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A Review on Tobacco and Its Effects on Human Health



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ABSTRACT

Tobacco is a multisite carcinogen causing various cancers and high mortality in the world, tobacco is the only product that kills half of its consumers. This study aimed to review the various carcinogenic compounds present in tobacco, the harmful effects from tobacco consumption and the therapy for smoking (Nicotine) addiction. Tobacco causing 3 million deaths every year globally. About 1.3 billion smokers worldwide and half of them die due to smoking related diseases. Cigarette smoke contain nearly 4000 chemicals, most of them are carcinogens, causing various and other diseases. Pharmacological treatment includes the various first line and second line drugs, which are showing promising results in treating smoking addiction. Non-pharmacologic intervention includes counselling smokers by physicians or by promoting the public awareness of various dangerous effects of tobacco, implementing schemes and programs to reduce the usage of tobacco and related products, result to a reduction in usage of tobacco ultimately reduce the resulting dangerous consequences.



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INTRODUCTION

Tobacco is regarded as “holy herb” and “Gods remedy” [1]. Tobacco is obtained from ‘*Nicotiana tobaccum*’ belongs to the family “*Solanaceae*” and genus “*Nicotiana*.” Nicotine is the major drug present in tobacco. Tobacco causes 3 million death every year globally, if current smoking rates continue, by 2030, the annual mortality will cross 10 million. Compare to other persons, smokers die 14 years earlier. Almost half of children frequently breathe air which is polluted by tobacco smoke in public places and 65000 die every year because of illness from passive smoke [2]. In 2003, World Health Organization (WHO) initiated the development of the framework convention on tobacco control (FCTC)[3]. The main aim of FCTC is to protect the present and future generations from devastating health, social, environmental consequences of tobacco consumption.

Toxic chemical composition of Tobacco and Cigarette:

Nicotine is the potent drug of tobacco which causes addiction to cigarette smoking. It stimulates the nervous system and causes increase in heartbeat, blood pressure and even cause wrinkles by shrinkage of blood vessels under the skin. Cigarette smoke contains nearly 4000 varieties of chemicals and most of them cause different types of cancer. Some of the harmful chemicals emitted during smoking like Carbon monoxide a poisonous gas decreases the amount of oxygen which is taken up by the RBC, hydrogen cyanide causes the accumulation of various toxins in the lungs and other dangerous substances like dimethylbenz(a)anthracene, mainly cause lung cancer by causing mutations in P53 genes crucial for cell cycle deregulation and carcinogenesis.

Forms of Tobacco Intake [4]

- Cigarette – most common and very harmful
- Bidi- most commonly used form in India
- Tobacco chewing
- Hokkah
- Kreteks
- Sheesha

Tobacco causes various deaths from non-communicable diseases such as Cancer, Chronic respiratory disease, diabetes, ischemic heart diseases.

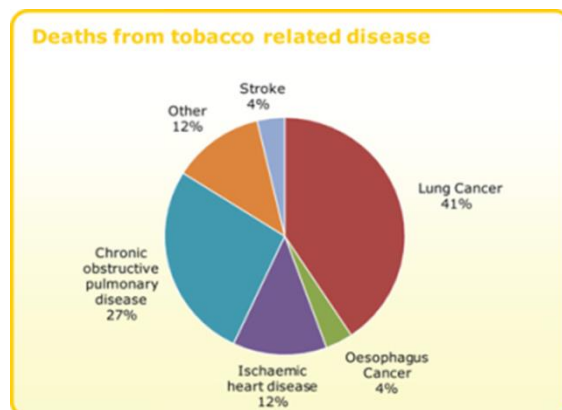


Figure No. 1: Deaths from tobacco related diseases

Tobacco contains large number of toxic compounds which contribute to different types of cancer and other diseases.

Carcinogenic effects

Tobacco causes cancer of lungs, oral cavity, nasal cavity, pharynx, larynx, esophagus, kidney, uterine, pancreas, stomach, liver, renal pelvis, bladder and myeloid leukemia. [5] Tobacco causes largest number of deaths by lung cancer, respiratory and cardiovascular diseases. [6] The risk of lung cancer is 20-30 times higher in non-smokers who marry smokers [7], also non-smokers who expose to passive smoke have 20% to 30% higher risks of getting lung cancer. [8]

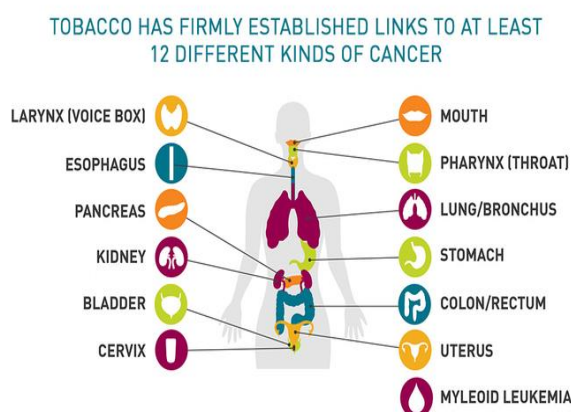


Figure No. 2: Tobacco causing 12 different kinds of cancer.

Cardiovascular diseases

There is a causative link between cigarette smoking and cardiovascular conditions. The major mechanism causing smoking induced cardiovascular diseases are endothelial dysfunction, inflammation, prothrombotic effects, changes in lipid metabolism, decreased supply of blood and oxygen to myocardium, increased preload on heart, insulin resistance.^[9] These conditions resulting in stroke, cardiac arrest.

Respiratory effects

Cigarette smoking has contributed to the development of chronic obstructive pulmonary diseases (COPD) and cigarette smoking aggravates Asthma in adults and causes inflammation, results in abnormal functioning and injury of lungs. A survey in China found that smokers are 14 times more prone to develop Severe Respiratory Pneumonia than non-smokers, the scientific data showed that nicotine increases the ACE-2 expression and worsen the COVID-19 disease in smokers. ^[10]

Reproductive effects

Maternal tobacco smoking and exposure of child to passive smoking contributes to various complication like congenital defects in the baby (spina bifida, cleft lip, cleft palate, cerebral palsy, down syndrome), slow growth, poor lung function, increased chance of developing asthma.

Additional Effects

Despite causing various diseases and cancer, tobacco even worsens some existing conditions like Rheumatoid arthritis, diabetes, kidney damage and dental caries. Studies shown that smoking causes reduction in olfactory and odor recognition, also interferences with sensory-motor-oral system which causes alterations in functions like chewing, swallowing, breathing.^[11]

Tobacco causes more deaths compared to all other deaths from alcohol use, HIV, motor-vehicle injuries, murders and suicides.

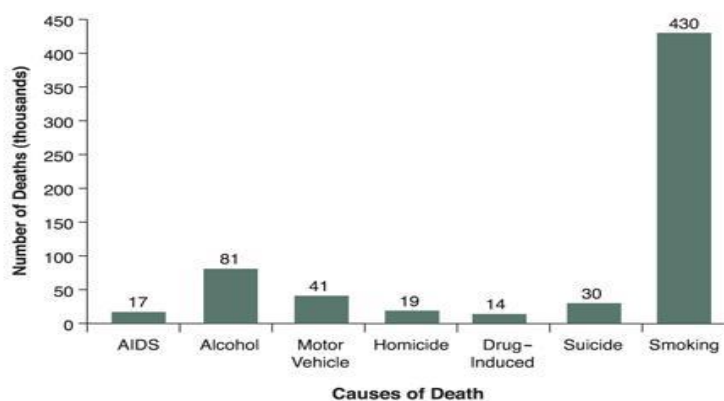


Figure No. 3: Tobacco causing more deaths.

Pharmacological treatment of cigarette (Tobacco) smoking

Cigarette is the major form of consuming tobacco. There are seven FDA approved drugs for quitting smoking: Transdermal nicotine patch, nicotine lozenge, nicotine gum, nicotine inhaler, nicotine nasal spray, Bupropion, Varenicline. These are the first line drugs for treatment of tobacco cessation according to U.S public health service guidelines. These first line drugs maintain moderate levels of nicotine to counteract the withdrawal symptoms, reduce the degree of craving and will help in reduction of tobacco addiction. Nicotinic Replacement Therapy (NRT) is given to patients who are more dependent on nicotine and have serious withdrawal symptoms^[12]. NRT therapy include nicotine gum, Nicotine nasal spray, Nicotine lozenge, Nicotine inhaler, and transdermal patch. Clonidine and nortryptiline are second line agents used for nicotine addiction.

Non-Pharmacological intervention for treatment of smoking addiction

Doctors and other healthcare professionals play a major role in advising smokers to quit tobacco and other tobacco-related products. Clinical practice guidelines recommended that physicians follow the “ 5 As” in tobacco cessation intervention with tobacco users, the “5As” are.^[13]

1. Asking the patient if he or she uses tobacco and documenting tobacco use status for every patient at every stage.
2. Advising the patient to quit tobacco
3. Assessing the patients willingness to quit tobacco use

4. Assisting the patients in this quit attempt
5. Arranging follow up contacts and relapse prevention. or by motivational interventions.

Tobacco consumption in youngsters is a major concerning health issue, there are about 1.2 billion smokers, out of which,50% are youngsters ^[14] . Heavy smokers are not able to quit smoking at once, so there must be a gradual reduction of smoking which give very positive results without any withdrawal symptoms. Smokers who are not willing to quit, are recommended to enter a smoking cessation programme or by motivational intervention. Smoking cessation reduces tobacco related diseases in future, improve life span by an average of 10 years. ^[15]

CONCLUSION

Tobacco causing largest number of deaths in the world. Tobacco contain various carcinogenic compounds like methylnaphthalene, Dimethyl benz(a)anthracene causes cancers of lungs, oral cavity, uterine, kidney, pancreas. Tobacco causing 3 million deaths every year globally and Smokers die 14 years earlier than non smokers. Tobacco also causes coronary heart diseases, cardiac arrest, COPD, congenital defects. It also worsen some existing conditoinis like diabetes, kidney damage, rheumatoid arthritis. Adddiction treatment include either using drugs like Buprioprin, Verenicline, NRT therapy, clonidine and nor tryptyline or counselling the smokers by the physicians or attending smoking cessation programs. The main intervention should be highlight the beneficial effects of quitting tobacco rather than on the harmful effects of tobacco consumption. By making people aware of health benefits of quitting tobacco and harmful effects of consumption tobacco by implementing various schemes and programs, Tobacco consumption and relate deaths can be avoided. Tobacco should be avoided for leading a healthy and happy life. People make every day a no tobacco day.

Abbreviations

WHO- World Health Organization

FCTC- Framework Convention of Tobacco Control

COPD- Chronic Obstructive Pulmonary Diseases

FDA- Food and Drug Administration

NRT- Nicotine Replacement Therapy

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