Review Article

Noncigarette forms of tobacco use*

Formas não habituais de uso do tabaco

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Abstract

There are many preparations for tobacco use, which can be classified as smoking or smokeless tobacco. Among the noncigarette preparations that produce smoke, we cite cigars, pipes and narghiles. Smokeless tobacco can be found in preparations for chewing or for being absorbed by nasal and oral mucosae (snuff). However, all tobacco products deliver nicotine to the central nervous system, and there is a confirmed risk of dependence. In addition, there is no safe form of tobacco use, and tobacco users have a significantly increased risk of morbidity and premature mortality due to tobacco-related diseases.

Keywords: Smoking; Tobacco; Tobacco, smokeless; Tobacco industry; Nicotine.

Resumo

Existem diferentes produtos de tabaco, preparados de formas distintas, que podem ser divididos em produtores e não produtores de fumaça quanto a sua utilização. Dentre os que produzem fumaça, além do cigarro, citamos o charuto, cachimbo e o narguilé. O tabaco que não produz fumaça pode ser encontrado em preparações para ser mascado ou para ser absorvido pela mucosa oral ou nasal. Entretanto, todas as formas de utilização do tabaco liberam nicotina para o sistema nervoso central com risco potencial confirmado para causar dependência. Além disso, não existe forma segura de consumo do tabaco, e seus usuários têm, de forma significativa, risco aumentado para adoecimento e morte prematura por enfermidades relacionadas ao uso de tabaco.

Descritores: Tabagismo; Tabaco; Tabaco não fumável; Indústria do tabaco; Nicotina.

Introduction

There are different forms of tobacco that can be prepared in varied manners with the objective of altering their flavor, smell and pharmacological properties. However, what all forms of tobacco use have in common is the delivery of nicotine to the nervous central system. It should be noted that tobacco can be smoked using delivery systems other than cigarettes. Such systems include pipes, cigars and narghiles. Tobacco can also be used in smokeless forms, such as chewing tobacco and preparations to be absorbed by the oral or nasal mucosae (snuff). It is believed that 2% of English and American men smoke cigars or pipes regularly, and that there are groups in USA, Sweden and Asia that make significant use of smokeless tobacco. Individuals who use smokeless tobacco absorb nicotine in a manner similar to that of those who inhale the smoke.[1] It is of note that nicotine, absorbed through inhalation or otherwise, is highly addictive, and tobacco consumed in any of its forms is a potentially lethal product.

Cigars

A cigar is defined as any roll of tobacco wrapped in leaf tobacco, or in any substance containing tobacco, and which is typically smoked without a filter.[2] The prevalence of cigar consumption has been progressively decreasing worldwide; of the 30% of the English population who were regular smokers in 2002, only 5% were cigar smokers.[3] In another study conducted in England in 2003 and involving over 7,000 men, it was concluded that cigar smoking results in a considerable risk of developing smoking-related diseases. The authors found that, in comparison with individuals who had never smoked, the smokers presented a greater risk of coronary disease and cerebrovascular accident, as well as a higher overall rate of mortality due to other diseases.[4]

It is known that the great majority of cigars have more nicotine than the sum of many cigarettes (1-2 mg of nicotine in a cigarette and 100-400 mg of nicotine in a cigar, which contains up to 17 g of tobacco).[5] It should be borne in mind that cigar smoke is more alkaline than is that of cigarettes, thereby facilitating its dissolution and absorp-

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Financial Support: None.
Submitted: 21 January 2008. Accepted, after review, 25 March 2008.

tion by the oral mucosa. This makes it possible to achieve the desired dose of nicotine without the need to inhale the smoke into the lungs. Despite the fact that cigar smokers do not inhale, cigars can cause nicotine dependence, because they make high levels of nicotine available so rapidly.

Cigar smoke contains a class of highly carcinogenic compounds (nitrosamines, hydrocarbons and aromatic amines) at levels significantly higher than those found in cigarette smoke. Biochemical analysis has shown that, for an equal number of grams of tobacco smoked, tar, carbon monoxide and ammonia are produced in larger quantities through the burning of cigars than through the burning of cigarettes. In addition, the tar derived from cigars has high concentrations of carcinogenic agents such as polycyclic aromatic hydrocarbons.[6] This could explain the fact that the risk of presenting lung cancer is up to nine times greater for cigar smokers than for nonsmokers. The rates of mortality due to lung cancer among cigar smokers are related to the number of cigars smoked per day and to the degree of inhalation of the smoke.[7] For other types of cancer, the differences in smoke exposure by different tissues provide the best explanation for the distinct differences in mortality patterns between cigar smokers and cigarette smokers. Cigar smokers who inhale no smoke expose the oral cavity and the tongue to large quantities of smoke, thereby increasing the risk of oral cancer. The constituents of tobacco dissolved in the saliva are also swallowed, increasing the incidence of esophageal cancer in this population. We highlight the fact that tobacco and alcohol act synergistically to increase the development of oral and pharyngeal cancer.[8] The risk of developing cancer in the oral cavity (lips, tongue, mouth and throat), larynx or esophagus is twice as high for cigar smokers as it is for nonsmokers. Cigar smokers also present an increased risk of developing COPD and coronary disease: 45% and 27% higher, respectively, than that reported for nonsmokers. A study conducted by the American Cancer Society showed that the risk of dying from cancer of the pancreas or bladder is two and three times higher, respectively, for cigar smokers who inhale the smoke than for nonsmokers.[5] Compared with cigarette smokers, cigar smokers also present an increased risk of respiratory and heart diseases, as well as of cancer of the oral cavity, throat and esophagus. To date, there have been no studies conclusively linking cigar smoking to cerebrovascular accident or peripheral vascular disease. However, cigar smoking has been related to the onset of erectile dysfunction in men.[9]

Finally, it is of note that the secondary smoke from cigars contributes more to environmental pollution than does cigarette smoke, assuming an equal quantity of tobacco burned, as well as that cigars contain a greater quantity of tobacco and burn longer (1-2 h *vs.* 10 min). Therefore, since cigar smoke contains higher concentrations of toxins and cancerous substances than does cigarette smoke, it also contributes to increasing the risk of lung cancer and other smoking-related diseases in nonsmokers (passive smokers).[2]

Pipes

The prevalence of regular pipe use among American men dropped from 14% in the 1960s to 2% in the 1990s, remaining rare among women (< 0.1%).[10] In classic studies on smoking, the overall risk of early death was only 10% higher in pipe smokers than in nonsmokers. However, in those studies, only individuals who had never smoked cigarettes were considered pipe smokers. Nevertheless, currently, most pipe or cigar smokers are former-cigarette smokers, who might retain some of the techniques of smoke inhalation, despite the irritation the smoke provokes in the airways. In such cases, the smokers present a significantly higher risk of becoming ill, with a 30% increase in the risk of heart disease and a nearly three times greater risk of developing COPD.[11] In addition, there is a causal relationship between pipe smoking and mortality due to lung, laryngeal, esophageal and oropharyngeal cancer.[12] In a multicenter study conducted in Europe, it was reported that smoking cigars or a pipe might have a carcinogenic effect on the lungs that is comparable to that of cigarette smoking.[7]

As previously mentioned, pipe smokers and cigar smokers present a greater risk of coronary disease, cerebrovascular accident and lung cancer. They also present higher rates of mortality due to other diseases and other forms of smoking-related cancer, such as liver, pancreatic, bladder and colorectal cancer,[4] as well as periodontal problems, tooth loss and bone loss.[13]

Narghiles

Narghiles are also known as water pipes, *argilehs*, *gozas*, *hookahs*, *shishas*, etc. It has been

suggested that the narghile originated in India and has been widely used for over 400 years. It is now more commonly used in the countries of the Arabian Peninsula, as well as in Turkey, Bangladesh and Pakistan. However, in recent years, a true rebirth of its use has been observed, principally among young people, including those in western countries. It is believed that there are currently more than 100 million people worldwide who use a narghile on a daily basis. In some parts of the world, narghile use is even more prevalent that is that of cigarettes. The prevalence of its use varies widely among regions, such as Lebanon, where 14.6% of adults, 25% of pregnant women and 32% of university students use a narghile regularly.[14] In a recent survey conducted in Syria, it was shown that, among university students, 62.6% of the men and 29.8% of the women had smoked a narghile at least once, as well as that 25.5% of the men and 4.9% of the women smoked one regularly.[15]

In some European countries, as well as in Brazil, there has also been a resurgence of the use of narghile. In United States, there are various bars specializing in its use, especially in New York and Los Angeles.

The composition of the tobacco used for this modality of consumption has no standard, and its nicotine content is estimated at 2-4%, compared with 1-3% for the tobacco used in cigarettes. Similarly, the proportion of carbon monoxide in narghile smoke is greater than that reported for cigarette smoke, and it is increased by the burning of the coal used in that modality. In an analysis of the smoke from the primary flow of a narghile, we find significant quantities of nicotine, tar and heavy metals, as well as arsenic, benzopyrene, nickel, cobalt, beryllium, chromium and lead, all in larger quantities than those found in cigarette smoke.[16]

Another fact that should be borne in mind is that one narghile session exposes the smoker to more smoke for a longer period than when one smokes cigarettes. For each cigarette smoked, a cigarette smoker typically takes between 8 and 12 drags, each of 40-75 mL, over a period of 5-7 min, inhaling a total of 0.5-0.6 L of smoke. However, a narghile session typically lasts 20-80 min, or even longer, during which time the smoker takes 50-200 drags, inhaling a total of 0.5-1.0 L of smoke. Therefore, the narghile smoker inhales, in one session, the same quantity of smoke that a cigarette smoker would inhale if consuming 100 cigarettes or more.[17,18]

We highlight that, although the water used in the narghile absorbs some of the nicotine (approximately 5%), narghile smokers are nevertheless exposed to sufficient quantities of the drug to cause dependence.[19] However, since the quantity of nicotine inhaled is an important regulator of the quantity of tobacco smoked, narghile smokers have to inhale larger quantities of smoke and are therefore exposed to larger quantities of cancerous substances and noxious gases.[20] This fact puts narghile smokers and passive smokers of narghile smoke at risk for the same diseases caused by cigarette smoking, such as cancer, heart disease, respiratory disease and adverse effects during pregnancy.[21,22]

Smokeless tobacco

Many terms are used to describe smokeless tobacco products. Such terms include oral tobacco, chewing tobacco, snuff, *snus*, etc. All oral forms of tobacco contain agents that cause cancer, principally mouth and pancreatic cancer, as well as other health problems such as periodontal disease, bone loss, tooth loss, discoloration of teeth and halitosis.[23]

Chewing tobacco

One form of smokeless tobacco is chewing tobacco. It is one of the oldest modalities of consumption of the tobacco leaves, having been used by the Indians who lived in the Americas prior to the introduction of tobacco to the Old World. There are a variety of ways in which the leaves are prepared for chewing: they can be cured before or after being twisted into rolls, and flavorings such as whisky, rum, fruit, etc., can be added. The tobacco can thus be cut into small pieces or ground and packaged in small sachets. The use of chewing tobacco peaked at the end of the 19th century and the beginning of the 20th century, after which its use decreased. However, it continues to be used, principally in the southern region of United States and in the interior regions of Latin-American countries. In addition, the prevalence of chewing tobacco use is considerable in India, Sri Lanka and other countries. In Brazil, chewing tobacco, as well as snuff, is still used, especially in rural areas.

Another important fact is that chewing tobacco has been supplanted by other forms of oral use, a resurgence of which was seen in the United States in 2005. In that year, 170 million dollars were spent in advertising and divulgation, probably due to the increased regulation of smoking in public places. This form of tobacco is being sold in most places where cigarettes are sold, and the distribution of chewing tobacco is limited.[24]

Preparations for mucosal absorption

Snuff consists of the finely ground tobacco, sold as a dry or moist powder. The moist powder can be placed in small quantities between the cheek and the gum, in the lower part of the mouth. It can also be found in small sachets to be placed in the mouth. These presentations aim at being smokeless and are marketed as a discreet form of using tobacco. The dry powder form (known as "rapé" in Brazil) is used for aspiration or inhalation through the nose.

The presentation known as *snus* is the moist form marketed in Sweden and Norway. It is sold in small sachets to be placed in the mouth. It is produced by curing tobacco in room air, after which the tobacco is mixed with water, salt and flavorings. It has fewer nitrosamines than do the other preparations, since the tobacco is not fermented. Apparently, people who use the Swedish *snus* have lower quantities of cancerous agents in their bodies than do the users of other smokeless tobacco products.

The tobacco industry promotes the consumption of smokeless tobacco, drawing attention to the fact that it can be used without problems at any time and in any place, even where smoking is forbidden ("no smoking - no problem"). With this objective, the direct targets are the smokers who experience nicotine withdrawal in smoke-free environments. In United States, baseball players constitute an important source of advertising for the use of smokeless tobacco. In 2003, more than one in every three major league players was frequently seen on television using the product during the games. The industry also suggests that the use of these products promote smoking cessation, which has not been demonstrated.

We call attention to the fact that the use of smokeless tobacco products is not a safe alternative to smoking and has harmful health effects, including the promotion of oral and pancreatic cancer,[25] as well as nicotine dependence, leukoplakia, periodontal disease, bone loss, tooth loss, tooth abrasion, etc. It has also been demonstrated that men who use smokeless tobacco products as a substitute for cigarettes present higher rates of mortality due to heart disease, cerebrovascular accident, oral cancer and lung cancer than do smokers who stop using all forms of tobacco. As for the prevalence of the use of these products, data from the US Centers for Disease Control and Prevention show that, in 2004, among adults over 18 years of age, 6% of men and less than 1% of women were regular users of these products. Data from 2005 showed that, in the younger population, this prevalence can reach 14% in males.[23]

The use of smokeless tobacco is probably less lethal than is the use of cigarettes. However, there is no doubt that all forms of tobacco use significantly increase the risk of developing diseases and of premature death among their users.

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