Effect of cannabis smoking on Vitamin C and E levels of male cannabis smokers in Nnewi, Nigeria


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Abstract
Smoking has been known to cause a wide range of deleterious effects on human health but the impact of cannabis use on the antioxidant vitamins are not well known. In this study, we evaluated the effect of cannabis smoking on antioxidant vitamin C and E levels of male cannabis smokers in Nnewi, Nigeria. A total of hundred (100) male participants aged between 18 and 45 years (50 cannabis smokers and 50 non-smokers) were recruited for the present study. Also, the anthropometric indices (height, weight and body mass index (BMI) of the participants were measured while other relevant data such the feeding habit, life style and age of the subjects were obtained using a structured questionnaire. Afterwards, 5 ml of venous blood sample was collected from each participant into plain containers and used for laboratory analysis by using standard methods. There was a significant decrease in the vitamin C and E levels in cannabis smokers than in non-smokers (p=0.000), whereas, the weight and BMI of both groups were similar (p>0.05). This study has shown that cannabis smoking depletes the antioxidant vitamins C and E status in users. Thus, antioxidant supplementation may be necessary in the diet of cannabis smokers as a way of boosting their antioxidant status.

Keywords: Smoking, Cannabis sativus, Marijuana, Oxidative stress, Antioxidant, Vitamin C, Vitamin E.
possess a high antioxidant and anti-inflammatory activity, together with antibiotic, neuroprotective, anxiolytic, and anticonvulsant properties. The THC content is highest in the flowering tops, declining in the leaves, lower leaves, stems and seeds of the plant. Cannabidiol (CBD) at lower doses has physiological effects that promote and maintain health, including antioxidative, anti-inflammatory, and neuroprotection effects. For instance, CBD is more effective than vitamin C and E as a neuroprotective antioxidant and can ameliorate skin conditions such as acne. Direct measurement of oxidative stress reveals that cannabinoids prevent cell death by antioxidation. The antioxidative property of cannabinoids is confirmed by their ability to antagonize oxidative stress and consequent cell death induced by the powerful oxidant, retinoid anhydroretinol. Cannabinoids also modulate cell survival and growth of B-lymphocytes and fibroblasts.

However, several authors have documented conflicting reports regarding the effect of cannabis use on the biomarkers of oxidative stress. Previously, some authors in this area had noted the effect cannabis smoking on both the kidney function and lipid profile levels in cannabis smokers. However, there is paucity of information regarding the effect of cannabis smoking on antioxidant status of cannabis smokers especially in the present area under study. Therefore, the present study is geared towards evaluating the effect of cannabis smoking on vitamin C and E levels of male cannabis smokers in Nnewi, Nigeria.

Materials and Methods

Study Area
This study was carried out in Nnewi North Local Government Area of Anambra State, Nigeria.

Study Design
This is a cross-sectional study designed to assess the levels of vitamin C and E among cannabis smokers in Nnewi North, Anambra State, Nigeria. The protocol was explained to the intending participants and those who gave informed consent were randomly recruited. A total of hundred (100) male participants aged between 18 and 45 years (50 cannabis smokers and 50 non-smokers) were recruited for the present study. The height, weight and body mass index (BMI) of the participants were measured and feeding habit, life style and age of the subjects were obtained using a structured questionnaire. Afterwards, 5mls of venous blood sample was collected from each participant into plain containers and used for laboratory analysis. The serum vitamin C and E levels were estimated using standard methods as described by Omaye et al. and Jadoon et al. respectively.

Ethical Consideration
This was obtained from the Faculty of Health Sciences and Technology Ethics Committee of Nnamdi Azikiwe University, Nnewi, Nigeria.

Inclusion Criteria and Exclusion Criteria
Apparently healthy male cannabis smokers aged 18 to 45 years were included in the present study but cannabis users taking vitamins C and E supplements, diabetics and alcoholics, female cannabis users and those younger than 18 years or older than 45 years were not allowed into this study.

Statistical Analysis
The data obtained from this study was organized and subjected to statistical analysis using Statistical packages for social science (SPSS) version 20. Student t-test was used to compare differences between groups and was deemed significant at P<0.05.

Results
Table 1 showed that there was a significant difference in the mean age of the subjects between the cannabis smokers (29.76±5.03) and control group (24.40±4.10) at p<0.05. The weight of the subject showed that there was no significant difference between the cannabis smokers (62.28±5.09) and control group (62.72±6.22), (p>0.05). Also, the result of BMI difference between cannabis smokers and control group (p>0.05).

Table 2 results show the independent t-test analysis comparing the level of Vitamin C and E level of cannabis smokers and non-smokers. There was a significant decrease in the mean level of vitamin C in cannabis smokers compared with non-smokers (p=0.000). Also, the mean level of Vitamin E differed significantly between cannabis smokers and non-smokers (p=0.000).

Discussion
Oxidative stress is considered as an imbalance between pro-oxidant and antioxidant species, which results in molecular and cellular damage. Smoking may impact negatively on the antioxidant status of the body as a result of its ability to generate free radicals which may induce damage to cells by passing its unpaired electron resulting in oxidation of cell components and molecules.

Findings from this study showed no significant differences in mean weight and body mass index of cannabis smokers in comparison with non-smokers. The mechanism that explains the current result is not quite clear. This is in agreement with the report of some previous studies. The present finding is not in keeping with the report of some previous studies. The result showed a significant reduction in the mean serum levels of both vitamin C and E in cannabis smokers than in non-smokers. The reason for the decreased serum levels of these vitamins (C and E) may be attributed to the generation of reactive oxygen species (ROS) by cannabinoid leading to increase in oxidative stress which tends to deplete the antioxidant balance. Oxidative stress leads to changes in the cellular structure and function which may ultimately culminate in cell death. Due to the paucity of information regarding the present study, we could not make a direct comparison with any previous finding involving the effect of cannabis smoking on serum vitamin C and E levels. However, our findings corroborate the previous findings of some studies on the effect of cigarette smoking on antioxidant status.
Conclusion
This study has shown significant reductions in the serum levels of Vitamin C and E in cannabis smokers than in non-smokers. Thus, antioxidant supplementation may be necessary in the diet of cannabis smokers as a way of boosting their antioxidant status.

Conflict of Interest: None.

References


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