

Tobacco Smoking and Cardiovascular Diseases: A Review

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Abstract

The major risk factor for cardiovascular diseases (CVD) is tobacco use, if we stop use we can reduce cardiovascular disease. Atherosclerosis, which is a main contributor to cardiovascular diseases is formed because of tobacco use. Nicotine is the main addictive substance of cigarette smoke. Its effect on Cardiovascular organs is well documented but when nicotine is taken in the form of patches its effect is very limited. For this reason, Nicotine Replacement Therapy is used for tobacco cessation. Smokeless tobacco is also harmful as they contain nicotine and other chemical components which affect the gastrointestinal tract. Quitting tobacco not only has an immediate health benefit but also improves the psychosocial life of that person.

Keywords: Tobacco, Smokeless Tobacco, Cardiovascular diseases (CVD), Atherosclerosis, Nicotine Replacement Therapy.

Introduction

Tobacco chewing or smoking has a grim and unfavorable effect on most organs of the body and is associated with multiple diseases reducing the expectancy and quality of life. Diseases associated with tobacco usage include lung & oral cavity cancer, cardiovascular diseases, emphysema, and bronchitis. Tobacco consumption is considered highly prevalent and an epidemic both in developing as well as developed nations. The prevalence of tobacco usage is more in men than women in India. Rustic, illiterate & poor section of the society were found to have this habit of smoking as found in a survey done by National Family Health

Survey (NFHS)-3, conducted in 2005–06.¹ As it was found by Global Adult Tobacco Survey (GATS) done on persons 15 years of age or older than 34.6% of the adults (47.9% males and 20.3% females) are tobacco users. Of this fourteen percent of the adults smoke (24.3% males and 2.9% females) and 25.9% use smokeless tobacco (32.9% males and 18.4% females).² And in the survey done by Global Youth Tobacco Survey (GYTS)³ on students aged 13–15 years, 14.6% of students were found to be tobacco users. Reports done on morbidity in the age group of 30 – 69 years it was found that one in twenty (5.4%) deaths among Indian women and one in five deaths (25%) among Indian men are because of smoking⁴. India has 11.2% of the world's total smokers. The main organ affected by tobacco use, are cardiovascular system and death due to cardiovascular diseases (CVD) deaths are expected to surge by 12% over the next decennium.⁵ Only if tobacco use can be stopped there will be a reduction in the occurrence of cardiovascular diseases (CVD).⁶ From 2007 the creation and enforcement of Cigarettes and other tobacco product acts (COTPA) and national tobacco control program (NTPC) by the government has tried to control tobacco usage⁴.

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The smokes of cigarettes harm numerous parts of the body thus causing diseases and ultimately death. A study done in 2015 found globally one in every ten cardiovascular deaths is attributable to smoking, and the majority of them took place in just four countries one being India. Morbidity due to cardiovascular diseases is measured in disability-adjusted life years (DALYs) and 41% of this that are attributable to daily smoking⁷. The smoke that is coming out while a cigarette is burning is a toxic mix of more than 7,000 chemicals⁸ and, when the inspiration of cigarette smoke loaded air is actively or passively done by a human body, it starts interfering with the normal physiological processes of the body. Pumping and delivery of oxygenated blood to the heart and different parts of the body is one of such important physiological process which is mainly processed by heart and lungs in collaboration. As the world is developing technology-wise the urban lifestyle diseases are also increasing. Cardiovascular diseases which claim lives globally, encompasses ischemic heart diseases (IHD), cardiac dysrhythmias, cerebrovascular diseases, peripheral arterial disease and heart failure.⁹

Effect of Smoking on Cardiovascular Health: Fresh air from the atmosphere is oxygen-rich, thus when we breathe in, lungs exchange the oxygen with the impure blood and send oxygenated blood back to the heart and other parts of the body via an artery. When we breathe in air contaminated with cigarette smoke, the blood carrying this air is dispensed throughout the body thus affecting body parts with the cigarette chemicals. The chief chemicals of tobacco smoke are total aerosol residue abbreviated as tar, carbon monoxide gas, and nicotine toxin. The maximum risk of CVD is posed by the chemicals which are present in cigarette other than nicotine. The nicotine is a highly habit-forming substance and it is associated with escalation in heart rate and blood pressure when inspired. The chemicals that reach the heart and other parts of the body will cause damage⁸ and thus cause cardiovascular disease (CVD). The major cause of all deaths for both men and women in America.¹⁰ is cardiovascular diseases.

CVD is a generic term referring to multiple conditions affecting the heart or blood vessels.⁷ Some of these conditions include:

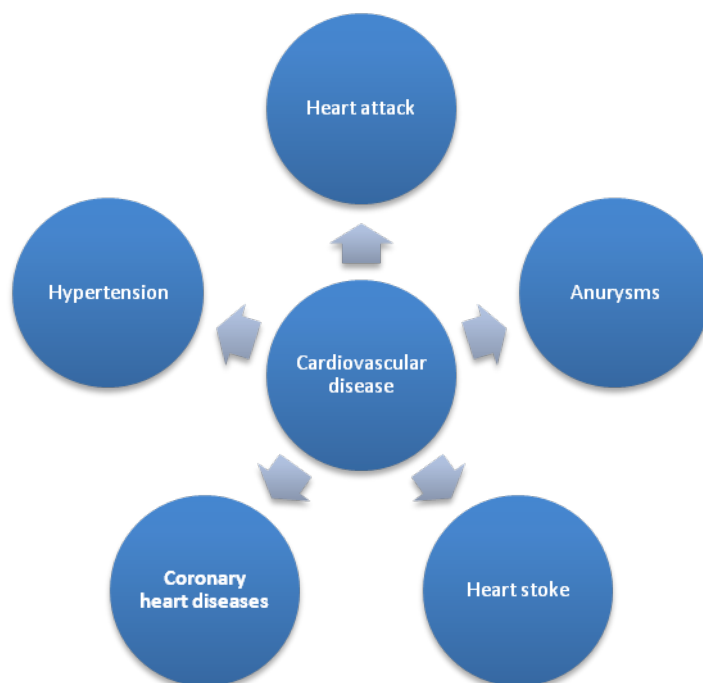


Figure 1. Multiple Conditions Leading To Cardiovascular Disease

The chemical components present in the smoke from cigarette have a seriously damaging effect on heart, its blood vessels and causes cardiovascular diseases by the

accumulation of plaques on sides of the walls, the plaques are a sticky substance which consists of cholesterol, calcium, triglycerides, and scar tissue and this plaque

causes a disease called atherosclerosis.⁵⁻⁷ This plaque formed causes constriction of the blood vessels, which in turn causes difficulty for the blood to flow through the vessels and reach the vital organs like the heart, brain, and lung. When there is a clot in vessels supplying the heart, it leads to heart attack, which may even cause death.^{5,6} Some serious cardiovascular conditions that can be an end product of smoking are as follows:

- **Peripheral Artery Disease:** It is a common circulatory problem in which plaque builds up and narrows the arteries and reduces blood flow to your legs. Smoking along with a high amount of cholesterol and fat is the leading cause of this condition. This peripheral artery disease by itself doesn't cause any morbidity but patients with this condition are at higher risk of ischemic heart disease. And it a preventable disease which can be treated by lifestyle modification which includes quitting smoking, healthy eating, and more physical activity.
- **Abdominal aortic aneurysm:** It is a localized enlargement of the abdominal aorta like a small balloon such that the diameter is greater than 3cm. The bursting of an abdominal aortic aneurysm, may cause sudden death. Abdominal aortic aneurysm can be prevented by eating healthy food, exercising daily and avoiding smoking.⁸

Impact of cardiovascular disease caused by tobacco smoking: According to the American Heart Association, CVD accounts for about 800,000 deaths every year,¹¹ in United states making it the leading cause of all deaths. Of those, nearly 20 percent are due to cigarette smoking.¹² Even in persons who smoke less than 5 cigarettes per day also are at risk of CVD.¹²

Not only smokers even people who are passive smokers are at a risk of cardiovascular disease and ultimately death. There is a 25 to 30 percent increased risk of coronary heart disease in nonsmokers who are regularly exposed to secondhand smoke than those who are not exposed.¹² In fact, according to surgeon general report 33,000 U.S. coronary heart disease deaths per year are caused by exposure to secondhand smoke¹³ Passive smokers exposed to cigarette smoke increases the risk of a heart attack.^{12,13}

It is time to protect your heart: Smoking is a bad habit and we all must refrain from this habit, for people who have this habit, it is time to quit smoking now as

it is said it is better to be late than never and the earlier you do it the better. Once a person gives up his smoking habit, certain changes start occurring in our body:

- Heart rate drops after twenty minutes of quitting smoking.¹⁴
- In 12 weeks circulation improves and lung function also increases¹⁴
- The level of carbon monoxide in the blood plunge to normal, allowing more oxygen to vital organs like your heart & brain just after 12 hours of quitting smoking.¹⁴
- The risk of stroke drops to that of a lifetime non-smoker within five years of quitting smoking.¹⁵

Conclusions

Quitting tobacco smoking has many immediate and lifelong benefits. By quitting smoking, immediately blood pressure and heart rate normalizes, the destruction process of lungs will stop and the body will try to repair itself. And, after one year of quitting smoking the risk of coronary heart disease reduces to half when compared with a smoker. Socially and frugal, benefits of quitting tobacco, are enormous not only we save our income of not buying cigarettes but also we can protect society from the harmful effect of passive smoking particularly the vulnerable group babies, teens. Nicotine when given as patch or better known as Nicotine Replacement Therapy is neither addictive nor affects the cardiac health. As quitting an addictive habit like smoking cigarettes is difficult, these therapies can be of help and can help us achieve our goal to completely quit smoking. There are some good habits which can help boost our health along with these therapies, they are regular exercise, eating a healthy diet, getting to an ideal body weight, reduce stress, limit alcohol consumption, make sure other health conditions, such as diabetes & hypertension, are under control. Last but not least have 8 hours of sleep and visit a physician regularly for routine check-up after the age of 60.

Quitting tobacco also reduces the impotence, low birth weight, Preterm babies and miscarriage¹⁶.

So to conclude to the prevention of CVD, is directly proportional to smoking, so we should take steps to reduce the proliferation of smoking in the general population particularly in teens. This can be done by urging the government to strongly enforce the laws of restriction of smoking like COTPA & NTPC in public

spaces and enact new regulations to halt the availability of cigarettes to teens.

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