



Review Article

Effect of tobacco consumption – A review

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ABSTRACT

There are about 1.2 billion smokers worldwide of which estimated about 4 million died every year. Tobacco consumption is a common habitual concern in India; in two major Forms such as Smoking and Chewing tobaccos. Smoking includes Cigarette, Bidi Hukkah and other forms of consumption while Chewing tobaccos include Khaini, Gutka, Mawa, Dukta, Snuff, Gudakhu and other forms. The cancer reported by Chewing forms of Tobaccos are known as CIT (Chewable Indian Tobacco) Cancers. The CIT cancers more seen in India and adjacent countries like Nepal, Bangladesh, Pakistan, Sri Lanka etc, than western part of the globe. It has been calculated that 26 grams of CIT for 20 years will produce oral cancer in genetically coded people. It is a major problem in Oncology, Oral medicine as well as Public Health. Although tobacco smoking has reduced in the recent past in India, tobacco consumption / smoking is leading preventable cause of death due to cancer in males. Cigarette smoking also complicates morbidities related pulmonary conditions like Asthma, COPD, Cancer and COVID etc. A dynamic comprehensive approach is required for breaking the habit of tobacco consumption in any form. Various studies conducted in the past proposed that intensive tobacco cessation interventions involving behavioural support plays an important role in the treatment of addiction / deaddiction. Public health professionals can play an important role in creating awareness among people regarding the ill effects of tobacco through different community communication technologies. It is important that government has passed trading restrictions in order to curb the tobacco consumption through primordial prevention method. Advertisement and promotion of tobacco products are also banned throughout the country, though it continues in one form or other. Many NGO as well as Government sectors have taken initiatives at central and state level to establish tobacco cessation clinics (TCCs) in fewer instances. Behaviour Change in Tobaccoreplacement therapy, Smoking.

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1. Introduction

Tobacco comes from the leaves of *Nicotiana tabacum* which are raised, dehydrated and preventable cause of death, although it is Primarily a Risk factor. However, reduction in tobacco consumption is seen more effectively in developed countries as compared to developing countries. India is the second largest consumer and third largest producer of tobacco.¹ Annually 7,00,000 deaths are recorded in India which are mainly attributed to tobacco consumption and

is expected to rise around 1 million in next few decades.² China followed by India are the major countries which contribute to smoking risks. (Figure 1)

In India, around 35% adults use tobacco and around 25% consume smokeless tobacco, 9% only smoke cigarettes while 5% use cigarettes as well as CIT.³ In India, annual incidence of oral cancer among males is as high as 10 per 100,000. Smokers are more prone to develop respiratory, cardiovascular and peripheral vascular diseases as compared to non-smokers. Approximately, one person dies due to tobacco consumption every six seconds.^{4,5} Smoking is considered as a chronic relapsing condition,

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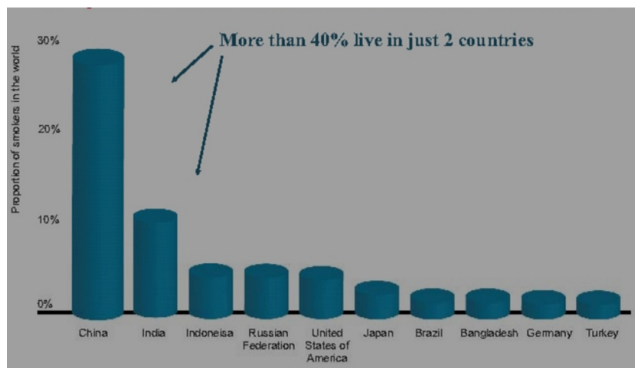


Fig. 1: Worldwide distribution of smokers; MPOWER package, 2008

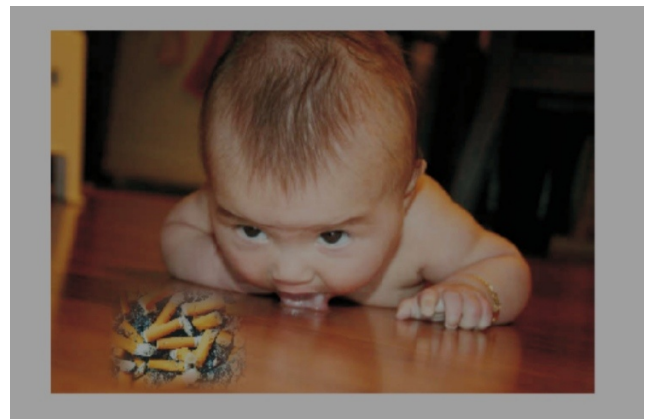


Fig. 3: Third hand smoking biggest risk to young children

whose treatment is often difficult. As reported by American Heart Association, nicotine dependence is hardest to interrupt because its behavioural as well as pharmacological features those are equivalent to that of cocaine and heroin dependence.⁶

2. Second Hand Smoke

It is also called as passive smoking, involuntary smoking and environmental tobacco smoking. Second hand smoking is basically inhalation of tobacco smoke by persons other than the intended “active” smoker, which affect the children around (Figure 2).

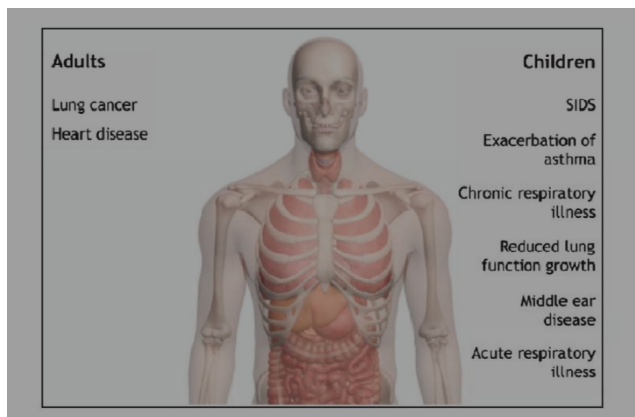


Fig. 2: Diseases and adverse health effects caused by second hand smoke

3. Third Hand Smoke

Third hand smoke refers to the chemical residual of tobacco smoke built up for weeks and months that clings to clothing, cushions, furniture, wall, carpet, hair, skin, and other materials after the cigarette is extinguished. This normally affects the young ones who quire toxins by tongue while playing (Figure 3)

3.1. Green Tobacco Sickness (GTS)

GTS is a form of nicotine sickness/poisoning that occurs due to nicotine dermal exposure with wet tobacco leaves. Commonly seen among people who harvest or cultivate tobacco. The overall prevalence of GTS is higher (86.2%) among tobacco cultivators. Symptoms mainly includes headache, weakness, giddiness, nausea, vomiting, abdominal pain and breathlessness.

4. Musculoskeletal effect Review of Tobacco Consumption

Tobacco consumption has many deleterious effects on the musculoskeletal system which in turn reduces the quality of life. Studies conducted by different researchers who studied the effect of smoking on musculoskeletal system has been depicted in Table 1.

Table 1: Effect of smoking on musculoskeletal system

Citations	Results
Beyth et al., 2015 ⁷	Average concentration of Bone marrow progenitor cells (BMPCs) in smokers is lower as compared to nonsmokers.
Bjarnason et al., 2009 ⁸	Bone mineral density of smokers on treatment with estradiol increases but with a less pace as compared to nonsmokers
Breitling, 2015 ⁹	The study was carried out on three different groups (i.e. never-smokers, former smokers and current smokers) and they showed an overall positive trend between calcium consumption and BMD
Callreus et al., 2013 ¹⁰	The relative fracture risk and bone mineral density is same in never-smokers and former and current smokers; however, the bone mineral density of femoral neck gets reduced as smoking increases. The bone mineral density is not significantly lower in young women of a longer duration of time or just started. In case of smokers the reduced levels of bone mineral density last only for 24 months and becomes equal to those of nonsmokers with 24 months of time.
Cangussuet al., 2012 ¹¹	There was no significant difference between the postural balance among smokers and nonsmokers, in the study. However, the risk of fall was seen to be higher among smokers than nonsmokers in case of postmenopausal women
Caram et al., 2016 ¹²	The results of the study showed that there is an inverse joint effect of smoking and COPD on health, composition of body and exertion.
Cetin et., 2009 ¹³	Smokers have higher rate of osteopenia and osteoporosis as compared to nonsmokers. Less T-scores in smokers Higher activity of antioxidant enzymes in smokers than nonsmokers
Chassanidis et al., 2012 ¹⁴	Smokers showed less reduction of expression of bone morphogenetic proteins (BMP-2, BMP-4 and BMP-6) Also non-fractured group showed higher expression of bone morphogenetic proteins than fractured group.
Dorn et al., 2013 ¹⁵	High frequency of smoking is associated with less bone mineral density of lumber spine and total hip among 13-19 age group of girls Higher symptoms of depression are associated with less BMD of lumber spine
Drage et al 2007 ¹⁶	No significant association between bone marrow density of jaws, hips etc and years of cigarette smoking exists.
Eleftheriou et al., 2013 ¹⁷	Smoking adversely affects the bone marrow density and calcaneal quantitative ultrasound High bone marrow density in case of moderate alcohol intake Physical activities improve the bone mineral density
Emaus et al., 2014 ¹⁸	Life time bone loss was higher in smokers than in nonsmokers Body mass index effects the loss of bone in case of women
Fujiyoshi et al., 2016 ¹⁹	According to this study, people who were current smokers showed lower levels of parathyroid hormone as compared to old smokers. Along with this smoker also showed lowest levels of serum calcium and excretion of calcium through urine in a day.
Kargin et al., 2016 ²⁰	Mean serum PTH level and C-terminal telopeptide levels were less in smokers than in nonsmokers.
Kassi et al., 2015 ²¹	The study revealed that smokers had comparatively less 25(OH)D level than nonsmokers.
Kaume et al., 2014 ²²	Smoking-induced bone loss was lesser in women consuming antioxidant rich berries is less than in non-consuming group.
Kleppinger et al., 2010 ²³	According to this study the weight, fat mass and functional muscle mass increased within a period of 16 months after quitting cigarette.
Lucas et al., 2012 ²⁴	Lower levels of bone mineral density was observed in girls at the age of 17 years who consumed smoking at the age of 13 and same goes with those who consumed alcohol.

Continued on next page

Table 1 continued

Myong, et al., 2013 ²⁵	A significant linear relationship exists between smoking and bone mineral density among Korean women.
Tamaki et al., 2010 ²⁶	Smokers showed less lumber spine bone mineral density as compared to smokers
Dinah et al., 2007 ²⁷	The success of operative management in case of nonunion carpal scaphoid was less in smokers as compared to nonsmokers.
Hernigou & Schuind, 2013 ²⁸	In case of both open as well as closed fracture smoking showed significant association with nonunion.
Campos et al., 2011 ²⁹	Smoking shows negative effect on expression of alveolar bone-related markers.
Adler et al., 2008 ³⁰	Smokers showed deep periodontal pockets as compared to nonsmokers.
Eren et al., 2015 ³¹	Lesser platelet-derived growth factor-AB are seen in smokers as compared to nonsmokers
Heikkinen et al., 2008 ³²	Boys and girls who smoke showed higher calculus and periodontal pocket as compared to those who do not smoke.
Hugoson & rolandsson, 2011 ³³	Smokers showed more significant association with severe periodontitis as compared to gingivitis. Snus users showed less significant association with gingivitis and periodontitis.
Torrungruang et al., 2012 ³⁴	Periodontal conditions were compromised among smokers as compared to nonsmokers.
Ata-Ali et al., 2016 ³⁵	Peri-implant parameters were compromised among smokers as compared to nonsmokers.
Rodriguez-Argueta et al., 2011 ³⁶	Strong association exists between smoking and complications in case of implants.
Romanos et al., 2013 ³⁷	As compared to smokers' long term success rate of dental implants was more in nonsmokers.
Shibli et al., 2010 ³⁸	Smokers showed less bone-to-implant contact and decreased bone density inside and outside the threaded area.
Svezut et al., 2008 ³⁹	Smokers showed 3.2% of early implant loss in contrast to only 2.81%. nonsmokers.
Saevarsdottir et al., 2011 ⁴⁰	Current smokers showed lower response to treatment (MTX & TNF inhibitors).
Mattey et al., 2011 ⁴¹	Smokers showed high scores of Bath AS Functional Index as compared to nonsmokers.
Adedoyin et al., 2010 ⁴²	Athletes who smoke showed high rate of exertion and fatigue index as compared to nonsmoker athletes.
Kim & Kim, 2012 ⁴³	Smokers are more dependent on internal oblique and transverse abdominis muscles as compared to nonsmokers.
Kumar et al., 2010 ⁴⁴	Smokers showed reduction in lumber extension strength as compared to nonsmokers.
Rom et al., 2015 ⁴⁵	According to this study the subjects who quit smoking showed improvement in body parameters as well as strength as compared to those who continued smoking.
Blackwell et al., 2016 ⁴⁶	Smokers showed early meniscus repair failure as compared to nonsmokers.
Sanden et al., 2011 ⁴⁷	Requirement of analgesics was more in smokers The ability to walk after surgical treatment of lumber spine in smokers was more difficult to improve than nonsmokers.
Hagnas et al., 2016 ⁴⁸	Babies of smoker mothers were more associated with low aerobic fitness than nonsmoker mothers.
Holmberg et al., 2011 ⁴⁹	The bone mineral density of individuals who were exposed to second hand smoking was less than nonsmokers.
Zadzinska et al., 2016 ⁵⁰	According to this study there are more chances of having offspring with shorter leg length in parents who smoke than in parents who do not smoke.

5. Dental Health

Primarily, mouth is exposed to tobacco and most significant effects of tobacco affects the oral cavity includes precancerous lesions, oral cancers, periodontal diseases and poor wound healing. Tobacco smoke also causes tooth decay, wearing of teeth, black pigmentation of oral tissues, Gingivitis, palatal erosions, black hairy tongue, keratotic patches. Cigarette smoking during gestation has six times greater chances of having babies with birth defects like cleft lip and cleft palate formation.⁵¹ Primary caries are seen among children in case of maternal tobacco consumption.⁵²



Fig. 4: Oral ulceration due to tobacco consumption

6. Conclusion

The issue of smoking, invariably triggers oral cancer in the brain but other issues cannot be too emphatically forgotten. Carcinoma is the most obvious terrifying condition, for which tobacco is a recognized risk factor but not causative agent. Present paper has been specifically designed to draw the attention of researches to the important studies on tobacco consumption and its effect on health other than cancer, for which tobacco is a causative agent by producing biological and physiochemical changes in humans. Multiple aspects are still not touched since they were beyond the scope of the present review.

7. Source of Funding

None.

8. Conflict of Interest

The authors declare that there is no conflict of interest.

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