THE IMPACT OF E-CIGARETTE SMOKING AND VAPING VOLTAGE ON TEAR FILM

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ABSTRACT

Background: The impact of e-cigarette (EC) vaping to the eyes is not much known except for reported eye irritation from exposure to EC vapor and e-liquid. Dubbed as "healthier" version of smoking due to lesser toxicants compared to conventional cigarette, studies found that e-liquid product label often do not represent the actual components. Carcinogens and free radicals were also found in EC vapor and they were associated with e-liquid compositions, device power output, and puffing profile. This study aims to investigate the effect of vaping on tear film and ocular comfort of long-term vapers.

Methodology: Twenty-one vapers and 21 non-smokers (age range: 18 - 30 years old) were evaluated on their Ocular Surface Disease Index (OSDI) score, non-invasive tear break-up time (NITBUT), fluorescein break-up time (FBUT), tear meniscus height (TMH), and Schirmer test. The influence of regular vaping voltage was assessed against the parameters.

Results: The OSDI score shows vapers experienced moderate-to-severe eye dryness [25.0 (IQR 14.6—43.7)]. Significantly lower NITBUT ($P < .0001$, $r = 0.70$), FBUT ($P < .0001$, $r = -0.76$), and TMH ($P = .002$, $r = -0.40$) but higher Shirmer test score ($P = .001$, $r = -0.49$) were found in vapers compared with non-smokers. Increase in vaping voltage deteriorate the dry eye symptoms and tear stability ($P < .05$). Higher Schirmer test result was also noted as voltage increases.

Conclusion: Moderate-to-severe ocular discomfort and poor tear film function among vapers signaled disadvantages of vaping to the eyes. Exposure to the by-products of e-liquid pyrolysis during high voltage vaping may have deteriorated the tear function. Investigation on other ocular surface health parameters is necessary to gain a deeper understanding on the impact of vaping to the eyes.

Keywords: E-cigarette, eye, ocular surface