

Electronic Nicotine Delivery Systems (ENDS)/Electronic Cigarettes and Lung Health

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COLUMN ARTICLE

Electronic Nicotine Delivery Systems (ENDS), also called as electronic cigarettes are highly addictive and potentially harmful products. E-cigarettes use, called vaping is popular among the youth. E-Cigarettes are available in many shapes and sizes, including the prominent brand JUUL, which resembles a flash drive and contains roughly the same amount of nicotine as in a pack of 20 cigarettes.

ENDS contains liquid nicotine, propylene glycol, and flavors to attract kids and youth. In India, E-cigarettes are unapproved under Drugs and Cosmetics (D&C) Act but are still available through e-commerce sites because of the lack of awareness and poor implementation of the law.

Punjab was the first Indian State to declare ENDS as unapproved under the Drugs and Cosmetics (D&C) Act in 2013. On 18th September 2019, the Government of India has approved the Promulgation of the Prohibition of Electronic Cigarettes (production, manufacture, import, export, transport, sale, distribution, storage and advertisement) Ordinance, 2019.¹ The prohibition of e-cigarettes includes all forms of Electronic Nicotine Delivery Systems [ENDS], Heat Not Burn Products, e-Hookah, and the like devices [1].

In the US too, the Surgeon General released an advisory on the e-cigarette epidemic among youth, in December 2018. As per US Surgeon General's advisory, Most e-cigarettes contain nicotine - the addictive drug in regular cigarettes, cigars, and other tobacco products. Nicotine exposure during adolescence can harm the developing brain - which continues to develop until about age 25. Nicotine exposure during adolescence can impact learning, memory, and attention. Many e-cigarettes also come in kid-friendly flavors. In addition to making e-cigarettes more appealing to young people, some of the chemicals used to make certain flavors may also have health risks. E-cigarettes can also be used to deliver other drugs, including marijuana. In 2016, one-third of U.S. middle and high school students who ever used e-cigarettes had used marijuana in e-cigarettes [2].

Regulation is not the way out: There is a strong propaganda being created by the tobacco industry in favor of e-cigarettes with the seemingly harmless name of vaping. Today, some of the most popular e-cigarette brands are owned by Big Tobacco. Regulating e-cigarettes like other Tobacco products under any Act is not a solution as tobac-

co is still not regulated in decades, in spite of strong provisions under the law. The tobacco industry/E-Cigarette companies will always find ways and means to circumvent existing laws.

Cigarette smoking rates among teens have dropped over the last few decades, but the use of ENDS also called vaping, has risen in this age group. There is ample scientific evidence available about the harmful health effects relating to the use of e-cigarettes, including cardiovascular and lung diseases.

Lung toxicity of ENDS: The E- cigarette aerosols contain very fine particles, heavy metals, organic compounds and heavy metals like nickel, tin and lead. Inhalation of aerosol extracts causes DNA damage in lung cells. Inhalation of electronic cigarette aerosols leads to pulmonary inflammation, impaired innate immunity, reduced lung function and changes consistent with chronic obstructive lung disease (emphysema) in pre-clinical animal models. Recently, analyses of broncho-alveolar lavage collected from nonsmokers, smokers and e-cigarette users clearly showed that electronic cigarette vapors exert marked and extensive biological effects on human airways, albeit different than tobacco smoke. Thus, regardless of the presence or absence of nicotine, exposure to electronic cigarette aerosol in adolescence and early adulthood is not risk-free and can result in pulmonary toxicity [3].

Contents of E-cigarettes: A study from the University of North Carolina found that the main ingredients found in e-cigarettes-propylene glycol, vegetable glycerin, and acrolein-are toxic to cells. Acrolein can cause COPD, asthma and lung cancer [4].

Second-hand aerosol exposure: The Surgeon General 2016 report concluded that secondhand emissions contain, nicotine; ultrafine particles, diacetyl, a chemical linked to serious lung disease; volatile compounds such as benzene and heavy metals, such as nickel, tin, and lead.

As per The American Lung Association statement responding to an increase in reported vaping-related illnesses and deaths, E-cigarettes are not safe and contain chemicals harmful to lung health. The lungs of young persons may be

more at risk, making what the Surgeon General refers to as a youth e-cigarette epidemic even more alarming. CDC and state and local health departments are conducting an ongoing investigation of the current vaping-related illnesses. There have been 26 vaping-related deaths, and there have been about 1299 cases reporting to hospitals across USA [4,6].

Bronchiolitis Obliterans or Popcorn Lung disease: The chemical that gave this condition its nickname is diacetyl. After workers at a factory that packaged microwave popcorn were found to have this ailment more often than other people, some companies stopped using diacetyl as a flavoring, but is still being used in some electronic cigarette flavors in the US [5].

Harmful flavors in ENDS: About 8,000 e-liquid flavors have been reported. Cinnamon flavor had the strongest cytotoxic effect, followed by the menthol tobacco-flavored E-liquids [7].

E-cigarettes are not currently approved by the US FDA as a Tobacco cessation aid. The evidence is insufficient to recommend e-cigarettes for smoking cessation in adults. Currently it is banned for sale in about 25 countries [8].

Considering the harmful effects of ENDS/E-Cigarettes, many more countries are planning to highly restrict or altogether ban sales of these products.

BIBLIOGRAPHY

1. MOHFW-India Advisory on ENDS.
2. US Surgeon General's Advisory on E-cigarette Use Among Youth.
3. Electronic cigarette use in youths: a position statement of the Forum of International Respiratory Societies.
4. Nation's leading lung health organization warns of irreversible lung damage and disease associated with e-cigarette use.
5. Popcorn lung disease.
6. Outbreak of Lung Disease Associated with E-Cigarette Use, or Vaping.

7. Some e-cig flavors could be more toxic than others.
8. The countries where vaping is illegal, banned or restricted.

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