Foreign studies show e-cigarettes harmful to oral health

By DTI

ROCHESTER, USA/QUEBEC CITY, Canada: In the Western world, electronic cigarettes continue to grow in popularity among young adults and current and former smokers because they are often perceived as a healthier alternative to conventional cigarettes. However, two recent studies conducted by scientists in the US and Canada have found that regular exposure to e-cigarette vapours causes damage to the gingival tissue, which may lead to infection, inflammation and periodontal disease.

Both studies investigated the effect of e-cigarettes on oral health on cellular and molecular levels through in vitro experiments. The team of Prof. Mahmoud Rouabhia from the Faculty of Dentistry at Université Laval in Quebec City exposed gingival epithelial cells to e-cigarette vapour, finding that a large number of these cells died within a few days. “Mouth epithelium is the body’s first line of defense against microbial infection,” Rouabhia explained. “This epithelium protects us against several microorganisms living in our mouths.”

To simulate what happens in a person’s mouth while inhaling, the Canadian researchers placed human epithelial cells into a small chamber containing a saliva-like liquid. E-cigarette vapor was pumped into the chamber at a rate of two 5-second “inhalations” per minute for 15 minutes a day. Observations under the microscope showed that the percentage of dead or dying cells, which is about 2 per cent in unexposed cell cultures, rose to 18, 40 and 53 per cent after one, two and three days of exposure to e-cigarette vapour, respectively.

“Contrary to what one might think, e-cigarette vapour isn’t just water,” Rouabhia stated. “Although it doesn’t contain tar compounds like regular cigarette smoke, it exposes mouth tissues and the respiratory tract to compounds produced by heating the vegetable glycerine, propylene glycol, and nicotine aromas in e-cigarette liquid.”

The cumulative effects of this cell damage have not yet been documented, but they are worrying, according to Rouabhia. “Damage to the defensive barrier in the mouth can increase the risk of infection, inflammation, and gum disease. Over the longer term, it may also increase the risk of cancer. This is what we will be investigating in the future,” he concluded.

Researchers at the University of Rochester Medical Center in the US came to similar conclusions. Dr Irfan Rahman, Professor of Environmental Medicine at the university’s School of Medicine and Dentistry, and his colleagues exposed cell cultures of human gingival epithelial cells and periodontal ligament fibroblasts to e-cigarette vapours. “We showed that when the vapours from an e-cigarette are burned, it causes cells to release inflammatory proteins, which in turn aggravate stress within cells, resulting the damage that could lead to various oral diseases,” he explained.

Most e-cigarettes feature a battery, a heating device and a cartridge to hold liquid, which typically contains nicotine, flavourings and other chemicals. The US researchers found that the flavouring chemicals negatively affect gingival cells too. “We learned that the flavourings—some more than others—made the damage to the cells even worse,” said study author Fawad Javed, a postdoctoral resident at Eastman Institute for Oral Health, part of the university’s medical centre.