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Uzależnienie od papierosów i jego toksyczne działanie na stan jamy ustnej

Streszczenie

Wstęp. Szkodliwe działanie papierosów, a w szczególności toksyczny wpływ substancji smolistych zawartych w dymie tytoniowym został opisany w różnych publikacjach i pracach naukowych. Wiele objawów tego niekorzystnego działania można zaobserwować w obrębie jamy ustnej m.in. w składzie śliny, stanie powierzchni szkliwa i zmianie składu mineralnego struktury zębów oraz zmian na błonie śluzowej, a także w obrębie języka.

Cel. Celem pracy jest przedstawienie szkodliwego działania dymu tytoniowego na stan jamy ustnej oraz profilaktyki stomatologicznej, jako środka częściowo niwelującego te negatywne skutki.

Materiał i metody. Ankiety określające rodzaj uzależnień oraz badanie przedmiotowe zewnątrzustne pacjentów. Badani zostali podzieleni na trzy grupy wiekowe oraz ze względu na płeć.

Wyniki. Tendencję spadkową do palenia papierosów zauważa się w najmłodszej grupie wiekowej pomiędzy 20-40 r.ż. oraz w grupie powyżej 60 r.ż. U wszystkich palących osób występują złogi nazębne, osad i przebarwienia, a u połowy badanych stany zapalne przyzębia. U wszystkich palących występował problem z nieświeżym oddechem, ale tylko połowa badanych starała się temu zaradzić. Prawidłowe nawyki higieniczne zaobserwowano u 60% badanych.

Wnioski. Badania wykazały pozytywny wpływ profilaktyki stomatologicznej, która zmniejsza niekorzystne działanie papierosów na stan jamy ustnej.

Smoking addiction and its toxic influence on the oral health

Abstract

Introduction. Harmful effect of cigarettes, in particular, the toxic influence of tarry substances in the tobacco smoke has been described in various publications and scientific works. Numerous symptoms of this adverse influence can be observed within the oral cavity, among others, in saliva composition, the state of enamel surface and the change in the mineral structure of teeth as well as changes in the mucous membrane and within the tongue.

Aim. The aim of the study is presentation of harmful influence of the tobacco smoke on the oral health state and dental prophylaxis as a means partially reducing the negative effects.

Material and methods. Questionnaires defining the type of addiction and patients' subjective extra-oral examination. The investigated were divided into three age groups and according to gender.

Results. Decrease in smoking is observed in the youngest age group between 20 and 40 as well as in the group above the age of 60. In all smoking patients, dental plaque, calculus, discolorations are present and in half of the investigated periodontitis occur. All smokers experienced the problem of bad breath and only half of the investigated tried to resolve it. Proper hygiene habits were observed in 60% of the investigated.

Conclusions. The study revealed positive effect of dental prophylaxis which decreases adverse influence of cigarettes on the oral health state.

Słowa kluczowe: nikotynizm, jama ustna, substancje toksyczne, dym tytoniowy.

Keywords: nicotine addiction, oral cavity, toxic substances, tobacco smoke.

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INTRODUCTION

For many generations people had searched for and tasted numerous intoxicants which would be relaxing and calming for their organisms. Especially at present in the so called 'life acceleration' many people struggle with the increasing stress which they would like to relieve somehow. In such cases reaching for a cigarette or alcohol temporarily allows them to forget about the existing problems. However, it may be the onset of addiction which will result in undesirable psychological and physical changes of a given individual. Although it is known that substances harm your health people still take these risks ignoring the consequences. Negative influence of cigarette smoking on the human body was confirmed by numerous studies. Harm from smoking depends on many factors, among others, on age at which you start smoking, number of cigarettes smoked as well as their quality. Chemical composition of tobacco smoke depends on the type of tobacco, type of a cigarette, the way of drawing on the cigarette, humidity, chemical additives. Toxic compounds contained in the tobacco smoke are around 4000 substances among which 40 were scientifically proved to be carcinogenic. The existing classification differentiates the following:

1. Toxic substances which include, among others, carbon monoxide, hydrogen cyanide, nitrogen oxides.
2. Irritating substances e.g. acrolein, sulphur oxide, ammonia, formaldehyde.
3. Substances being the blockers of the respiratory enzyme activity – hydrogen cyanide, acrolein, acetaldehyde, formaldehyde.
4. Substances augmenting properties of carcinogenic substances – formaldehyde, pyrene, naphthalenes, catechol
5. Carcinogenic substances – benzene, dimethylnitrosamine, ethylmethylnitrosamine, nitrosopyrrolidine, hydrazine, vinyl chloride, cadmium, naphthylamine, dibenzoacridine
6. Neoplasm promoters – toluidine, phenol, urethan.
7. There are also radioactive elements in the tobacco smoke (e.g. polonium) which expose the smokers to additional dose of ionizing radiation depending on the daily amount of cigarettes smoked.
8. Cigarette filter is also a source of toxic substances as it contains cellulose acetate. Its fibers can get into the respiratory system and initiate neoplastic processes [1-3].

Oral cavity is the first place exposed to this harmful effect. The fact of frequent lip irritation with the cigarette causing mechanical pressure as well as high temperature of the glowing cigarette may damage the lip surface on which ulceration develops and in the later stage, if not treated, a neoplasm of this area [4].

However, the main factors having considerably negative influence on the oral cavity are tarry substances included in the tobaccos smoke. Their action causes increased saliva secretion which may contribute to disorders of the digestive system, loss of appetite or the sense of taste. The place most exposed to smoke irritation is smokers' oral mucosa where microtrauma, erosions or ulcerations develop more frequently. The frequency of precancerous states such as leucoplakia is three times higher in smokers in comparison to non-smokers [5]. Poisonous substances – carcinogenic hydrocarbons – produced while smoking in large extent

contribute to the development of malignant tumors of the lip or tongue [3,6,7]. The remains of the tobacco smoke stay on the tooth surface, forming dental plaque and in time dental calculus causing mucosal inflammatory changes, vitamin C deficiency which may be the cause of dental decay. They also contribute to the development of bad breath [8]. Nicotine from cigarettes causes narrowing of blood vessels which results in the lack of gingival bleeding and thus impeding the diagnosis of inflammation in this area. In smokers there are also changes in the chemical composition of saliva which becomes body's enemy damaging the cells of lips and the oral cavity [9]. Tobacco smoking is also harmful to post extraction wound healing and in implantology it may lead to the inflammation of tissues surrounding the inserted implant, inflammation of the nearby mucosa and result in increase in the resorption of bone surrounding the implant. Generally, there are numerous cases of failures in the course of implantological treatment caused, among others, by nicotine from the tobacco smoke impairing bone healing. It was scientifically confirmed that the risk of the loss of implant caused by bone atrophy is increased in smokers [10].

AIM

The aim of the study was observation of the negative influence of the tobacco smoke on the oral cavity health state, the analysis of changes in this area related to the number of smoked cigarettes and time that had passed since the onset of the addiction as well as what may be the role of dental prophylaxis in the decrease of smoking adverse effects within the oral cavity.

MATERIAL AND METHODS

The study involved 80 patients of the Conservative Dentistry Centre of the Voivodship Dental Clinic in Lublin aged 20-63 (the mean age was 41.4). They were tobacco addicts and drank a lot of coffee, tea and also consumed excessive amounts of sweets. The patients were classified according to sex (30 women, 50 men) and three age groups were distinguished: the first group included patients in the age range between 20 and 40, the second between 41 and 60 and the third included patients above the age of 60.

The studies were conducted according to the own construction questionnaire Addictions versus Evaluation of Oral Hygiene and Health State, Test for Nicotine Dependence by Fagerström, Motivation Test to Quit Smoking by Nina Schneider and intraoral follow-up examination of each patient.

RESULTS

In the investigated group there were 15% patients with primary education, 65% patients with secondary education and 20% with higher education.

Among the investigated the laborers constituted the largest group – 45%, office workers 30%, 10% did not work, 5% studied and 10% were pensioners or retired.

In the group of 30 addicted women there were 6 (20%) patients from the first group, 20 (67%) from the second age group and 4 (13%) from the third.

As much as 26 (87%) women drank large amounts of coffee and tea. Fifteen (50%) women consumed large amounts of sweets, including 12 from the first age group, 2 from the second age group and 1 from the third group.

Dental plaque and the problem with bad breath occurred in all smoking women. In 8 (27%) smoking patients teeth discolorations were observed including 6 from group 2 and 2 from group 3.

In the group of 50 addicted men, 25 (50%) were from the first age group, 21 (42%) from group 2 and 4 (8%) from group 3.

Large amounts of tea and coffee were drunk by 40 (80%) men. As much as 25 (50%) consumed a lot of sweets. Dental plaque and calculus occurred in all smokers, enamel discolorations occurred in 12 (24%) smokers (2 from group 1, 9 from group 2 and 1 from group 3). The problem of bad breath concerned all smoking males.

Summing up hygiene procedures performed by the whole female group, 23 (77%) have regular scaling procedure performed. Nineteen women (64%) have dental check-ups every six months, 4 (13%) once a year, the remaining 7 (23%) have dental appointment in case of a toothache or loss of filling. Twenty five women (83%) brush their teeth at least twice a day, the remaining 5 (17%) once a day. Twenty five (83%) women exchange their toothbrush more than twice a year, the remaining patients – once a year or less. Twenty one women (70%) report brushing their teeth for 5 min., the remaining for 1 min or shorter. Twenty women (67%) use additional oral hygiene devices (mouthwashes, dental floss etc.).

Among men 30 (60%) have scaling procedures performed. Twenty patients (40%) have dental appointments twice a year, 15 (30%) once a year, the remaining ones in case of a toothache or loss of filling. Thirty men (60%) brush their teeth twice a day, the remaining once a day. Twenty men (40%) replace their toothbrush more than twice a year, the remaining once a year or less. Twenty five men (50%) reported brushing time up to 5 min., the remaining 1 min. or shorter. Fifteen patients (30%) use additional oral hygiene devices.

In both male and female group it was observed that the intensity of changes in oral cavity related with smoking addiction depends more on duration of smoking and particular care while performing oral hygiene procedures than on the number of cigarettes smoked.

Among smoking women in the first age group (20-40) there were 4 (13%) women whose addiction was short-term (0.5 to 1 year), and 2 women (7%) with smoking habit for 5-10 years. All patients claimed they had smoked 5-10 cigarettes a day (Fig.1).

The intensity of changes related with tobacco addiction was higher in women whose smoking duration was longer, their oral hygiene was poor and they neglected dental check-ups.

In the first age group in 4 (13%) who were characterized by proper oral hygiene and who were complying with the rules of dental prophylaxis, the intensity of changes within masticatory organ was small (little amount of plaque, calculus, small number of dental caries), in 1(3%) – it was medium (plaque, calculus, few lost teeth and dental caries) and in

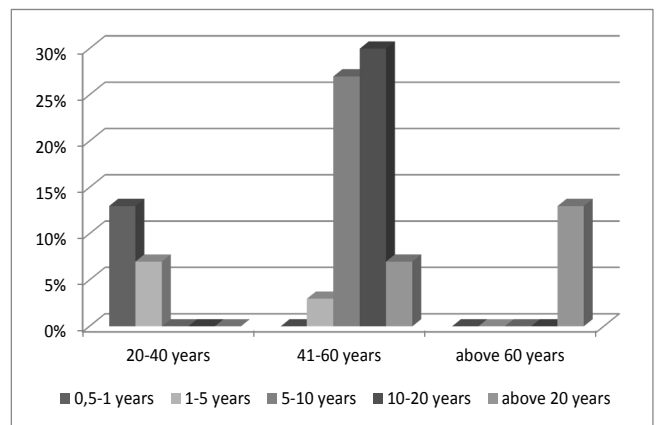


FIGURE 1. Duration of smoking addiction in individual age groups in female smokers (N=30).

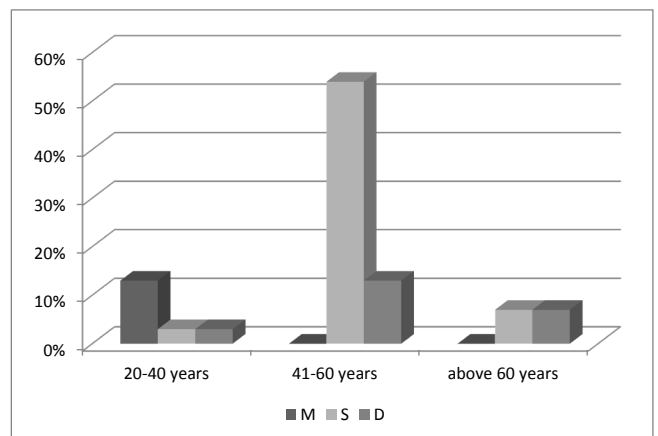


FIGURE 2. Intensity of oral changes related to smoking addiction in female patients (N=30) in individual age groups where the letter M stands for low intensity of changes, letter S stands for moderate changes and letter D stands for high intensity changes.

1 patient (3%) there was high intensity of changes (extensive plaque, calculus, discolorations, a lot of lost teeth, dental caries, inflammatory changes within the oral mucosa) (Fig.2).

In the second age group (41-60) of 20 women there were 9 (30%) patients whose addiction lasted for 10-20 years, 1 (3%) woman who had smoked for 1-5 years, 8 (27%) women who had smoked cigarettes for 5-10 years and 2 (7%) women whose addiction duration was over 20 years. All of these patients report to smoke 5-10 cigarettes daily (Fig.1).

In 16 (53%) patients from this age group (41-60) who performed oral procedures properly and complied with the prophylactic recommendations, the intensity of smoking-related changes was moderate, whereas, in the remaining 4 (13%) women not following oral hygiene rules – it was high (Fig.2).

In the third group (over 60) there were 4 (13%) women addicted to smoking for over 20 years; all of them had smoked 5-10 cigarettes daily. In 2 patients with good oral care the intensity of changes was medium; in the remaining ones it was high. (Fig.1 and Fig.2).

Among male smokers, in the first group (20-40) of 25 men there were 5 (10%) who said their addiction had lasted 1-5 years; 15 subjects (30%) whose addiction was 5-10 years and 5 subjects (10%) who had smoked for 10-20 years. Two patients of this group reported to smoke 5-10 cigarettes daily, one – 5 cigarettes and 22 of them from 10-20 (Fig.3).

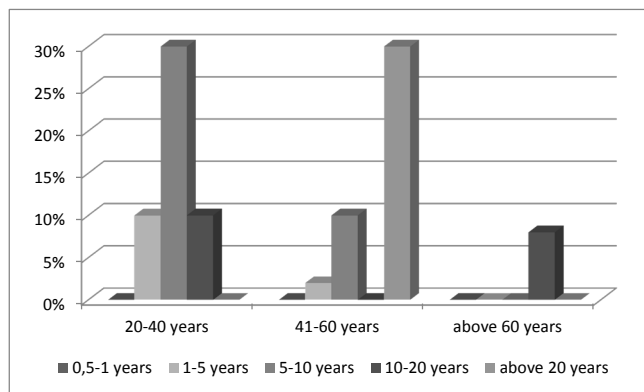


FIGURE 3. Duration of addiction to smoking of male patients in individual age groups (N=50.)

In 3 patients (6%) of this group (20-40) whose addiction was short-term (1-5 years) and there was proper oral hygiene, the intensity of changes within its area was low. In 16 subjects (32%) it was moderate and in 6 patients (12%) – high. Patients with high intensity of changes were characterized by poor oral hygiene and the lack of dental check-ups (Fig.4).

In the second male age group (21 patients) one of the men reported duration of addiction 1-5 years, 15 (30%) – over 20 years and the remaining 5 (10%) – from 5-10 years; one man reported to smoke 5-10 cigarettes daily, one – 5 cigarettes and the remaining 19 – from 10-20 (Fig.3).

In the second male age group moderate intensity of changes concerned 5(10%) of the investigated and high – 16 patients (32%) (Fig.4).

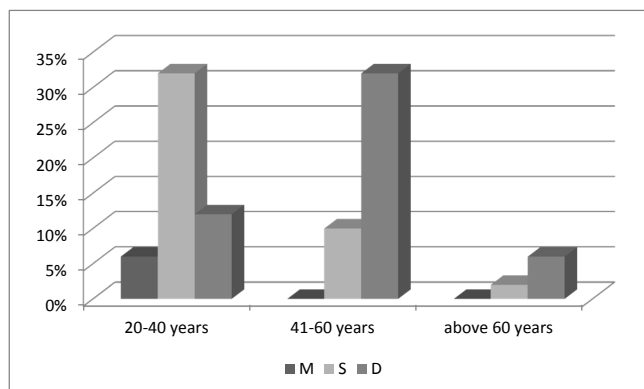


FIGURE 4. Intensity of oral changes related to smoking addiction in male patients (N=30) in individual age groups where the letter M stands for low intensity of changes, letter S stands for moderate changes and letter D stands for high intensity changes.

In the oldest male group (over 60) all patients defined their addiction duration for 10-20 years and the number of 10-20 cigarettes smoked daily (Fig.3).

In these men high intensity of the oral changes occurred in 3 patients (6%) and in one-moderate (Fig.4).

Study results obtained with the use of Fagerström Nicotine Tolerance Questionnaire (Fig.5) allow to state that 45% of patients were characterized by the low level (0-4 points) of nicotine addiction. Tobacco smoking was for these people rather a habit they weren't able to quit. Likewise, 45% patients (5-8 points) possess nicotine addiction features. These people cannot go without a cigarette. Particular problems and at the same time inclination to reach for a cigarette are revealed in stress situations (connected with the social pressure,

restlessness, sense of threat, in stressful or threatening situations). The highest level of nicotine addiction concerns 10% of patients. Achievement of the range of 9-11 points in Fagerström Questionnaire (Fig.5) indicates the presence of pharmacological nicotine addiction symptoms. Patients may be burdened with ailments the etiology of which is undoubtedly connected with smoking.

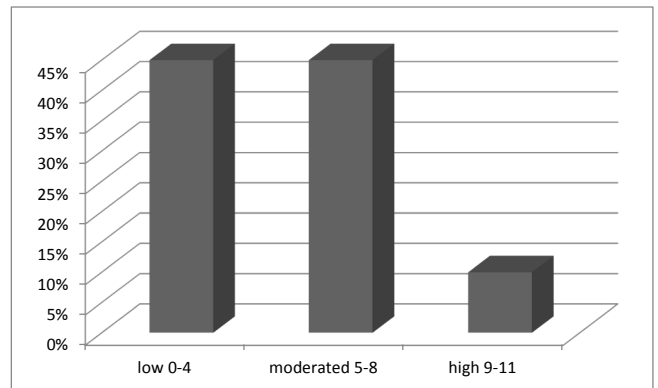


FIGURE 5. Level of smoking addiction according to Fagerström Questionnaire in the whole investigated group (N=80).

Study results obtained on the basis of Motivation to Quit Smoking Test by Nina Schneider (Fig.6) indicate that 90% of patients (8-12 points) decide to quit smoking. These people are aware of difficulties they will encounter in the initial period and especially the first days after smoking cessation as the symptoms of nicotine deficiency will occur. It's a nicotine withdrawal syndrome (cigarette craving). There is excessive tension, restlessness, increased nervousness, drop of mood, difficulties in concentration, excessive excitability, insomnia may occur, loss of appetite or excessive appetite. Patients are ready to overcome these difficulties. However, 10% of the investigated (6-7 points) reveal problems with smoking cessation despite the awareness of its harmfulness for the body (its toxic influence on the body).

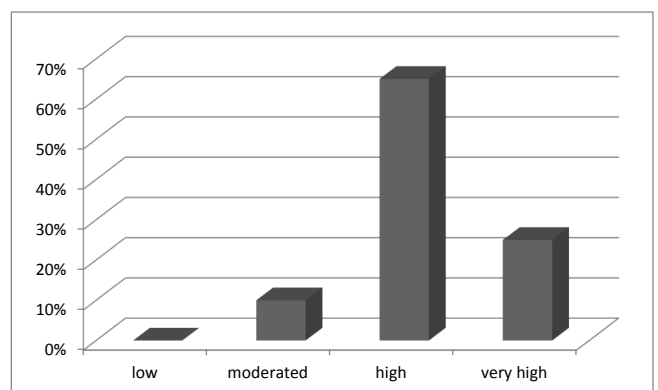


FIGURE 6. Level of motivation to quit smoking based on 'Motivation Test to Quit Smoking' by Nina Schneider in the whole investigated group (N=80).

DISCUSSION

Results of questionnaire investigations conducted by the authors of the above study and their clinical observations made during the dental check-ups of smokers' dentition explicitly confirm adverse influence of this addiction on the oral health state.

Biochemical studies conducted by Zarzycka on the samples of the supragingival calculus collected from the employees of Sędziszów steelworks and the smoking inhabitants of Cracow indicate the presence of heavy metals in the smokers' saliva composition [11].

Similar experimental analyses of Malar et al., performed with the method of absorption spectrophotometry for the presence of lead and cadmium in the hard tissues of 132 teeth in smoking and non-smoking inhabitants of Ruda Śląska confirmed the hypotheses of the adverse influence of cigarette smoking. The authors of the study revealed that tobacco smoking influences the increased cadmium and lead content in tooth hard tissues. Greater concentration of these elements was stated in smokers' teeth. It was also observed that as the result of cigarette smoking the amount of cadmium and lead in teeth increases to a greater extent in men rather than in women. Moreover, it was stated that the composition of dental calculus may be influenced by the place of work and residence [12].

Results that we obtained resemble experimental results of Machuca et al. where the authors carried out comparative analysis of the intensity of periodontal diseases caused by the deposits of dental calculus. Furthermore, authors' experimental observations focused on the amount of tarry substances in saliva composition and their presence on the surface of the oral mucosa. It was stated that the intensity of these changes is much higher in smokers. However, the changes in smokers caring for their oral hygiene were smaller [13].

Study results of Johnson et al. also report that cigarette smoking creates favorable conditions for the development of periodontal inflammatory changes and is more aggressive in these patients than in people who quit smoking or did not smoke at all. Dental calculus deposited quicker and in larger amounts in tobacco smokers than in non-smokers [14].

Study results obtained by Konopka et al. reveal that nicotine increases clinical symptoms of periodontitis. The authors based their conclusions on their finding of higher indices of dental plaque levels and the increased depths of gingival pockets in their smoking patients [15].

The investigations conducted by the authors of the above study gave the answers for the formulated hypotheses. However, they contributed to the appearance of new problems; therefore, they should be continued in much wider dimension.

CONCLUSIONS

1. The conducted investigations reveal that patients addicted to tobacco, especially those whose addiction is long-term and the intensity of oral changes is high, demand regular dental check-ups and proper oral hygiene procedures to prevent the toxic action of smoking in this area of the human body.
2. Smokers should be motivated to quit the addiction not only because of its commonly known bad effects but also more and more frequently practiced smoking bans in public places and workplace as well as cigarettes anti-advertisement showing its drastic consequences.
3. Smoking patients should be encouraged to improve the appearance of their dentition and regain fresh breath by modern trends promoting esthetic dentistry procedures.

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