

## A Cigarette A Day, Keeps The Doctor In Pay

### Abstract

Smoking is one of the most common forms of recreational drug use. Tobacco smoking is today by far the most popular form of smoking and is practiced by over one billion people in the majority of all human societies. The history of smoking can be dated to as early as 5000 BC, and has been recorded in many different cultures across the world. Only relatively recently, and primarily in industrialized Western countries, has smoking come to be viewed in a decidedly negative light. Today medical studies have proven that smoking tobacco is among the leading causes of many diseases such as lung cancer, heart attacks, COPD, erectile dysfunction and can also lead to birth defects. The inherent health hazards of smoking have caused many countries to institute high taxes on tobacco products and anti-smoking campaigns are launched every year in an attempt to curb tobacco smoking. Smoking cessation, referred to as "quitting", is the action leading towards abstinence of tobacco smoking. There are a number of methods such as nicotine replacement therapy, antidepressants, hypnosis, self-help, and support groups.

### Key Words

Smoking, Drug, Tobacco, Cancers

### Introduction

The main tobacco killers in both sexes are cancers, especially lung cancer, heart disease and chronic bronchitis. However, in developing countries with higher level of traditional tobacco use, such as chewing or smoking with the lit end of the chutta inside the mouth, tobacco use is associated with high level of oral cancer. For example, the highest reported rate of mouth cancer in the world is among women in Bangalore. In India indeed it is estimated that tobacco use causes around one in five of all cancers in women.<sup>(1)</sup>

This article aims to explore the reasons and consider why more attention needs to be paid to issues around smoking both in terms of research and action. It will not revisit the pathology associated with smoking.

### History

Tobacco has been variously hailed as a gift from the gods, a miraculous cure-all for life's physical ills, a solace to the lonely soldier or sailor, a filthy habit, a corrupting addiction, and the greatest disease-producing product known to man. This diversity of opinion has continued unchanged for centuries and has appeared until very recently to be little affected by research results from more than 900,000 papers thus far published on the topic. It is common

knowledge that cigarette smoking is the single major cause of cancer and cardiovascular disease in the United States, contributing to hundreds of thousands of premature deaths each year, yet one-fourth to one-third of American adults continue to smoke.

Before examining the negative health effects of tobacco use, we would remind the reader that a popular emphasis on negative aspects is a rather new phenomenon. Since the Middle Ages tobacco leaves have been used as medicinal herbs in ointments, poultices, mouth rinses and smoke. Oral ulcers, caries and "toothache" were all treated with this wonder drug. A product is still readily available today, called "Dental Snuff" which was advertised more than a century ago as a cure for toothache, gingivitis, facial neuralgia, caries, and scurvy. Given this positive image throughout most of its history it's universal popularity is not surprising. It is surprising, rather, that some persons have always been moved to speak out against it, even to the extent of proclaiming its use a capital offense in some European and Asian countries as early as the sixteenth century.

### How smoking spreads

The initiation of smoking among adolescence is heavily influenced by

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social pressures and psychological needs including environmental influence, school and peer influence, personal factors and knowledge, attitude and beliefs about smoking.

The tobacco market is dependent on a mass market. As smokers die or quit, they are keen to recruit new young smokers to maintain their profits, particularly in new markets such as developing countries. They tailor a product to appeal to specific target groups by altering its price, availability and image through packaging, advertisement and promotion using images and messages being glamorous, sophisticated, romantic, healthy, sporty, fun, relaxing, liberated, rebellious and, last but not least, slimming. Young teenagers who smoke are more appreciative of cigarette advertisements than non smokers and the most heavily advertised brands are more often bought by teenagers than adult smokers. How smoking is portrayed in the media more generally also affects the way in which young people view the habit. Glamorous models, female personalities, teenage pop idols and film stars featuring in magazines, TV soaps, plays and films depict smoking as being part and parcel of their success. However,

adolescent smokers are more likely to be under achievers in schools with low academic goals. Using smoking to bolster self confidence stems from the wide spread belief that smoking can help calm nerves, control moods and alleviate stress- all important concerns during adolescence.

### **Particularly about women**

Smoking kills over half a million women each year and is the most important preventable cause of female premature death in several advanced countries. Women take up cigarette smoking as a widespread habit later than men, mainly due to socio- cultural factors, such as it not being socially acceptable for women to be seen smoking in public, religious attitudes and women being generally less affluent than men. Smoking affects women's health in ways which specific to them. Research has shown women who smoke (i) have a 10 times higher risks of heart disease and an increased risks of stroke if they also use oral contraceptives (ii) have a two fold associated higher risks of cervical cancer and (iii) experience detrimental affects on their reproductive health, including dysmenorrhoea, reducing fertility and an early menopause. Women who smoke during pregnancy also increase by a quarter their risks of mis-carriage and by a third the risks of the infants prenatal death, they are twice as likely to have premature labour and 3 times more likely to have a low birth weight baby. In developing countries where the health of mother and baby is already jeopardized through poverty and malnutrition, the effects of smoking are likely to have even greater impact on birth weight and prenatal mortality. Smoking is more common among these in low income, who have low status jobs or are unemployed, are single parents or divorced, have low level of academic achievement and are from under privileged ethnic groups.<sup>(2)</sup> As one starts to smoke regularly, his/ her body gets used to regular nicotine doses and becomes physiologically dependant. There are no consistent patterns or trends among women. Prevalence rates vary from as much as 58% in Nepal and over a third in European countries, such as Denmark and Poland, to barely detectable levels in many African countries, such as the Ivory Coast and Guinea.<sup>(3)</sup>

### **In the U.S.A.**

Smoking is directly responsible for 80 percent of lung cancer deaths in women in the U.S. each year.<sup>(4)</sup> Smoking is directly responsible for more than 90 percent of chronic obstructive pulmonary disease (COPD), or emphysema and chronic bronchitis deaths each year.<sup>(4)</sup> Postmenopausal women who smoke have lower bone density than women who never smoked. Women who smoke have an increased risk for hip fracture compared to never smokers. Cigarette smoking also causes skin wrinkling that could make smokers appear less attractive and prematurely old.<sup>(5)</sup>

### **Smokeless Tobacco**

Like cigarettes, smokeless tobacco products contain a variety of toxins associated with cancer. At least 28 cancer-causing chemicals have been identified in smokeless tobacco products. Smokeless tobacco is known to cause cancers of the mouth, lip, tongue, and pancreas. Users also may be at risk for cancer of the voice box, esophagus, colon and bladder, because they swallow some of the toxins in the juice created by using smokeless tobacco. Smokeless tobacco can irritate your gum tissue, causing periodontal (gum) disease. Sugar is often added to enhance the flavor of smokeless tobacco, increasing the risk for tooth decay. Smokeless tobacco also typically contains sand and grit, which can wear down your teeth.<sup>(6)</sup>

### **Treating The Addiction**

Nicotine, the main addictive chemical in tobacco smoke, is essential in continued and compulsive tobacco use. Seven medications are currently US Food and Drug Administration (FDA) approved for smoking cessation: five nicotine replacement therapies (NRTs), bupropion, and varenicline. In addition, clonidine and nortriptyline are effective for smoking cessation but are not FDA approved for this indication.

### **Nicotine Replacement Therapy**

In the US market, five NRT products are currently available: nicotine patch, nicotine chewing gum, nicotine lozenge, nicotine nasal spray, and nicotine vapor inhaler. Nicotine gum, patch, and lozenge are available as over-the-counter (OTC) products, whereas nasal spray and vapor inhaler are available by prescription only. Although initially thought to be a "substitution" treatment, similar to methadone treatment for opioid addiction, the NRTs have limited efficacy

in reducing nicotine reinforcement in clinically used doses. The NRTs are effective in relieving tobacco withdrawal and making abstinence easier in smokers trying to quit. NRTs approximately double the success rate of quitting smoking relative to placebo. NRTs can be classified as short-acting (gum, lozenge, inhaler, and spray) and longer-acting (patch) products. Short-acting NRT products are especially effective in acute management of tobacco withdrawal and craving. An important consideration for NRT treatment is titration of the dose based on the smoker's nicotine intake, determined roughly by the number of cigarettes smoked per day (CPD).<sup>(7,8)</sup>

### **Sustained-Release Bupropion**

Bupropion, an atypical antidepressant, is approved for treatment of smoking cessation. In preclinical studies, bupropion reduced nicotine's rewarding effects and attenuated nicotine withdrawal symptoms. Its mechanism of action is thought to be mediated by its ability to block the reuptake of norepinephrine and DA in the mesolimbic system and nucleus accumbens, a key area for nicotine reinforcement. Additionally, bupropion antagonizes brain nicotinic receptors and blocks the reinforcing effects of nicotine. (9)

### **Varenicline (CHANTIX)**

Varenicline is a partial agonist for the  $\alpha 4\beta 2$  subtype of nAChRs, which are associated with the addictive effects of nicotine. Varenicline is also a full agonist at the  $\alpha 7$  nAChR. In smokers, varenicline attenuates the subjective rewarding responses and heart rate increases induced by intravenous nicotine. Varenicline also improves tobacco withdrawal symptoms, mood, and cognitive performance in abstinent smokers. All these effects may contribute to varenicline's efficacy for smoking cessation.<sup>(9)</sup>

### **Nortriptyline**

Nortriptyline, a tricyclic antidepressant, has been found to be effective for smoking cessation. The underlying mechanism of nortriptyline's efficacy for smoking cessation might be through norepinephrine reuptake inhibition in central synapses or through nAChR antagonism. In clinical trials for smoking cessation, the dose of nortriptyline was 75 to 100 mg/d, and the length of treatment was 8 to 12 weeks. Compared

with placebo, nortriptyline approximately doubles the rates of smoking abstinence.<sup>(9)</sup>

### Clonidine

Clonidine, an antihypertensive agent, reduces central sympathetic activity by stimulating the  $\alpha_2$ -adrenergic receptors. Clonidine is not FDA approved for smoking cessation and is a second-line option. It effectively suppresses the acute symptoms of nicotine withdrawal, such as tension, irritability, anxiety, cravings, and restlessness.<sup>(9)</sup>

### Electronic Cigarette

The E-cigarette is a battery-powered electronic nicotine delivery device (ENDD), often resembling a cigarette. It is designed to deliver nicotine to the respiratory system, where neither tobacco nor combustion are necessary for its operation. Consequently, it is likely that this product may be considered as a lower risk substitute for factory-made cigarettes.

An important aspect that needs to be highlighted in relation to the findings of the present case series is the putative risk of E-cigarettes. In June 2009, the US Food and Drug Administration (FDA) announced in a press conference that 'a laboratory analysis of electronic cigarette samples has found that they contain carcinogens and toxic chemicals such as diethylene glycol (DEG), an ingredient used in antifreeze'.

### Conclusion

Mark Twain once said "Quitting smoking is easy. I have done it a thousand times". Smoking cessation programs are useful in helping smokers to quit, but smoking is a very difficult addiction to break and the need for novel and effective approaches to smoking cessation interventions is unquestionable. Cigarette smoke harms nearly every system of the human body, thus causing a broad range of diseases, many of which are fatal. The risk of serious disease diminishes rapidly after quitting and life-long abstinence. Firm action needs to be taken now to halt and ultimately reverse this epidemic.

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