

Tobacco Uses: A Great Health Hazard

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Abstract

The continued popularity of tobacco appears to defy rational explanation. Smokers mostly acknowledge the harm they are doing to themselves and many report that they do not enjoy it – yet they continue to smoke. Smoking behavior is maintained primarily by the positive and negative reinforcing properties of nicotine delivered rapidly in a way that is affordable and palatable, with the negative health consequences mostly being sufficiently uncertain and distant in time not to create sufficient immediate concern to deter the behavior. Tobacco smoking increases the risk of contracting a wide range of diseases, many of which are fatal. Despite reductions in prevalence in recent years, tobacco smoking remains one of the main preventable causes of ill-health and premature death worldwide. This paper reviews the source, history and epidemiology of tobacco use, extent and nature of harms caused by tobacco use – both active and passive and the benefits of stopping.

Key-words: Tobacco, Nicotine, Smoking, Ischemic Heart Disease, COPD, Cancer, Stroke.

Introduction

The English word “Tobacco” originates from the Spanish and Portuguese word “Tabaco”. The precise origin of this word is disputed, but it is generally thought to have derived at least in part, from Taino, the Arawakan language of the Caribbean. In Taino, it was said to mean either a roll of tobacco leaves (according to Bartolomé de las Casas, 1552) or to tabago, a kind of L-shaped pipe used for sniffing tobacco smoke (according to Oviedo; with the leaves themselves being referred to as cohiba)^{1,2}. Tobacco is the common name of several plants in the *Nicotiana* genus and the Solanaceae (nightshade) family, and the general term for any product prepared from the cured leaves of the tobacco plant. More than 70 species of tobacco are known, but the chief commercial crop is *N. tabacum*. The more potent variant *N. rustica* is also used around the world. Tobacco contains the stimulant alkaloid nicotine as well as harmful alkaloids³.

Tobacco has long been used in the Americas, with some cultivation sites in Mexico dating back to 1400–1000 BC⁴. Many Native American tribes have traditionally grown and used tobacco. In some populations, tobacco is seen as a gift from the Creator, with the ceremonial tobacco smoke carrying one’s thoughts and prayers to the Creator⁵. Following the arrival of the Europeans to the Americas, tobacco became increasingly popular as a trade item. Tobacco smoking, chewing, and snuffing became a major industry in Europe and its colonies^{6,7} by 1700. In the late 19th

century, cigarettes became popular. James Bonsack created a machine that automated cigarette production. This increase in production allowed tremendous growth in the tobacco industry until the health revelations of the late-20th century^{8,9}. In 2003, in response to growth of tobacco use in developing countries, the World Health Organization (WHO)¹⁰ successfully rallied 168 countries to sign the Framework Convention on Tobacco Control. The convention is designed to push for effective legislation and its enforcement in all countries to reduce the harmful effects of tobacco. This led to the development of tobacco cessation products. On May 31 every year the world observes “World No Tobacco Day” that is promoted by WHO. The objective of observing World No Tobacco Day is to reduce tobacco consumption.

Tobacco use is a risk factor for many diseases; especially those affecting the heart, liver, and lungs, as well as many cancers. In 2008, the World Health Organization named tobacco use as the world’s single greatest preventable cause of death¹¹. Bangladesh came forward and renewed a vow to put an end to deaths resulting from tobacco related diseases while observing World No Tobacco Day on 31 May 2015. Campaigns by various organizations such as MANAS, PROGGA and ADHUNIK are playing pivotal roles in the movement against tobacco. Print and electronic media is also playing a very crucial role for many years to create awareness against tobacco use.

Forms of Tobacco: Dried tobacco leaves are mainly used for smoking in cigarettes, cigars, pipes, shishas as well as E-Cigarettes (both rechargeable and disposable), E-Cigars, E-Pipes and Vaporizers. Hookahs and Bidis are other popular forms of smoked tobacco in this part of the world. They can also be consumed as snuff, chewing tobacco, dipping tobacco and snus. While overall health hazards are more in case of smoked tobacco consumption, smokeless tobacco presents greater hazards of the mouth and oral cavity such as mouth and esophageal cancer.

Demography and Social Factors: Research on tobacco use is limited mainly to smoking, which has been studied more extensively than any other form of consumption. An estimated 1.1 billion people, and up to one-third of the adult population, use tobacco in some form¹². Smoking is more prevalent among men¹³ (however, the gender gap declines with age)^{14,15} the poor, and in developing countries¹⁶. Rates of smoking continue to rise in developing countries but have leveled off or declined in developed countries¹⁷. Smoking rates in the United States have dropped by half from 1965 to 2006, falling from 42% to 20.8% in adults¹⁸. In the developing world¹⁹, tobacco consumption is rising by 3.4% per year (Table-I).

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Table-I: Estimates of tobacco smoking prevalence in world regions²⁰.

Region	Prevalence %		
	Male	Female	Overall
Africa	23	3	13
Caribbean Central and Northern America	20	4	13
South America	30	15	21
Central Southern and Western Asia	37	4	23
Eastern and South-eastern Asia	45	4	24
Eastern Europe	42	22	31
Northern Europe	28	22	27
Southern Europe	35	24	28
Western Europe	33	24	29
Oceania	43	19	30
World	32	7	23

Note: Current smoking of any tobacco product, adults aged 15 years and older, age-standardized rate, by gender. 'Tobacco smoking' includes cigarettes, cigars, pipes or any other smoked tobacco products. 'Current smoking' includes both daily and non-daily or occasional smoking.

Smoking in public was, for a long time, reserved for men, and when done by women was sometimes associated with promiscuity; in Japan, during the Edo period, prostitutes and their clients often approached one another under the guise of offering a smoke. The same was true in 19th-century in Europe²¹. Following the American Civil War, the use of tobacco, primarily in cigars, became associated with masculinity and power. Today, tobacco use is often stigmatized; this has spawned quitting associations and antismoking campaigns^{22,23}. Bhutan is the only country in the world where tobacco sales are illegal²⁴. Due to its propensity for causing detumescence and erectile dysfunction, some studies have described tobacco as an aphrodisiacal substance²⁵.

Various inter-related social factors play important parts in influencing a person into taking up tobacco which has been shown in Figure 1. Important factors predicting initiation in our society are: having friends who smoke, having parents who smoke, low social grade, tendency to mental health problems and impulsivity²⁶.

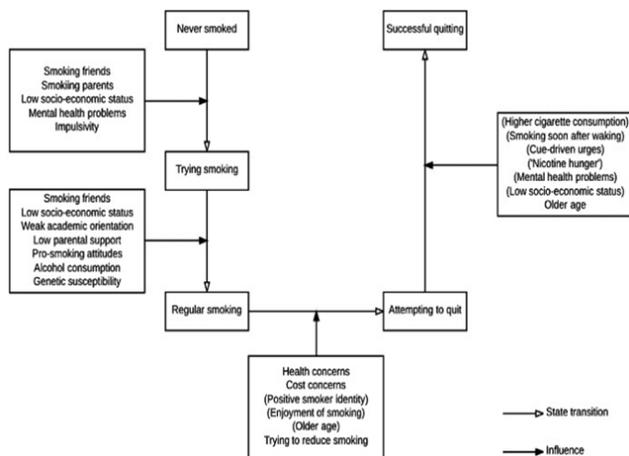


Figure-1: Factors associated with transitions in the natural history of smoking (parentheses indicate negative associations)²⁶.

Harmful Effects of Tobacco and Smoking

Tobacco smoking poses a risk to health due to the inhalation of poisonous chemicals in tobacco smoke such as carbon monoxide, cyanide, and carcinogens which have been proven to cause heart and lung diseases and Cancer. According to the World Health Organization (WHO), tobacco is the single greatest cause of preventable death globally²⁷. The WHO²⁸ estimates that tobacco caused 5.4 million deaths in 2004 and 100 million deaths over the course of the 20th century²⁹. Similarly, the United States Centers for Disease Control and Prevention describe tobacco use as “the single most important preventable risk to human health in developed countries and an important cause of premature death worldwide³⁰.”

Due to the health consequences of smoking tobacco, it is estimated that a 10 hectare field of tobacco used for cigarettes causes 30 deaths per year,¹⁰ from lung cancer and 20 from cigarette-induced diseases like cardiac arrest, gangrene, bladder cancer, mouth cancer etc³¹. The harms caused by inhalation of poisonous chemicals such as carbon monoxide in tobacco smoke include diseases affecting the heart and lungs, with smoking being a major risk factor for heart attacks, strokes, chronic obstructive pulmonary disease (emphysema), and cancer (particularly lung cancer, cancers of the larynx and mouth, and pancreatic cancers). Cancer is caused by inhaling carcinogenic substances present in tobacco smoke.

There is a positive association between average daily cigarette consumption and risk of smoking-related disease, but in the case of cardiovascular disease the association is non-linear, so that low levels of cigarette consumption carry a higher risk than would be expected from a simple linear relationship³². Smoking in both women and men reduces fertility. Smoking in pregnancy causes underdevelopment of the fetus and increases the risk of miscarriage, neonatal death, respiratory disease in the offspring, and is probably a cause of mental health problems in the offspring³³. The addictive alkaloid nicotine is a stimulant, and popularly known as the most characteristic constituent of tobacco. Users may develop tolerance and dependence^{32,33}. Thousands of different substances in cigarette smoke, including polycyclic aromatic hydrocarbons (such as benzopyrene), formaldehyde, cadmium, nickel, arsenic, tobacco-specific nitrosamines, and phenols contribute to the harmful effects of smoking³⁴. Tobacco's overall harm to user was determined at 3 percent below cocaine, and 13 percent above amphetamines, ranking 6th most harmful of the 20 drugs assessed³⁵.

Tobacco Related Cancers

Tobacco carcinogenesis has remained a focus of research during the past 10 years, and various epidemiological and experimental studies have not only confirmed the major role of tobacco smoke exposure in lung and bladder cancers, but have also reported on its association with cancers of various other sites, such as the oral cavity, esophagus, colon, pancreas, breast, larynx and kidney. It is also associated with leukemia, especially acute myeloid leukemia. In addition to the highly recognized role of cigarette smoking in lung cancer, it has been implicated in many other chronic diseases, including chronic bronchitis and pulmonary emphysema. In the United States, the reduction in smoking has resulted in a decline in death due to lung cancer in men since the mid-1980s. However, the incidence of lung cancer in women has surpassed that of

breast cancer and continues to rise; it will likely be the focus of future studies^{36,37}. Both active and passive smoking are implicated in this increase, and several studies of smoking behavior and disease incidence in women suggest greater susceptibility of women to tobacco carcinogens³⁸. It is believed that 80% to 90% of all respiratory cancers are related to active smoking.

Because of the anti-estrogenic protective effects of smoking, the role of smoking in breast cancer is controversial. However, recent studies suggest that both active and passive smoking may have a role in the occurrence of breast cancer³⁹. In both men and women, cancers of the head and neck are also on the rise, and this has been attributed to increased use of smokeless tobacco products. Also, a synergistic interaction between cigarette smoking and radon exposure was confirmed in a large study that showed that lung cancer incidence due to an interaction between smoking and radon exposure exceeded incidence accounted for by additive effects and, therefore, indicated multiplicative effects⁴⁰.

Causes of Death from Smoking

A 'premature death from smoking' is defined as a death from a smoking-related disease in an individual who would otherwise have died later from another cause. On average, these premature deaths involve 10 years of life years lost (US Department of Health and Human Services)⁴¹. Many of these deaths occur in people who have stopped smoking but whose health has already been harmed by smoking. It also happens to be the case that smokers who do not stop smoking lose an average of 10 years of life expectancy compared with never-smokers and they start to suffer diseases of old age around 10 years earlier than non-smokers.

Most smoking-related deaths arise from cancers (mainly lung cancer), respiratory disease (mainly chronic obstructive pulmonary disease – COPD), and cardiovascular disease (mainly coronary heart disease) (Action on Smoking and Health)⁴² (Table II). Smoking is an important risk factor for stroke, blindness, deafness, back pain, osteoporosis, and peripheral vascular disease (leading to amputation) (US Department of Health and Human Services)⁴³. After the age of 40, smokers on average have higher levels of pain and disability than non-smokers⁴³.

Table-II: Main causes of death from tobacco smoking and benefits of stopping⁴².

Cause of death from smoking	Benefit of stopping smoking
Coronary heart disease and stroke	Preventable if cessation occurs in early adulthood; at least partially reversible thereafter
Cancers of the lung and upper airways	Preventable if cessation occurs in early adulthood; further increase in risk prevented thereafter
Chronic obstructive pulmonary disease	Preventable if cessation occurs in early adulthood; further decline in lung function slowed thereafter
Miscarriage and underdevelopment of fetus	Preventable if cessation occurs early in pregnancy; risk is mitigated by stopping at any time in pregnancy

Passive Smoking

While the risks to human health from active smoking are accepted, evidence supporting the risk of involuntary exposure to environmental tobacco smoke (ETS) has

accumulated in recent years. ETS is now regarded as a risk factor for development of lung cancer, cardiovascular disease and altered lung functions in passive smokers⁴⁴. In general, children exposed to ETS show deterioration of lung function, more days of restricted activity, more pulmonary infections, more days in bed, more absences from school and more hospitalization than children living in nonsmoking homes⁴⁵. Passive smoking is also implicated in increasing atherosclerosis in individuals 15 to 65 years of age. Children exposed to ETS are at higher risk of developing cardiovascular disorders.

Effective Interventions for combating smoking

There are various methods which can be followed to prevent smoking for non-smokers or to quit smoking in case of smokers (Table III)⁴⁶. Many different strategies can be used for smoking cessation. Different individuals prefer different methods to quit

- Unassisted & abruptly
- Assisted and gradually
- Psychosocial approaches
- Medications
- Substitutes for cigarettes
- Community interventions

Unassisted and Abruptly: It is also called "Cold Turkey" Method. This is not a very successful method as only 3-6% individuals can successfully quit smoking using this method.

Assisted and Gradually: This plan involves gradual reduction of smoking over a period (7-10 days or more) which comprises the psychosocial approach, medications, substitutes for cigarettes and community interventions.

Psychosocial approaches: Group or individual psychological support can help people who want to quit. Individuals can seek support from support groups which comes in the form of face-to-face support group or online support group. Hypnosis, acupuncture and behavior therapy are other alternative options.

Medications: Medications such as Chantix or Bupropion can be used. Chantix (varenicline) is a prescription medication used to treat nicotine addiction. Wellbutrin (bupropion) is a medication primarily used to treat major depressive disorder and to support stopping smoking.

Substitutes for cigarettes: A nicotine patch is a transdermal patch that releases nicotine into the body through the skin. It is used in Nicotine Replacement Therapy (NRT), a process for smoking cessation. It is endorsed and approved by the Food and Drug Administration (FDA).

Community interventions: Policies such as making workplaces and public places smoke-free are an important and effective method. Mass media campaigns and institutional level smoking bans are also effective. Policies can be made that smokers will not be fit for admission in educational institutes. Religious teachers can also preach on the harms of tobacco

Table-III: Effective interventions for combating smoking⁴⁶.

Intervention	Effectiveness
Increasing the financial cost through increasing excise duty and reducing illicit supply	1–2 percentage point reduction in prevalence for 10% increase in cost of smoking; increases cessation and reduces initiation
Anti-tobacco marketing campaigns	Effect on cessation and initiation varies with content and intensity of campaigns
Brief physician advice to smokers	1–3 percentage point increase in long-term smoking cessation rate in all those receiving it regardless of initial motivation to quit
Prescription for varenicline, nicotine replacement therapy, bupropion, nortriptyline or cytisine	5–15 percentage point increase in quit success in those using it to try to quit (highest with varenicline and nicotine patches plus faster acting nicotine replacement therapy)
Behavioural support, either face to face or by telephone	3–10 percentage point increase in long-term quit success among those using it to try to quit for multi-session support delivered by trained specialists, the effect apparently being additive with pharmacotherapy
Printed self-help materials	1–2 percentage point increase in long-term quit success in those using it to try to quit compared with nothing
Peer-led school-based anti-smoking programmes and social competence training	Reduction in youth uptake varies with content and intensity of the programme

Conclusion

Tobacco smoking causes death and disability on a huge scale and only about half of smokers’ report enjoying it. Despite this, approximately 1 billion adults engage in this behavior worldwide and only around 5% of unaided quit attempts succeed for 6 months or more. The main reason appears to be that cigarettes deliver nicotine rapidly to the brain in a form that is convenient, and palatable. Nicotine acts on the brain to create urges to smoke in situations where smoking would normally occur and when brain nicotine levels become depleted. Concern about the harm from, and financial cost of, smoking is mostly not enough to counter this. Governments can reduce smoking prevalence by raising the cost of smoking through taxation, mounting sustained social marketing campaigns. Health professionals need to ensure that they routinely advise smokers to stop and offer support for quitting and make available pharmacological and behavioral support for stopping. The harms inflicted by tobacco use is widespread and known these days, even in the rural areas. It is no more a silent killer and multi-level approach including strict laws and personal motivation need to be made to counter this global problem.

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