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gOPINION

EDITORIAL VIEWPOINT

Tobacco and CVD: A Historical Perspective

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Tobacco consumption, in the past few decades has arguably been established as one of the most significant preventable causes of mortality and morbidity globally [1]. Recent projections estimate that tobacco kills at least 6 million people globally every year, which is much higher than the combined mortality caused by diseases such as acquired immunodeficiency syndrome, tuberculosis, and malaria [2]. The low- and middle-income countries (LMICs) are the worst affected by the tobacco epidemic [2]. It is estimated that by 2030, more than 80% of the tobacco-related deaths will occur in LMICs [3].

Tobacco use is a leading preventable risk factor of cardiovascular diseases (CVDs) [4]. About 1.62 billion deaths in the year 2000 (1 in every 10 cardiovascular deaths) worldwide were due to smoking tobacco in any form [5]. Approximately one-third of deaths due to tobacco are likely to be attributed to CVDs by the year 2015 [6].

Understanding the historical evolution of tobacco use and its association with CVDs may stimulate as well as provide important inputs for future tobacco control and CVD prevention programs and policies.

TOBACCO'S JOURNEY ACROSS THE WORLD

The story of the origin and spread of tobacco goes back thousands of years. The tobacco plant is mostly indigenous to the Americas, where its cultivation was started by the native Indians in the year 6000 BCE [1]. Tobacco was introduced in Europe in 1492 when Christopher Columbus and his crew returned from their first voyage of the Americas and brought with them tobacco leaves and seeds [7]. From Europe, tobacco spread to other parts of the world in the 16th century. In the early 16th century, tobacco was introduced in the Middle East by Egyptians [8]. Tobacco was introduced in China and Japan between 1530 and 1600, and the Japanese army introduced tobacco in Korea in the last decade of the 16th century [7]. During the same period, Portuguese and Spanish traders took tobacco to Africa during their voyages [7]. The Portuguese brought tobacco to India in early parts of the 17th century where they used tobacco leaves as barter for spices and textiles [1].

The origin of the word *tobacco* is contested. Some people believe that it is derived from the Arabic word *tabaq*, which means "euphoria producing herb." Some experts believe that tobacco comes from the Caribbean word *tabaco*, which is the name of the pipe from which tobacco was smoked. Some sources refer the origin of this word from the Tabasco state in Mexico [9]. The tobacco plant was botanically named by Swedish botanist Carolus Linnaeus in 1753. He described 2 species of the tobacco plant: *nicotiana rustica* and *nicotiana tabacum*. He named the tobacco plant after French Diplomat Jean Nicot who introduced and popularized tobacco in France as a cure for migraine headaches [1].

Historically, tobacco has been used for several purposes. These varied from time to time and region to region. Tobacco was mainly used by Native Americans for ceremonial purposes. They used tobacco for smoking, ingesting orally as syrup and chewing [8]. They even consumed tobacco through rectal enemas in a spiritual ritual [8]. In Haiti, tobacco was used as a medicine for cleaning nasal passages and as an analgesic [1]. In the 16th century, European doctors used to recommend tobacco as

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a cure for headache, toothache, falling fingernails, lockjaw, halitosis, worms, and cancer [10]. The recreational use of tobacco started in the latter half of the 16th century when pipe smoking was popularized by Thomas Harriot (on his return from Virginia, where he was sent to explore opportunities in the newly acquired colony) and his friend Sir Walter Raleigh (an English aristocrat, who developed the art of curing tobacco leaves in a way that popularized smoking among the British aristocracy) [10]. In the beginning of the 17th century, pipe smoking became popular in the Netherlands and later in the 18th and 19th centuries, it spread across Europe and to the East Asian countries [10]. In India and the Middle East, hookah or water pipe smoking (where tobacco smoke was filtered through water to overcome its purported ill effects) was popular among noble and elite classes [11]. Oral and nasal forms of tobacco use became popular in the 18th century [12]. In India, chewing of different flavors of tobacco flakes along with betel quid gained popularity especially among women. Women, in those times used to color their lips and mouth red by chewing tobacco with betel quid for makeup. Sniffing tobacco was also widely accepted, which led to an increase in import of tobacco in India during the Medieval Ages [11].

During the Crimean War, the use of cigarettes started becoming popular [10]. Consumption of cigarettes increased exponentially during World War I and by the end of World War II, cigarette smoking was the most common form of tobacco consumption in developed countries of the world [10]. Cigarette smoking became deeply ingrained in Western society after World War II. Cigarette smoking remains the most popular means of tobacco consumption worldwide.

TOBACCO CONSUMPTION AND CVDS: THE HISTORICAL EVIDENCE

Huchard [13], in his article on diseases of the heart and blood vessels in the year 1893, provided some of the first evidence in scientific literature of a relationship between tobacco consumption and heart diseases. He wrote: "The (unfavorable) influences of nicotinism on the development of arteriosclerosis appear to have been demonstrated. And this is not surprising since nicotine produces most often arterial hypertension by vasoconstriction" [13]. Since the early 20th century, several physicians and researchers have implicated tobacco in increasing the risk of several CVDs. Erb [14], in 1904, found that almost 60% of patients with intermittent claudication were heavy smokers. Buerger [15], in 1908, reported a rare form of peripheral vascular disease that leads to progressive inflammation and thrombosis of arteries and veins of hand and feet and occurs mostly in smokers. This disease was later named after him as Buerger's disease (*thromboangiitis obliterans*). His findings were supported by Weber [16], Brown and Allen [17], and Allen et al. [18]. Hoffman was among the first to show a statistical association between smoking and coronary thrombosis [19]. English et al. [20] compared 1,000 smokers matched with 1,000 nonsmokers in 1940 to show possible association between smoking and CVDs and concluded that there is "a more profound effect on younger individuals owing to the existence of relatively normal cardiovascular systems, influencing perhaps the earlier development of coronary disease." The first U.S. Surgeon General's Report on Smoking and Health [21] provided evidence of higher death rates among male smokers from coronary artery disease in comparison to male nonsmokers. This evidence was further strengthened in the U.S. Surgeon General's Report of 1971, which stated that smoking not only is an independent risk factor, but also combines with other risk factors to affect cardiovascular health [22]. Hammond [23], in his study on approximately 1 million people, showed an increased mortality from coronary heart disease among cigarette smokers.

The seminal British physicians cohort study by Doll and Hill [24] showed that male cigarette-smoking doctors had a higher risk of death from coronary thrombosis (ratio of death rate for male smokers in comparison to lifelong nonsmokers under 70 years of age was 2:1 and for men over 70 years was 5:1). The Framingham Heart Study, which is one of the most important cohort studies for CVD epidemiology, in the year 1960, provided evidence that cigarette smoking increased the risk of heart disease. The same cohort, in 1988, provided conclusive evidence for cigarette smoking being among the most important factors to cause stroke [25].

ANTITOBACCO MOVEMENTS AND SENTIMENTS: A HISTORICAL SNAPSHOT

During the time when tobacco consumption was gaining popularity worldwide the health, societal, and economic harms of tobacco were also being highlighted by various scientists, thinkers, and philosophers.

In the year 1604, King James I of England wrote “A Counterblaste to Tobacco” in which he said: “Smoking is a custom loathsome to the eye, hateful to the nose, harmful to the brain, dangerous to the lungs, and in the black, stinking fume thereof nearest resembling the horrible Stygian smoke of the pit that is bottomless” [10].

The first recorded legislation against tobacco use dates back to 1575, when the Roman Catholic Church passed a law prohibiting smoking in any place of worship throughout the Spanish colonies [26]. In the year 1624, Pope Urban VIII issued a worldwide ban on using or carrying tobacco products in any place of worship. He also issued a warning to excommunicate those who violated this law. However, the law was abolished by Pope Benedict XIII in the late 17th century who was a tobacco user himself [10].

From the 17th century onward, different rulers and religious leaders worldwide have imposed some form of tobacco ban in their regimes or among their followers. Sultan Murad IV of the Ottoman Empire and Czar Michael of Russia issued smoking bans with violators being treated as criminals and issued a death penalty [7]. In 1891, Iranians, led by the Grand Ayatollah Haji Mirza Hasan Shirazi, banned the trading of any tobacco products [7]. Cigarette trading was also banned for about 26 years in North Dakota [8]. In the latter half of the 20th century, the tobacco industry became so powerful financially that it started providing financial assistance to the governments and so all the existing smoking bans either were made very weak or were abolished.

One of the most successful antitobacco campaigns took place in Germany and was led by the Association against Tobacco for the protection of Non Smokers (Deutscher Tabakgegnerverein zum Schutze fur Nichtraucher), which was formed in 1904 and rose to strength with the National Socialist Party of Germany coming to power in the 1930s [27]. Hitler was strongly against the use of tobacco and made education about the harmful effects of tobacco compulsory in junior schools [27]. The government printed pamphlets warning people against the harms of tobacco and doctors organized mass meetings to raise public awareness. Smoking by uniformed police officers, persons under 18 years of age, and in buses and trains was banned [27]. However, this campaign against tobacco was short-lived and had very little impact on the per capita consumption of cigarettes, which rose year after year.

EVOLUTION OF ANTITOBACCO POLICIES IN THE MODERN ERA

Countries worldwide are now cognizant of the harmful effects of tobacco, and the ever-powerful tobacco industry, and are trying to put in place comprehensive legislations to reduce tobacco consumption as well as to prevent people who are nonsmokers from secondhand smoke. California was the first U.S. state to pass legislation against smoking in public places, including bars and restaurants, in the year 1998 [28]. This was followed by South Africa, where a law was passed making public places smoke-free but this law exempted bars and restaurants from being smoke-free [28]. Ireland was the first country to adopt a comprehensive smoking ban in indoor workplaces, including bars, pubs, and restaurants. This ban was strengthened by overwhelming public support and was seen as a societal revolution in a country known for its smoke-filled pubs and restaurants [29]. New Zealand followed the Irish model of a smoking ban and became smoke-free in 2005 [28]. Soon after, a number of European countries such as Scotland, England, France, and Italy adopted the legislation of smoke-free indoor areas [8]. The smoking bans were not confined to European nations and recently Canada and Australia have also put into effect legislations banning smoking in indoor areas [8]. India has also been a world leader in tobacco control. On October 2, 2008, the Indian government implemented Section 4 of the Cigarette and Other Tobacco Products Act (COTPA), which banned smoking any form of tobacco in public places [30]. Although COTPA-2003 is comprehensive tobacco control legislation, its implementation has been weak. This has been mainly due to lack of human resources at the state level, lack of infrastructure and training to implement the law, and absence of a strategic media and communication plan to effectively disseminate the law.

Given the importance of tobacco control in reducing CVD burden, the World Health Organization (WHO) proposed one of the most rapidly embraced treaties of all time known as the Framework Convention of Tobacco Control (FCTC). This was the world’s first global public health treaty, and it came into effect on February 27, 2005 (Table 1). To date, 170 of the 192 members of WHO have signed and ratified this treaty [8]. The treaty has been immensely successful in mobilizing resources; it has rallied hundreds of

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Table 1. Main provisions of WHO Framework Convention of Tobacco Control

Regulation of:
Contents, packaging, and labeling of tobacco products
Sales to and by minors
Illicit trade in tobacco products
Smoking at work and public places
Reduction in consumer demand by:
Price and tax measures
Comprehensive ban on tobacco advertising, promotion, and sponsorship
Education, training, raising public awareness, and assistance with quitting
Protection of environment and health of tobacco workers:
Support for economically viable alternative activities
Research, surveillance, and exchange of information
Support for legislative action to deal with liability

Adapted, with permission, from Shafey et al. [8].
WHO, World Health Organization.

nongovernmental organizations, encouraged government action, and raised tobacco control awareness. In a further addition to its tobacco-control efforts, WHO published the MPOWER report on the global tobacco epidemic in 2008. The MPOWER report elaborates 6 strategies, recommended by WHO as an entry point to implementation of the WHO FCTC (Table 2) [31]. The report is evidence-based and is shown to reduce the burden of noncommunicable diseases in countries that have successfully implemented them. The MPOWER report serves as a guiding document especially for LMICs to help them plan effective tobacco-control strategies.

The historical evidence stated herein clearly points to the fact that leaders across the globe believed that by formulating and effectively implementing antismoking policies, health can be promoted and premature losses of lives and disability can be prevented.

Table 2. WHO MPOWER strategy

Monitor tobacco use and prevention policies
Protect people from tobacco smoke
Offer help to quit tobacco use
Warn about the dangers of tobacco
Enforce bans on tobacco advertising, promotion, and sponsorship
Raise taxes on tobacco

Adapted, with permission, from WHO [31].
WHO, World Health Organization.

CONCLUSIONS

The use of tobacco became omnipresent worldwide within 150 years of Columbus being introduced to it in the Americas. Tobacco was successfully able to percolate through the social and cultural texture of communities in many continents. This assimilation was facilitated by the perceived medicinal attributes of tobacco and its ability to suppress hunger and provide mild intoxication. Myriad varieties of tobacco products and methods in which they can be used made it popular across the globe. Although there were many controversies against tobacco use and concerns about health effects of its use, the demand for tobacco kept expanding across the world and provided the thrust to tobacco companies for increased production of tobacco. The ready revenues that strengthened the economy along with ease of export and employment opportunities provided a rationale for bringing tobacco to center stage both as a crop and as an industry. It is this amalgamation of international linkages, strong economic forces, and distinctive sociocultural influences that make the history of tobacco a very fascinating study.

Learning from history, a concerted action is needed at the international, the national, and the community levels to curb the tobacco epidemic, which in turn will help in reducing the burden of CVDs. The tobacco industry, over the years, has worked to assimilate tobacco use in culture, political structures, local and national economies, and personal behaviors. Therefore, sustainable tobacco-control efforts require not only government

support, financing, and community empowerment, but also effective global health governance to control the multinational marketing, trade agreements, and information asymmetry that supports tobacco use.

The history of tobacco helps us to observe multiple factors and events that have contributed to the rise and fall of tobacco consumption worldwide. The history of tobacco provides a tool for discussion and a move forward for effective tobacco-control policies to realize the dream of a tobacco-free world.

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