflammation of periodontium is known as periodontitis. The pathogenesis of periodontal disease involves a complex interplay between plaque bacteria and a susceptible host. The inflammatory processes extend to affect all of the periodontal supporting structures (gingiva, periodontal ligament, cementum and alveolar bone), leading to the clinical signs of periodontitis. Breakdown of fibres of periodontal ligament occurs, resulting in clinical loss of attachment of the tooth to its supporting structures and resorption of alveolar bone follows. Pocket formation is evident, there is radiographic bone loss, and teeth may become mobile and may require extraction (21). Cigarette smoking is a significant risk factor for periodontal disease (25), demonstrated by an increased loss of attachment (2, 15, 23), development and progression of periodontal inflammation (12, 16) and increased gingival recession (18).

The Community Periodontal Index of Treatment Needs (CPITN) was developed for the 'Joint Working Committee' of the World Health Organization (WHO) and Federation Dentaire Internationale (FDI) by Jukka Ainamo, David Barmes, George Beagrie, Terry Cutress, Jean Martin, and Jennifer Sandro-Infirri in 1982. The CPITN procedure is recommended for epidemiological surveys of periodontal health. It uses clinical parameters and criteria relevant to planning and prevention of periodontal diseases and it records the common treatable conditions namely periodontal pockets, gingival inflammation and dental calculus. The CPITN is not intended as a comprehensive assessment of total past and present periodontal disease experience and it does not record irreversible changes such as gingival recession or other deviations from periodontal health such as tooth mobility or loss of periodontal attachment (20).

Association between cigarette smoking and various oral diseases such as leukoplakia and oral cancers has been well documented but the role of cigarette smoking in the causation of periodontitis, however has not been widely investigated in the Czech Republic. In this study, the CPITN index was used to evaluate the influence of cigarette smoking on periodontitis.

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2. AIMS OF THE STUDY

The primary aim of the study was to investigate the influence of cigarette smoking on periodontitis in Czech population. The secondary aim was to compare the results with those obtained from Indian population, taking into consideration that the differences in culture and race, socioeconomic status, oral hygiene measures and practices, and the use of tobacco in different forms like chewing tobacco and smoking bidi in India would have an impact on the final outcome of the study.

3. MATERIALS AND METHODS

The study was approved by the Ethics Committees of Charles University in Prague, Faculty of Medicine in Hradec Králové and SRM University Chennai, India. The Czech part of the research was conducted at the Department of Hygiene and Preventive Medicine and Department of Dentistry of Charles University Medical Faculty in Hradec Králové in cooperation with three private dentists. The Indian part of the study was simultaneously organized at SRM Dental College and Hospital, Chennai, India from July 2005 to February 2007.

3.1. Study population

Several studies used a representative sample (13,14), whereas most studies used a convenience sample such as volunteers or patients attending dental clinics (11,19) for collecting data. The participants of this study were patients of dentists cooperating with the study. The inclusion criterion was age between 30-69 years. Edentulous patients were excluded from the study. The participants were informed about the purpose of the study, an informed consent was taken and at the end of clinical examination, each participant was given instructions regarding dental treatment needs.

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3.2. Questionnaires

Two different sets of questionnaires were prepared; one for the Czech study population (in Czech language) and the other, with minor variations, for the Indian study population (in English). All participants of our study were requested to answer the questionnaire which included questions concerning their personal history, economic status, educational qualification, profession, general health status, food habits, frequency of dental visits, brushing habits, dental aids used and a detailed tobacco consumption history. Information collected on use of tobacco included current tobacco consumption status, duration and amount of tobacco use and form of tobacco use in case of Indian population. Possible forms of tobacco consumption in India that were considered in this study were: 1) tobacco with betel nuts and leaves 2) tobacco alone 3) bidi/chutta 4) cigarettes without filters 5) cigarettes with filters and 6) pipes and other forms. In case of cigarette or bidi/chutta smokers, they were classified into: 1) regular smokers 2) occasional smokers and 3) ex-smokers. Regular smokers were defined as individuals who, at the time of examination, smoked at least one cigarette daily. Occasional smokers were individuals who smoked less than one cigarette per day. Former or ex-smokers were defined as individuals who smoked at least 1 cigarette per day for 6 consecutive months and didn't smoke at least for the past 6 months from the time of the study. Since the use of smokeless tobacco, mostly in the form of chewing tobacco is prevalent in India, we further classified the Indian study population into 'consumers but non-smokers' and 'non-consumers'. 'Consumers but non-smokers' consisted of subjects who use tobacco in forms other than smoking and 'non-consumers' consisted of subjects who never used tobacco (at the time of study or in the past) in any form. In case of Czech study population, the most prevalent mode of tobacco consumption was smoking in different forms like cigarettes, pipes and cigars.

3.3. Clinical examination

The examiners in India and Czech Republic used a standard examination environment, standard equipment and followed detailed written instructions.

CPITN was recorded according to the codes and its respective inferences as given below:

Code	The description of condition
Code 0	Healthy periodontal tissues
Code 1	Bleeding on gentle probing
Code 2	Supragingival and/or subgingival calculus
Code 3	Shallow pockets up to 4-5 mm
Code 4	Deep pockets 6 mm or more
Code X	Sextant excluded (when less than two teeth present)

Mouth mirror and WHO-621 Trinity probe (22) set to give a constant probing force of 20-25 g as recommended, were used for the study in India and Czech Republic. The probe has a 0.5 mm diameter ball tip, which enhances detection of subgingival calculus or over-hanging restorative margins and limits false readings from over-measurement of probing depths. It also has a color-coded band extending 3.5 mm to 5.5 mm from the tip, which facilitates rapid interpretation of probing depths and markings at 8.5 mm, 11.5 mm and 15.2 mm. The CPITN probe is gently inserted into the gingival pocket and the depth of penetration read against the color-coded band. Intraoral sextants begin from the maxillary right sextant, proceeding in a clockwise manner and finishing in the mandibular right sextant. At least six points on each tooth (mesiobuccal, midbuccal, distobuccal, distooral, midoral and mesiooral) were examined by gently "walking the probe" around the tooth and for each sextant, only the highest score based on the highest probing value obtained on any tooth in that sextant was recorded. All fully erupted teeth, except third molars and retained roots, were examined. CPITN does not include measures of gingival recession, tooth mobility, intensity of inflammation, precise identification of pocket depths or differentiation between supra-gingival and subgingival calculus (7).

3.4. Data analysis

The statistical analysis of the data included the classification of data and calculation of frequencies and was performed by NCSS 2004 program. Mann-Whitney test or Kolmogorov-Smirnov test was used for comparing two groups (consumers and non-consumers or smokers and non-smokers) of quantitative data (e.g., age) and Kruskal-Wallis analysis of variance with multiple comparison tests was used for the five groups (regular smokers, occasional smokers, ex-smokers, 'consumers but non-smokers' and non-consumers) according to tobacco use. Chi-square test of independence in contingency tables or Fisher's exact test was used for qualitative data (e.g., CPITN, education, preventive dental visits, brushing habits, smoking habits). The level of significance was $\alpha = 0.05$.

4. RESULTS

4.1. Czech results

The Czech study group consisted of 339 males (49.9 %) and 340 females (50.1 %). Among regular smokers, 60.3 % were males and among non-smokers, 58.9 % were females.

The maximum CPITN score was calculated in percentage, by taking the maximum or worst findings from six sextants (max CPITN). Taking the CPITN scores in percentage of smokers and non-smokers in all sextants, non-smokers had higher percentage of healthy periodontium compared to smokers, smokers had lesser percentage of sites with bleeding on probing and higher percentage of sites with pocketing compared to non-smokers. A detailed description is given in table 1.

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Table 1: CPITN score (%) of smokers and non-smokers in each sextant:

	CPITN 0	CPITN 1	CPITN 2	CPITN 3	CPITN 4
1st sextant (p=0.076; χ^2 test)					
Smokers	5.6	27.2	13.9	34.5	7.3
Non-smokers	9.1	33.7	13.8	29.5	6.8
2nd sextant (p=0.016; χ^2 test)					
Smokers	17.4	31.7	24.0	15.0	5.2
Non-smokers	25.3	37.3	19.3	10.4	3.7
3rd sextant (p=0.021; χ^2 test)					
Smokers	7.0	23.7	16.4	32.8	9.8
Non-smokers	11.5	31.3	17.2	25.6	6.8
4th sextant (p=0.043; χ^2 test)					
Smokers	5.6	30.0	14.3	30.3	11.5
Non-smokers	10.2	35.2	14.1	27.2	6.5
5th sextant (p=0.007; χ^2 test)					
Smokers	4.2	14.3	58.9	15.7	3.5
Non-smokers	8.6	18.8	59.0	8.1	3.1
6th sextant (p=0.011; χ^2 test)					
Smokers	5.9	27,9	15,3	30,0	11,5
Non-smokers	10.2	37,1	14,4	24,5	6,8

The influence of independent variables like sex, age, education, preventive dental visits, brushing frequency and smoking habits on max CPITN (%) was analysed (table 2). Analysing the influence of **gender** on max CPITN, it was evident that there were no significant differences in percentage of CPITN scores 0, 1, 2, 3 and 4 among females and males (p=0.245).

Analysing the influence of **age** on max CPITN, it was evident that the younger age group (30-49 years) had a higher percentage of max CPITN 0 and 1 and lesser percentage of max CPITN 3 and 4 compared to older age group (50-69 years). The differences were statistically significant (p<0.001).

Table 2: Influence of chosen variables on CPITN (maximum) scores.

(χ^2 test of independence in contingency tables)

Variable	p-value	Chi-Square Contribution
Sex	0.245504	- No significant difference.
Age	0 ***	Max CPI-3,4 - More frequently in the age group 50-69 years. Max CPI-1,2 - Less frequently in the age group 50-69 years.
Education	0.001757 **	Max CPI-4 - More frequently in respondents with basic education.
Preventive dental visits	0.000054 ***	Max CPI-4 - Less frequently in respondents participating in preventive check-ups twice a year. - More frequently in respondents not participating in preventive check-ups.
Brushing frequency	0.00015 ***	Max CPI-4 - More frequently in respondents brushing their teeth once daily or less. - Less frequently in respondents brushing their teeth twice daily.
Smoking	0.007109 **	Max CPI-4 - More frequently in regular smokers. Max CPI-3 - More frequently in former (ex) smokers. Max CPI-1 - Less frequently in regular smokers.

Analysing the influence of **education** on max CPITN (%), it was obvious that the respondents with university graduation had a higher percentage of max CPITN 0 and the respondents with basic education had a higher percentage of max CPITN 4. The differences were statistically significant (p=0.0017).

Analysing the influence of **preventive dental visits** on max CPITN (%), it was obvious that the respondents who never visited a dentist before had a higher percentage of max CPITN 4 compared to that of respondents attending preventive check-ups. The differences were statistically significant (p<0.001).

It was also evident that respondents **brushing** their teeth less frequently had a higher percentage of max CPITN 4 compared to those brushing more frequently. The differences were statistically significant (p<0.001).

Analysing the influence of **tobacco consumption** on max CPITN (%), it was evident that non-smokers had a higher percentage of max CPITN 0 compared to other groups and regular smokers had a lower percentage of max CPITN 1 and a higher percentage of max CPITN 4 compared to other groups. The differences were statistically significant (p=0.007).

From the results mentioned above we can see that age, education, preventive dental visits, brushing frequency and smoking habits had a significant influence on the periodontal status where as gender of the respondents had no significant influence on the periodontal health.

4.2. Indian results

The population under study consisted of 580 males (72 %) and 225 females (28 %). Majority of respondents were male-consumers of tobacco and taking both the genders into consideration, the mean age of consumers was 47.3 and that of non-consumers was 40.3.

Non-consumers had a higher percentage of CPITN score 0 compared to consumers, indicating higher percentage of healthy periodontium in non-consumers. Consumers had a higher percentage of CPITN scores 2, 3 and 4 compared to non-consumers. Non-consumers also had a higher percentage of CPITN score 1 compared to consumers. A detailed description of CPITN scores (%) of consumers and non-consumers in each sextant is given in table 3.

The percentage of CPITN score 0, indicating healthy periodontium, in subjects using tobacco with betel nuts and leaves, smoking bidi/chutta and smoking cigarettes with/without filters were lower, demonstrated by a score of 5.9 %, 1.1 % and 5.6 % respectively compared to that of non-consumers demonstrated by CPITN score of 19 %. The percentage of CPITN score 1, indicating bleeding on probing, was lower in subjects

smoking cigarettes with/without filters and those using tobacco with betel nuts and leaves (35.6 % and 39.5 % respectively) and slightly higher in respondents smoking bidi/chutta (48.9 %) compared to non-consumers (47.2 %). Percentages of CPITN score 0 and 1 in regular smokers (smoking bidi/chutta and/or cigarette) were 3.8 % and 35.3 % respectively compared to 19 % and 47.2 % respectively in non-consumers (p<0.001). The percentage of CPITN score 0 was higher in non-consumers in all sextants compared to consumers (table 3).

Table 3: CPITN score (%) of consumers and non-consumers in each sextant:

	CPITN 0	CPITN 1	CPITN 2	CPITN 3	CPITN 4
1st sextant (p<0.001; χ^2 test)					
Consumers	20.4	50.4	23.6	5.1	0.5
Non-consumers	45.8	30.3	20.4	2.8	0.7
2nd sextant (p<0.001; χ^2 test)					
Consumers	29.4	54.0	13.3	2.8	0.5
Non-consumers	58.5	30.3	8.5	2.8	0.0
3rd sextant (p<0.001; χ^2 test)					
Consumers	21.3	48.3	24.9	4.4	1.1
Non-consumers	47.5	30.2	16.5	4.3	1.4
4th sextant (p<0.001; χ^2 test)					
Consumers	18.7	42.0	29.2	8.2	1.9
Non-consumers	49.3	32.4	11.3	6.3	0.7
5th sextant (p<0.001; χ^2 test)					
Consumers	25.3	49.8	18.7	5.4	0.8
Non-consumers	54.3	33.6	9.3	2.9	0.0
6th sextant (p<0.001; χ^2 test)					
Consumers	19.7	41.9	28.4	8.2	1.7
Non-consumers	50.4	28.1	14.4	5.8	1.4

The influence of independent variables like sex, age, education, preventive dental visits, brushing frequency and smoking habits on max CPITN (%) was analysed (table 4).

Table 4: Influence of chosen variables on maximum CPITN
(χ^2 test of independence in contingency tables)

| Variable	p-value	Chi-Square Contribution Section
Sex	0***	max CPI-0 - more frequently found in women max CPI-2 - more frequently found in men max CPI-4 - more frequently expressed in women
Age	0.717	- no significant difference between younger (30-49 years of age) and older (50-69 years of age) group of respondents
Education	0.000015***	max CPI-1 - more frequently present in university graduated respondents max CPI-3 and 4 - more frequently found in group of respondents with no education - less frequently expressed in university graduated respondents
Preventive dental visits	0,000401 ***	max CPI-0 - most frequently found in respondents participating in preventive dental visits 2 times a year max CPI-4 - most frequently expressed in respondents not participating in dental preventive visits
Brushing frequency	0,000259 ***	max CPI-0 - most frequently seen in respondents brushing their teeth 3 times daily, following by those brushing their teeth 2 times daily max CPI-4 - most frequently found in respondents brushing their teeth 3 times daily
Smoking	0***	max CPI-0 - most frequently found in the group of non-consumers - less frequently expressed in the group of regular smokers max CPI-2 - more frequently found in regular smokers max CPI-4 - most frequently expressed in the group of 'consumers but non-smokers'

Analysing the influence of **sex** on maximum CPITN score (%), it was evident that females had a higher CPITN score of 0 and 1 and males had a higher CPITN score of 2.

Analysing the influence of **age** on maximum CPITN (%), it was evident that there was no significant difference in percentage of CPITN scores 0, 1, 2, 3 and 4 among the compared age groups i.e., younger age group (30-49 years) and older age group (50-69 years). It was evident that university graduates followed by high school **educated** respondents had a higher percentage of max CPITN 0 (10.3 % and 8.2 % respectively) and respondents with no education followed by respondents with basic education had a higher percentage of max CPITN 4 (9.3 % and 5.5 % respectively). It was also obvious that respondents attending **preventive dental check-ups** twice a year had a higher percentage of healthy periodontium and respondents visiting dentist only when having some dental problems or those who never visited a dentist before had a higher percentage of shallow pockets. It was obvious that respondents **brushing** their teeth 3 times a day had a higher percentage of maximum CPITN 0 compared to respondents brushing less frequently but it was also evident that the same group of respondents had a higher percentage of maximum CPITN 4 compared to other groups.

Analysing the influence of **tobacco consumption** on max CPITN (%), it was evident that non-consumers had a higher percentage of max CPITN 0 compared to other groups, regular smokers had a higher percentage of max CPITN 1 and 2 and regular smokers followed by 'consumers but non-smokers' had a higher percentage of max CPITN 3.

Considering all the independent variables (sex, age, education, preventive dental visits, brushing habits and smoking habits) and the corresponding max CPITN scores that influenced the respective variable to be significant, it was evident that gender, education, preventive dental visits, brushing frequency and smoking habits had a significant influence on the periodontal status ($p < 0.001$) where as age of the respondents had no significant influence on the periodontal health ($p = 0.717$).
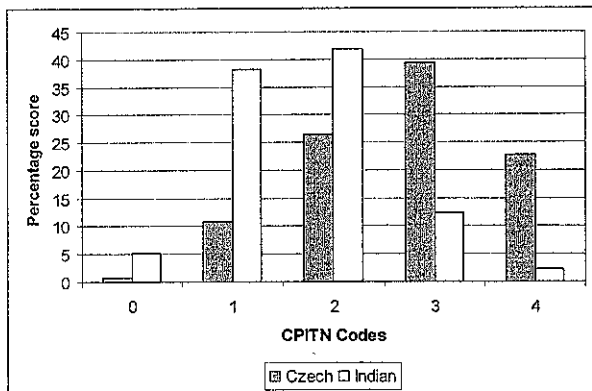
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4.3. Comparative analysis of CPITN scores of Czech and Indian study population

Diagram 1: Comparison between percentage of scores according to CPITN categories of Czech and Indian study population
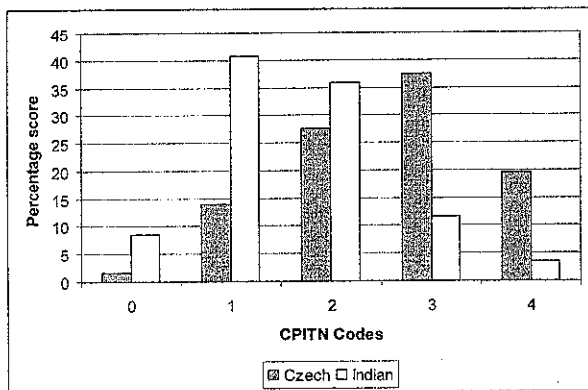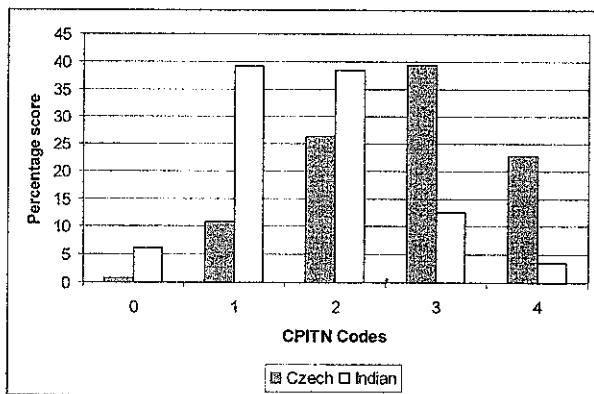

The Indian study population had a higher percentage of CPITN scores 0, 1 and 2 and lower percentage of CPITN scores 3 and 4 compared to the Czech study population.

Diagram 2: Comparison between percentage of scores of **smokers** according to CPITN categories of Czech and Indian study population
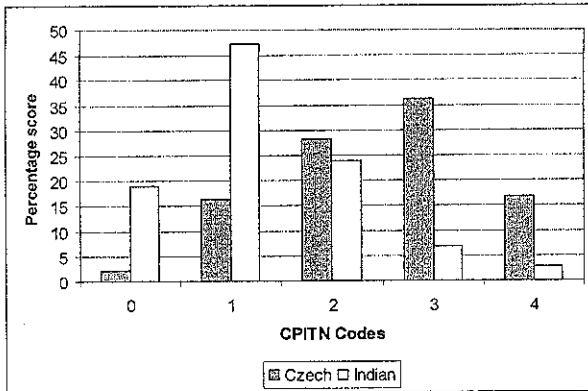
The smokers of the Indian study population had a higher percentage of CPITN scores 0, 1 and 2 and lower percentage of CPITN scores 3 and 4 compared to the Czech study population.

Diagram 3: Comparison between percentage of scores of **smokers (Czech)** and **consumers (Indian)** according to CPITN categories of Czech and Indian study population

The consumers of the Indian study population had a higher percentage of CPITN scores 0, 1 and 2 and a lower percentage of CPITN scores 3 and 4 compared to the smokers of the Czech study population.

Diagram 4: Comparison between percentage of scores of **non-smokers (Czech)** and **non-consumers (Indian)** according to CPITN categories of Czech and Indian study population:

The non-consumers of the Indian study population had a higher percentage of CPITN scores 0 and 1 and a lower percentage of CPITN scores 2, 3 and 4 compared to the non-smokers of Czech study population.

5. CONCLUSIONS

Certain limitations should be taken into consideration when interpreting the results of this study. The cumulative effect of periodontal destruction over time such as attachment loss, recession and loss of alveolar bone were not recorded by the CPITN index since it was originally constructed for the assessment of treatment needs (6). Thus the index scores may not fully reflect the true periodontal condition. Nevertheless, the use of CPITN renders knowledge about the high prevalence and low severity of periodontal disease among populations. The simplicity in recording and its worldwide application allowing for international comparisons were taken into consideration while using the index for this study.

Another limitation was that the plaque levels were not recorded during the dental examination. Consequently, adjustments for plaque could not be made in the present analysis. However, most studies reported similar plaque levels for smokers and non-smokers (1, 4) and no difference between smokers and non-smokers with regard to plaque accumulation could be observed in experimental gingival studies (3,5).

Another limitation was the inability to generalize our findings to the Indian and Czech population. Our study group was a convenient sample and was not randomized. A comparison of our data with recent studies was not always possible because of differences in methodology.

Within the limitations of this study, the following conclusions were drawn:

- Non-smokers/non-consumers had a higher percentage of healthy periodontium and sites with bleeding on probing demonstrated by higher percentage of CPITN scores 0 and 1 respectively, compared to smokers/consumers.
- Smokers/consumers had higher percentage of shallow and deep pockets demonstrated by higher percentage of CPITN score 3 and 4 respectively, compared to non-smokers/non-consumers.
- Age of the respondents significantly influenced the outcome of CPITN scores in case of the Czech study population where as age did not have any influence on the outcome of CPITN scores of Indian study population.
- Gender of the respondents significantly influenced the outcome of CPITN scores in case of Indian study population but had no influence on the outcome of CPITN scores of Czech study population.
- Education, participation in dental preventive check-ups, frequency of tooth brushing and smoking significantly influenced the outcome of CPITN scores in both the study populations.
- Majority of Indian respondents visited dentists only when they had some dental problems and brushed their teeth once daily where as majority of Czech respondents visited dentists for regular dental check-ups twice a year and brushed their teeth twice daily.

- The comparative analysis of CPITN scores of Czech and Indian study population revealed that irrespective of higher percentage of Czech respondents participating in regular dental check-ups twice a year and brushing their teeth twice daily, they had worse periodontal findings (lower percentage of healthy periodontium and higher percentage of shallow and deep pockets) compared to Indian respondents. This contrast in the findings between the Czech and the Indian study population may be due to differences in food habits, oral hygiene habits or due to measurement bias and requires further detailed investigation.
- Our results confirmed the negative influence of tobacco consumption on periodontal health in both Czech and Indian study population.

6. SUMMARY

The primary aim of the study was to investigate the influence of cigarette smoking on periodontitis in Czech population. The secondary aim was to compare the results with those from Indian population, where the differences in culture and race, socioeconomic status, oral hygiene measures and practices, and the use of tobacco in different forms like chewing tobacco and smoking bidi in India would have an impact on the final outcome of the study.

The participants of this study were patients of dentists cooperating with the study. The inclusion criterion was age between 30-69 years. Two different sets of questionnaires were prepared; one for the Czech study population (in Czech language) and the other, with minor variations, for the Indian study population (in English). All participants of this study were requested to answer the questionnaire which included questions concerning their personal history, economic status, educational qualification, profession, general health status, food habits, frequency of dental visit, brushing habits, dental aids used and a detailed tobacco consumption history. Information collected on use of tobacco included current tobacco consumption status, duration and amount of tobacco use and form of tobacco use in case of Indian population. Possible forms of tobacco consumption in India that were considered in this study were: 1) tobacco with betel nuts and leaves, 2) tobacco

alone, 3) bidi/chutta 4) cigarettes without filters, 5) cigarettes with filters, and 6) pipes and other forms. In case of cigarette or bidi/chutta smokers, they were classified into: 1) regular smokers 2) occasional smokers and 3) ex-smokers. Since the use of smokeless tobacco, mostly in the form of chewing tobacco is prevalent in India, we further classified the Indian study population into 'consumers but non-smokers' and 'non-consumers'. Consumers but non-smokers consisted of subjects who use tobacco in forms other than smoking and non-consumers consisted of subjects who never used tobacco (at the time of study or in the past) in any form. In case of Czech study population, the mode of tobacco consumption most prevalent was smoking in different forms like cigarettes, pipes and cigars.

The examiners in India and Czech Republic used a standard examination environment, standard equipment and followed detailed written instructions. Periodontal status of the respondents was assessed using CPITN index .

The Indian study population consisted of 580 males (72 %) and 225 females (28 %). The majority of respondents were male-consumers of tobacco. Among regular smokers, 98 % were males and among non-consumers 73.2 % were females. The percentage of female 'consumers but non-smokers' (75.2 %) was higher compared to that of males (24.8 %). Except age, all other variables like sex, education, preventive dental visits, brushing frequency and smoking habits significantly influenced the maximum CPITN (%) outcome. Non-consumers had a higher percentage of CPITN score 0 compared to consumers, indicating higher percentage of healthy periodontium in non-consumers. Consumers had a higher percentage of CPITN scores 2, 3 and 4 compared to non-consumers. Non-consumers also had a higher percentage of CPITN score 1 compared to consumers.

The Czech study population consisted of 339 males (49.9 %) and 340 females (50.1 %). Among regular smokers, 60.3 % were males and among non-smokers, 58.9 % were females. Except sex, all other variables like age, education, preventive dental visits, brushing frequency and smoking habits significantly influenced the maximum CPITN (%) outcome. Taking the CPITN scores in percentage of smokers and non-smokers in all sextants, non-smokers had higher percentage of healthy periodontium compared to

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smokers, smokers had lesser percentage of sites with bleeding on probing and higher percentage of sites with pocketing compared to non-smokers.

Comparison between percentage of scores according to CPITN categories of Czech and Indian population revealed that the Indian study population had a higher percentage of CPITN scores 0, 1 and 2 indicating healthy periodontium, bleeding on probing and supra-gingival or sub-gingival calculus respectively and a lower percentage of CPITN scores 3 and 4 indicating pocket depths up to 4-5 mm and 6 mm or more respectively compared to Czech study population.

7. SOUHRN

Hlavním cílem studie bylo posoudit vliv kouření cigaret na onemocnění parodontu u české populace. Ve druhé fázi výzkumu jsme se pokusili porovnat získané výsledky s identickým šetřením provedeným u vzorku indické populace. V úvahu se přitom musely vzít kulturní a rasové rozdíly, různý socioekonomický stav, rozdíly v provádění ústní hygieny, odlišné způsoby užívání tabáku v Indii (např. žvýkání tabáku či kouření bidi), které mohly významně ovlivnit konečné výsledky. Studie se účastnili respondenti ve věku 30-69 let, kteří byli vyšetřeni jednotně instruovanými zubními lékaři. Pro potřeby šetření byly připraveny dvě verze dotazníků, jedna pro českou populaci (v češtině) a druhá, s drobnými rozdíly, pro indickou populaci (v angličtině). Dotazník obsahoval otázky týkající se osobní anamnézy respondentů, jejich ekonomického postavení, vzdělání, profese, celkového zdravotního stavu, stravovacích návyků, četnosti návštěv u zubního lékaře a způsobu provádění ústní hygieny. Nedílnou součástí dotazníku byla detailní kuřácká anamnéza. Respondenti byli tázáni na to, zda, jak dlouho, v jakém množství a v jaké formě tabák užívají. V této studii byly brány v úvahu následující způsoby užívání: 1) tabákové palice a listy, 2) samotný tabák, 3) bidi/chutta, 4) cigarety bez filtru, 5) cigarety s filtrem, 6) dýmky a ostatní formy. Kuřáci cigaret nebo bidi/chutta byli navíc rozděleni do těchto skupin: 1) pravidelný kuřák, 2) příležitostný kuřák, 3) bývalý kuřák. Vzhledem k tomu, že v Indii je běžnější tabák žvýkat než kouřit, bylo dále u indických respondentů rozlišeno, zda jde o „konzumenta - nekuřáka" nebo „nekonzumenta". Skupinu „konzument - nekuřák" tvořili ti, kteří užívali tabák v jiné

formě než kouřením a skupinu nekonzumentů ti, kteří nikdy tabák neužívali v žádné formě (v době výzkumu nebo v minulosti). U české populace přicházelo v úvahu pouze kouření tabáku v různých formách: cigarety, dýmky a doutníky.

Zubní lékaři participující na výzkumu v České republice a v Indii pracovali za standardních podmínek se standardním vybavením a postupovali dle podrobně popsaných instrukcí. Stav parodontu byl hodnocen s pomocí indexu CPITN.

Indický soubor tvořilo 580 mužů (72 %) a 225 žen (28 %). Většina respondentů byli muži - konzumenti tabáku. Muži představovali 98 % pravidelných kuřáků, naopak ženy tvořily 73,2 % nekonzumentů. Podíl žen v kategorii „konzument ale nekuřák" (75,2 %) byl oproti mužům (24,8 %) vyšší. Všechny sledované proměnné s výjimkou věku, tj. pohlaví, vzdělání, četnost preventivních návštěv u zubního lékaře, frekvence čištění zubů a užívání tabákových výrobků měly významný vliv na výslednou hodnotu indexu CPITN. V porovnání s konzumenty byl index CPITN s hodnotou 0 (zdravý parodont) zjištěn u vyššího počtu nekonzumentů. U této skupiny byl rovněž častější výskyt CPITN 1 (krvácení na dotyk). U konzumentů byla naopak zjištěna vyšší frekvence CPITN 2, 3 a 4. Český soubor tvořilo 339 mužů (49,9 %) a 340 žen (50,1 %). Mezi pravidelnými kuřáky bylo 60,3 % mužů a mezi nekuřáky 58,9 % žen. Všechny sledované proměnné s výjimkou pohlaví, tj. věk, vzdělání, četnost preventivních návštěv zubního lékaře a frekvence čištění zubů a kouření měly významný vliv na zjištěnou hodnotu indexu CPITN. Při porovnání hodnot indexu CPITN u kuřáků a nekuřáků bylo zjištěno, že u nekuřáků byla ve všech sextantech vyšší prevalence nálezů CPITN 0 (zdravý parodont) a 1 (krvácení na dotyk), zatímco u kuřáků byly častější nálezy CPITN 3, 4 (parodontální choboty).

Srovnávací analýza četností zastoupení hodnot indexu CPITN u české a indické populace prokázala, že v indické skupině se častěji vyskytovaly subjekty s CPITN 0, 1 a 2 (tj. zdravý parodont, krvácení na dotyk a supra-gingivální či sub-gingivální calculus), zatímco v českém souboru byly častější nálezy CPITN s hodnotami 3 a 4 (parodontální choboty).

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