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Characteristics of Synthetic Cannabinoid Toxicity by U.S. Geographical Region: A Retrospective Review of National Poison Data System 2010 - 2015

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Background: Synthetic cannabinoids (SC) pose a significant public health problem in the U.S. Each year, novel SC compounds are introduced, outpacing the U.S. government's ability to schedule them. Currently, it is unknown whether there are regional differences in clinical characteristics and medical outcome as novel SC are introduced and sold in different U.S. regions.

Hypothesis: The goal of this study is to evaluate the characteristics of clinical effects and outcomes of SC exposures in different U.S. geographical regions from 2010 to 2015.

Methods: A retrospective study of SC exposures reported to U.S. poison centers was performed. National Poison Data System (NPDS) data was queried using AAPCC generic code for SC (200617) from January 1st, 2010 to December 31st, 2015. Regions were identified according to U.S Census definitions. Chi-square test was used to detect difference in clinical effects and Bonferroni correction was applied for multiple comparisons.

Results: In all, 23,822 cases of SC were identified. SC cases increased significantly in the Northeast and South from 2011 to 2015 while decreasing in other regions. Bradycardia, hypotension, coma, and respiratory depression increased in all regions in 2015, notably in Northeast (bradycardia-8.1%), West (hypotension-12.1%), Midwest (coma-9.1%, respiratory depression-7.1%) ($p<0.0001$). A larger proportion of SC cases were intubated in 2015, particularly in Midwest (13.3%; $p<0.0001$) and West (11.2%; NS). In all regions, except West, the clinical effect duration increased significantly, specifically 8-24 hours and 24-72 hours ($P<0.0001$). All regions showed increases in admission to critical care units, with significant increase in the Midwest ($p<0.0001$). There was an increase in major effect between 2011 and 2015 ($p<0.0001$); the highest net increase occurred in Midwest.

Discussion: Our findings suggest that there are regional differences in clinical effects and outcome from SC toxicity. Increases in bradycardia, hypotension, coma, and respiratory depression were noted with varying frequencies in different regions as well as hospital admission and medical outcome. This finding may be due to the availability of different SC in U.S. regions.

Conclusion: The regional differences in clinical effect and outcome may be correlated with the introduction of novel SC compounds as well as their availability.