Marijuana Smoking and Lung Cancer: Is there a *joint* connection?

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ABSTRACT

Background: The relationship between marijuana smoking and lung cancer has become increasingly relevant, as cannabis is the most commonly used illegal drug worldwide. Current evidence of all cancer related deaths, 27% will be specifically related to lung cancer; for accounting for approximately 159,260 deaths. Through extensive research on cannabis, several pathways have been identified in relation to oncogenesis, in addition to the factors correlated with carcinogen content and smoking technique6. Objective: This study will focus on the association between smoking cannabis and the development of lung cancer. A literature review will be performed to assess this relationship and attempt to provide a logical conclusion to the phenomenon.

Methods: This evaluation was conducted based on 11 peer reviewed articles retrieved from PubMed and The University of Ottawa Library Database by searching key words such as: cannabis, lung cancer and marijuana. Results: Although the relationship between marijuana smoking and lung cancer is unclear, the majority of the articles indicated a positive correlation between inhalation of cannabis and oncogenesis of the lungs. Conclusion: Based on the molecular, cellular and histopathological findings, further research is required for definitive conclusions; however, physicians should take the potential of adverse health outcomes clearly to their patients.

INTRODUCTION

Marijuana is the most commonly used illegal drug worldwide and its abuse has increased significantly in the past decade. In 2011, the prevalence of marijuana use was estimated to be 3.9% of the adult population aged 15-44. Given the widespread use and increasing dependence on cannabinoids, it is of pivotal importance to explore the clinical consequences of this substance7. Contrary to popular belief, cannabis smoking may have a greater potential to cause lung cancer than tobacco smoking.7. Research has shown that polycyclic aromatic hydrocarbon, is found in both tobacco and marijuana smoke and has been implicated in mutations related to lung cancer8. The main psychoactive component of cannabis is delta-9-tetrahydrocannabinol (THC); however, more than 60 compounds (cannabinoids) have been identified within the cannabis plant and it contains twice the concentration of cannabinoids polycyclic aromatic hydrocarbons. Generally speaking, marijuana is smoked less frequently on a daily basis compared to tobacco cigarettes; however, the pulmonary consequences of marijuana smoking may be amplified by the higher concentration of smoke, deeper inhalation9, the use of unfiltered marijuana cigarettes (“joints”) and a relatively larger tar (a carcinogenic particulate matter) deposit on the lungs. These factors result in a five-fold greater absorption of carbon monoxide from a cannabis joint compared to a tobacco cigarette. In addition, experimental studies utilizing animal models have demonstrated that marijuana users show airway inflammation as well as histopathological and/or molecular changes which indicate precancerous activities.

Biological Pathways

Cancer is defined as a mutation in the body which results in alterations in cell reproduction, with the development of lung cancer and smoking technique. The majority of the studies were observational, which is a lower level of evidence. Randomized control trials would be difficult to conduct on this topic because it is unethical to experiment with or administer an illegal drug. The external validity of this review is weak because the majority of the studies were conducted in the form of prospective cohort studies to determine definitive causality. These discrepancies are likely due to methodological concerns in this area of research including selection bias, response bias, recall bias and confounding factors.3. Prospective cohort studies need to be conducted with larger sample sizes of cannabis smokers in the future, to address these limitations. The participants should include a full range of users from light-to-heavy marijuana use and the definition of marijuana use should be clear to their patients. Lastly, in order to identify the potential of adverse health outcomes clearly to their patients. In addition, the majority of marijuana users are also tobacco users, it is difficult to link the cause of lung cancer directly to marijuana. Future studies should develop a rigorous inclusion criteria and include all individuals who smoke tobacco (within certain limits).

Limitations

Two French articles were excluded due to a language barrier. Two articles were excluded due to monetary fees. The majority of the studies were observational, which is a lower level of evidence. Randomized control trials would be difficult to conduct on this topic because it is unethical to experiment with or administer an illegal drug. The external validity of this review is weak because the majority of the studies were conducted in the form of prospective cohort studies to determine definitive causality. These discrepancies are likely due to methodological concerns in this area of research including selection bias, response bias, recall bias and confounding factors.3. Prospective cohort studies need to be conducted with larger sample sizes of cannabis smokers in the future, to address these limitations. The participants should include a full range of users from light-to-heavy marijuana use and the definition of marijuana use should be clear to their patients. Lastly, in order to identify the potential of adverse health outcomes clearly to their patients. In addition, the majority of marijuana users are also tobacco users, it is difficult to link the cause of lung cancer directly to marijuana. Future studies should develop a rigorous inclusion criteria and include all individuals who smoke tobacco (within certain limits).

RESULTS

This literature review ascertains a positive association between lung cancer and cannabis smoking; however, the current epidemiologic evidence is sparse and the association is relatively inconclusive. The conclusion is defined as a mutation in the body which results in alterations in cell reproduction, with the development of lung cancer and smoking technique. The majority of the studies were observational, which is a lower level of evidence. Randomized control trials would be difficult to conduct on this topic because it is unethical to experiment with or administer an illegal drug. The external validity of this review is weak because the majority of the studies were conducted in the form of prospective cohort studies to determine definitive causality. These discrepancies are likely due to methodological concerns in this area of research including selection bias, response bias, recall bias and confounding factors.3. Prospective cohort studies need to be conducted with larger sample sizes of cannabis smokers in the future, to address these limitations. The participants should include a full range of users from light-to-heavy marijuana use and the definition of marijuana use should be clear to their patients. Lastly, in order to identify the potential of adverse health outcomes clearly to their patients. In addition, the majority of marijuana users are also tobacco users, it is difficult to link the cause of lung cancer directly to marijuana. Future studies should develop a rigorous inclusion criteria and include all individuals who smoke tobacco (within certain limits).

DISCUSSION

Confirmation of the association between marijuana smoking and lung cancer can solidify the need for health education initiatives to educate their patients of the risk associated with smoking marijuana and developing lung cancer to ensure that people are thoroughly aware of the risks involved. Lastly, in order to identify the potential of adverse health outcomes clearly to their patients. In addition, the majority of marijuana users are also tobacco users, it is difficult to link the cause of lung cancer directly to marijuana. Future studies should develop a rigorous inclusion criteria and include all individuals who smoke tobacco (within certain limits).