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Original Article

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Cancer Prevalence in E-Cigarette Users: A Retrospective Cross-Sectional NHANES Study

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Abstract

Background: It is well known that traditional smoking causes various types of cancer, leading to the current decline in traditional smoking among US adults from 20.9% in 2005 to 14.0% in 2019. Electronic cigarettes (e-cigarettes) are commonly marketed as a safe alternative and gaining popularity especially among never-smokers and adolescents. However, there is limited evidence of effects of e-cigarette on cancer. Hence, we aim to find the prevalence and association of e-cigarette and traditional smoking among cancer respondents.

Methods: We conducted a retrospective cross-sectional study using the NHANES database from 2015 to 2018. We assessed history of cancer (MCQ220), type of cancers (MCQ230a), and smoking status (e-cigarette: SMQ900 or SMQ905 and traditional smoking: SMQ020) using questionnaires. We performed multivariable logistic regression models to find the association of e-cigarette use, traditional smoking, and no smoking with cancer after adjusting for confounding variables.

Results: A total of 154,856 participants were included, of whom 5% were e-cigarette users, 31.4% were traditional smokers, and 63.6% were nonsmokers. There is a higher prevalence of e-cigarette use among younger participants, females (49 vs. 38) in comparison to traditional smokers ($P < 0.0001$). The e-cigarette users have lower prevalence of cancer compared to traditional smoking (2.3% vs. 16.8%; $P < 0.0001$), but they were diagnosed with cancer at a younger age. Among cancer subtypes, cervical cancer (22 vs. 2.6), leukemia (8.5 vs. 1.1), skin cancer (non-melanoma) (15.6 vs. 12.3), skin (other) (28 vs. 10) and thyroid (10.6 vs. 2.4) had higher prevalence of e-cigarette use compared to traditional smokers ($P < 0.0001$). Our regression analysis showed that e-cigarette users have 2.2 times higher risk of having cancer compared to non-smokers (odds ratio (OR): 2.2; 95% confidence interval (CI): 2.2 - 2.3; $P < 0.0001$). Similarly, traditional smokers have 1.96 higher odds of having cancer compared to non-smokers (OR: 1.96; 95% CI: 1.96 - 1.97; $P < 0.0001$).

Conclusion: In our study, e-cigarette users had an early age of cancer onset and higher risk of cancer. Hence, this is stepping stone for future research to evaluate the safety and effects of e-cigarettes in patients with cancer.

Keywords: E-cigarettes; Electronic nicotine delivery system; Smoking; Cancer; Traditional smoking

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Introduction

Traditional smoking is the leading cause of preventable morbidity and mortality in the USA and worldwide. According to CDC 2019 estimates, nearly 40 million US adults aged 18 years or older are smokers and smoking is responsible for more than 480,000 deaths per year, including more than 41,000 deaths resulting from secondhand smoke exposure [1]. Approximately 16 million live with debilitating conditions due to smoking, including cancer, heart disease, stroke, lung diseases, and diabetes [1]. Every year, the US government spends nearly $170 billion as a direct cost on medical care, and indirectly around