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SMOKING: ENVIRONMENTAL AND SOCIAL IMPACT

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ABSTRACT Tobacco requires huge chemical inputs: up to 16 applications of pesticide are recommended during one three-month growing period. Aldrin, Dieldrin, DDT are among the chemicals used. Methyl bromide, widely used as a fumigant in developing countries, contributes significantly to ozone depletion. Global smokers are around 1.2 billion in the world). At least 4.5 trillion [non-biodegradable] filter-tipped cigarettes are deposited annually somewhere in the world. China, Brazil, Turkey, Indonesia are the countries that produce the most raw tobacco leaves and manufactured cigarettes. Thus, the hazardous effect of tobacco is not only limited up to smoking but also from its growing.

INTRODUCTION:

Global smokers are around 1.2 billion in the world (about one-third of the global population aged 15 and over). At least 4.5 trillion [non-biodegradable] filter-tipped cigarettes are deposited annually somewhere in the world. China, United States, Brazil, Turkey and Indonesia are the five countries that produce the most raw tobacco leaves and manufactured cigarettes. Malawi, Korea, Macedonia, Moldova, and Lebanon devote more than 1% of their agricultural land to tobacco leaf production. In Africa, around 5% of all deforestation is caused by tobacco. In Malawi, where the ancient dry forests of the Miombo highlands are particularly under threat, tobacco accounts for 20% of deforestation. Each year nearly 600 million trees are destroyed to provide fuel to dry tobacco. Putting it in another way, one tree is destroyed for every 300 cigarettes. Globally, tobacco curing requires 11.4 million tons of solid wood annually [1].

Releases to the environment of Toxics Release Inventory chemicals by the tobacco manufacturing industry in the United States recorded for 1996 included (but weren't limited to): Ammonia 946,155 kg, Hydrochloric acid 407,371 kg, Methyl ethyl ketone 340,821 kg, Nicotine and nicotine salts 900,377 kg, Sulphuric acid 67,228 kg, Toluene 349,622 kg. Furthermore, cigarette smoke contains polonium 210, a radioactive element. One study shows that a person who smokes 20 cigarettes a day receives a dose of radiation each year equivalent to about 200 chest x-rays. Thus, taking this background the present review encompasses the detrimental impacts of tobacco from its production up to its consumption with a special focus on its socio-economic impact [2].

Toxic impact of tobacco plant:

Tobacco is a sensitive plant prone to many diseases. It therefore requires huge chemical inputs: up to 16 applications of pesticide are recommended during one three-month growing period. Aldrin and Dieldrin, and DDT are among the chemicals used. Methyl bromide, widely used as a fumigant in developing countries, contributes significantly to ozone depletion. As well as being hazardous to users, chemicals may run off into water courses, contaminating local water supplies. There are also concerns about high levels of pesticide use leading to the development of resistance in mosquitoes and flies, making the control of diseases such as malaria more difficult. Tobacco is particularly potassium-hungry, absorbing up to six times as much as other crops, leaving soil in poor condition for essential food and cash crops. Modern cigarette manufacturing machines use more than six kilometres of paper per hour. In 1995 worldwide tobacco manufacturing produced 2.26 billion kilograms of solid waste and 209 million kilograms of chemical waste [3].

Health impact of smoking:

More than one in 10 deaths globally was caused due to smoking in 2015 and over 50 per cent of them took place in just four countries, one of which was India, a new study today said. Over 11 per cent of 6.4 million deaths worldwide was caused by smoking in 2015 and 52.2 per cent of them took place in China, India, USA, and Russia, according to the latest estimates in the Global Burden of Disease (GBD) study published in medical journal The Lancet. China, India, and Indonesia, the three leading countries with male smokers, accounted for 51·4 per cent of the world's male smokers in 2015. India has 11·2 per cent of the world's total smokers. Deaths attributable to smoking increased by 4.7 per cent in 2015 compared with 2005 and smoking was rated as a bigger burden on health moving from third to second highest cause of disability, the study said. The estimates are based on smoking habits in 195 countries and territories between 1990 and 2015, and illustrate that smoking remains a leading risk factor for death and disability. The USA, China and India, which were the leading three countries in total number of female smokers, accounted for only 27·3 per cent of the world's female smokers, while Indonesia, Bangladesh and the Philippines did not have significant reductions in male prevalence of daily smoking since 1990, the Philippines, Germany, and India had no significant decreases in smoking among women. Worldwide, between 1990 and 2015, smoking prevalence decreased by almost a third from 29.4 per cent to 15.3 percent and currently one in four men (25 per cent) worldwide smoke, as do one in nearly 20 women (5.4 per cent). Despite these improvements, population growth has led to an increase in the overall number of smokers from 870.4 million in 1990 to 933.1 million in 2015. Pakistan, Panama and India stand out as three countries that have implemented a large number of tobacco control policies over the past decade and recorded marked declines in the prevalence of daily smoking since 2005, compared with decreases recorded between 1990 and 2005. Framework Convention on Tobacco Control (FCTC), is necessary and vital for creating policy environment for more effective tobacco control worldwide but in not enough to fully address each country's tobacco control needs. The nations will need to both implement FCTC-stipulated measures and supplement such policies and programmes with strong enforcement and high rates of compliance [4].

The Indian scenario:

India, where 11·2 per cent of the world's smokers live, supplemented the Cigarettes and Other Tobacco Products Act (COTPA) with the creation of a National Tobacco Control Programme (NTCP) in 2007.

NTCP was created to strengthen implementation and enforcement of the various provisions of COTPA at the state and district level. It has been rolled out in phases and currently covers about 40 per cent of all districts in India. India remains the highest tuberculosis (TB) burden country in the world and accounts for one fifth of world's new TB cases and two thirds of the cases in the South-East Asia region. Though many biological, socio-economic, and behavioral risk factors are known to be associated with the development of pulmonary TB (PTB), tobacco smoking and alcohol use are important risk factors for TB. As shown in the Table-1, including all other addictive factors, tobacco consumption is the largest and deadliest problem in India particularly in tribes.

Risk factors	Eligible to screen	Total screened	TB cases	Prevalence/ 100,000 95% CI	p-value
Age in years ≤35 ≥35	2089 1990	2016 1887	5 18	248.0 (31.0–465.0) 953.9 (514.9–1392.9)	0.003

Sex					
Male	2118	2060	6	291.3 (58.3–524.3)	0.01
Female	1961	1843	17	922.4 (486.4–1358.4	
Tobacco smoking					
Non-smoker	3184	3024	12	396.8 (172.8–620.8)	0.003
Smoker	895	879	11	1251.4 (516.4–1986.4)	
Alcohol consumption Non-consumers	3408	3245	14	431.4 (205.4–657.4)	
Consumers	671	658	9	1367.8 (480.8–2254.8)	0.009
Tobacco smoking and alcohol consumption Nil	3047	2889	11	380.7 (155.7–605.7)	0.21
Tobacco smoking only	361	356	3	842.7 (107.3–1792.7)	0.51
Alcohol consumption only	137	135	1	740.7 (705.3–2186.7)	0.001
Tobacco smoking and alcohol consumption	534	523	8	1529.6 (477.6–2581.6)	

(Courtesy: Rao VG, et al. Smoking and alcohol consumption: Risk factors for pulmonary tuberculosis among the tribal community in central India, Indian J Tuberc. (2016), http:// dx.doi. org/10.1016/j. ijtb.2016.11.009) [5].

Thus, from the above information and available data it is quite clear that in India tobacco consumption is the most burning problem and challenging issue to the society. The tobacco consumption not only create health issues but also create socio-economic loss to the poor citizens.

Biological basis and Socio-economic impact of tobacco consumption:
Chronic exposure to tobacco, as well as to a number of environmental pollutants, impairs the normal clearance of secretions on the tracheobronchial mucosal surface and may thus allow the causative organism, *Mycobacterium tuberculosis*, to escape the first level of host defenses, which prevent bacilli from reaching the alveoli. Smoke also impairs the function of pulmonary alveolar macrophages (AMs), which are not only the cellular target of *M. tuberculosis* infection but also constitute an important early defense mechanism against the bacteria; AMs isolated from the lungs of smokers have reduced phagocytic ability and a lower level of secreted proinflammatory cytokines than do those from the lungs of nonsmokers. Recent work has suggested a novel mechanism for the effect: Nicotine is hypothesized to act directly on nicotine acetylcholine receptors on macrophages to decrease production of intracellular tumor necrosis factor and thus impair killing of *M. tuberculosi*. These effects of smoking on pulmonary host defense support a causal link between smoke exposure and either an increased risk of acquiring TB or progression of TB to a clinical disease [6]. Furthermore, some recent researchhave suggested that, MTHFR gene C677T polymorphism and MTR gene A2756G polymorphism in tobacco users (smoking and tobacco chewing) in eastern Uttar Pradesh population. This will help to correlate genetics with the smoking habit and find possibilities to remove this social disorder.

MTR is a vitamin B12-dependent enzyme essential forthe remethylation of homocysteine to methionine. The human MTRgene is located on chromosome 1q43. It produces approximately1265 amino acid residues andweighs 140.5 kDa . MTR, a polymorphism located at nucleotide position2756 (MTR A2756G; rs1805087) changes aspartic acid into glycine(D919G). Numerous studies have shown the relationships between smoking and an increased risk of mortality from cardiovascular diseases (CVD) and cancer. Alcohol and cigarette smoking each have an individual effect on the risk of mortality, but, when combined, they act synergistically. Epidemiological studies have demonstrated that, in adults, high rates of smoking strongly correlate with alcohol use. Hyperhomocysteinemia is an independent risk factor for stroke and other vascular events. The variant methylenetetrahydrofolate reductase (MTHFR) C677T is associated with elevated homocysteine levels, cardiovascular disease and stroke, which supports a causal relationship between hyperhomocysteinemia and vascular disease. However, MTHFR variants have also been reported to be associated with smoking behavior, which could be an important confounder. In our study samples, MTHFR variants and smoking behaviour were associated with homocysteine plasma levels. In addition, the MTHFR variants were associated with smoking behaviour. Such an association may be a relevant confounder between MTHFR variants, homocysteine plasma levels and vascular diseases [7-9].

CONCLUSION:
In conclusion we may suggest that, tobacco and poverty are inextricably linked. Many studies have shown that in the poorest

households in some low-income countries as much as 10% of total household expenditure is on tobacco. This means that these families have less money to spend on basic items such as food, education and health care.

Conflict of interest: NIL

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