The Effects of Smoking on Epilepsy; A Systematic Review

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Introduction

Epilepsy is a neurological disorder that affects over 50 million people each year.[1] In the U.S. alone it is estimated that 1.2% of the population is actively receiving treatment for epilepsy related symptoms and the percentage increases exponentially in low or middle-income countries.[1-2] Epilepsy is a treatable condition, with an estimated 70% of people able to become seizure free if treated properly, but treatment is expensive and its availability is below 50% in low SES countries.[1] Many factors have been shown to cause epilepsy, such as genetics, stroke, or head injury to name a few, but many cases still have undetermined causes.[1] Smoking is a known risk factor for many diseases and it has been noted that among people with epilepsy there is a significant increase in smoking rates compared to the general population making its effect on epilepsy an area of concern.[3]

The widespread use of cigarettes and the high prevalence of epilepsy in the general population leads to the goal of this paper, which is to study the effect that smoking has on the development of epilepsy, as well as the impact of smoking on the symptoms of epilepsy in adults. The broader impact of this study is to increase awareness about the prevalence of epilepsy and possible risk factors in the general population, as well as to attempt to reduce smoking rates among those with epilepsy by summarizing evidence of risks connected to smoking.

Methods

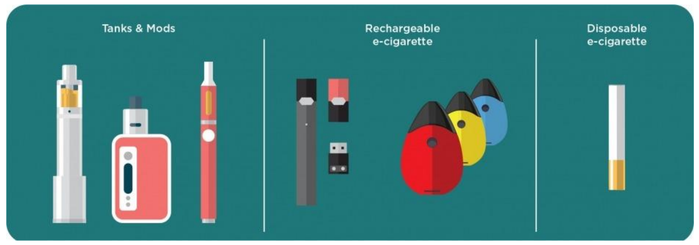
Research was conducted in February, 2025, using CINAHL, PubMed, and Google Scholar databases. Review of WHO and articles provided additional information. Search terms used in the database were as follows:

"Smoking[Title] AND Epilepsy[Title]"

The search was limited to studies that compared smoking populations with epilepsy rates and or symptom prevalence.

Results

Of the eight studies reviewed, there were four cross-sectional studies, one prospective study, one case study, and two retrospective studies with one being a pilot study. Two cross-sectional studies showed a significant correlation between current cigarette smoking and epilepsy prevalence.[1,4] Five of the eight studies concluded that smoking had a significantly negative effect on epileptic patients, with two stating smoking significantly lowered quality of life,[1,5] two showing a correlation between smoking as a perceived trigger factor of seizures,[6,7] and two showing a significant link between smoking and rate of seizures.[4,8] Two studies suggested that smoking could be a protective factor against seizures, one stating that cigarette smoking has a statistically significant positive effect on the prevalence of seizures,[9] the other suggesting that the use of marijuana was "somewhat effective" at reducing and managing seizures in epileptic persons.[10] Studies also showed a higher prevalence of smoking in people with epilepsy compared to those who don't have epilepsy.[1,3,6]



Rfigure 1. [11]

Figure 2. [12]

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Discussion

Studies reviewed showed conflicting evidence on the effect of smoking on epilepsy and seizure prevalence, showing a need for more studies to be conducted on this topic. Of the articles that showed smoking had a positive effect on epilepsy, one was a study of marijuana smoking on epilepsy.[4] Six of the eight studies provided evidence that smoking had a negative correlation with the health of people with epilepsy, with two of these studies showing a direct link between smoking and an increased prevalence of seizures.[2,10] This increase could be due to attempts to lower stress due to epilepsy significantly lowering the quality of life for individuals diagnosed.[1,2] While smoking undoubtedly influences epilepsy, it cannot be confidently concluded that the effect is either positive or negative, the data seems to lean towards smoking being a negative influence, which would be consistent with previous studies of cigarette smoking in health. General smoking has conflicting results on whether there are positive or negative effects on epilepsy, with cigarette smoking and vaping having evidence of both positive and negative effects while marijuana alludes to a positive effect in alleviating symptoms.

The most significant limitation for the studies selected in this review is the age of the studies used, as more recent studies may give a more definitive answer to the true effect of smoking on epilepsy. Though the age of the data is significant, the quality and range of the sources is high as many of the studies have large and unique sample sizes, allowing for cultural differences to be considered. Many of the studies relied on self-reporting of symptoms which could skew data of severity of symptoms as well as the honesty of reported smoking in relation. Smoking itself is a limitation because it affects any underlying diseases in patients, and may affect their reports of health and or epilepsy symptoms. Future reviews should use more recent data to receive a more accurate and definitive view of smoking's current effect on epilepsy.

Prior literature has already given evidence of cigarette smoking's negative effect on the health of the population, so even though conflicting evidence may show a protective benefit when used in correlation with epilepsy diagnosis, it cannot be recommended to use cigarette smoking as a protective factor. Epilepsy seems to have a large connection to stress, as studies have shown that higher levels of stress can be a risk factor for inducing seizures.[5,8] This could be an explanation for the seemingly protective factor that cigarette smoking has on preventing seizures, as marijuana acting as a depressant was theorized to be the reason of its protective effect on epilepsy. Conflicting evidence has been seen in this review, and this calls for more studies on cigarette smoking's effect on the severity of symptoms of people with epilepsy.

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