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The Prevalence of Cannabinoid Hyperemesis Syndrome Among Regular Marijuana Smokers in an Urban Public Hospital

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Abstract

Epidemiological data, including prevalence, for cannabinoid hyperemesis syndrome (CHS) remain largely unknown. Without these data, clinicians often describe CHS as 'rare' or 'very rare' without supporting evidence. We seek to estimate the prevalence of CHS in a population of patients presenting to a socio-economically and racially diverse urban Emergency Department of a public hospital. This study consisted of a questionnaire administered to a convenience sample of patients presenting to the ED of the oldest public hospital in the United States. Trained Research Associates (RA s) administered the questionnaire to patients between the ages of 18–49 years who reported smoking marijuana at least 20 days per month. The survey included questions related to CHS symptoms (nausea and vomiting) and Likert scale rankings on eleven symptom relief methods, including 'hot showers'. Patients were classified as experiencing a phenomenon consistent with CHS if they reported smoking marijuana at least 20 days per month and also rated 'hot showers' as five or more on the ten-point symptom relief method Likert scale for nausea and vomiting. Among 2127 patients approached for participation, 155 met inclusion criteria as smoking 20 or more days per month. Among those surveyed, 32.9% (95% CI , 25.5–40.3%) met our criteria for having experienced CHS . If this is extractable to the general population, approximately 2.75 million (2.13–3.38 million) Americans may suffer annually from a phenomenon similar to CHS.

First described in 2004, cannabinoid hyperemesis syndrome (CHS) is a generally under-recognized entity that affects heavy, chronic marijuana users 1. Current diagnostic criteria of CHS includes severe, cyclic nausea and vomiting, frequent hot water bathing to relieve symptoms, elimination of symptoms upon cannabis cessation, epigastric or periumbilical abdominal pain, and daily cannabis use 2. However, these proposed definitions came from a description of patients sick enough to seek medical care until receiving a proper diagnosis and therefore may not capture more mild versions of the phenomenon, which likely exists as a continuum from mild to severe. The most defining characteristic of CHS is the ability of hot water bathing and showering to mitigate symptoms of the nausea and vomiting experienced by regular cannabinoid users. Classic descriptions report that CHS patients will often spend several hours in hot showers to relieve their symptoms 3. Although marijuana is commonly associated with its antiemetic properties, it is now also recognized to produce paradoxical effects on the gastrointestinal tract and central nervous system through various proposed mechanisms. These speculative mechanisms include a down-regulation of brain CB_1 receptors and overstimulation of gut CB_1 receptors that may slow gastric emptying. Of note, brain CB_1 receptors are located near the thermoregulatory centre of the hypothalamus, potentially leading to thermodysregulation that is relieved by the pathognomonic hot showers 4. Although diagnostic criteria have been proposed, the disease remains poorly understood. This study, thus, attempts to estimate prevalence of patients experiencing this syndrome within a continuum of mild to severe symptomology. Since 2004, several case reports

and series help delineate this distinct clinical entity, but no study to date has estimated prevalence or incidence of CHS. Epidemiological data are necessary to determine the overall disease burden and appreciate the clinical and economic significance of this new syndrome, particularly as marijuana use increases 5. The primary objective of this study was to estimate the prevalence of CHS across a continuum of mild to severe cases through surveying a convenience sample of emergency department (ED) patients at one large, urban centre.

Materials and Methods

The study was conducted from 31 May 2015 through 10 August 2015 in an urban Emergency Department of a public hospital in New York City with approximately 145,000 annual visits.

Volunteer research associates approached and surveyed patients between the hours of 8:00 a.m. and midnight, seven days per week. These research associates received training in obtaining verbal consent, survey administration, and the ethical conduction of human subject research. Surveys were administered using REDcap electronic data capture tool on iPads at the patient bedside. Research associates were instructed to read the questions exactly as written and to refrain from providing clarifying statements.

This convenience sample included all patients between the ages of 18 and 49 years able to consent who did not currently complain of nausea, vomiting or abdominal pain. Patients presenting with nausea, vomiting or abdominal pain were excluded to avoid confounding conditions and, thus, an overestimate of CHS prevalence. No other concurrent illness, past medical history or drugs of abuse were recorded in the questionnaire. If the patient self-reported marijuana usage 20 or more days per month, he or she was classified as a 'near-daily' or 'daily' marijuana smoker and enrolled. Non-marijuana analogues of THC were not included. Twenty or more days per month was selected as the criteria to remain consistent with the 2014 National Survey on Drug Use and Health conducted by the Substance Abuse and Mental Health Services Administration 6. This criterion was also selected to avoid under-reporting of marijuana users who might not smoke each day of the month, but still use marijuana heavily. Research associates then administered a survey eliciting information on frequency of marijuana usage and previous symptoms experienced.

Respondents were also asked to rate eleven methods for relieving past nausea/vomiting on a ten-point Likert scale (one being 'not helpful at all' and 10 being 'the most helpful'). These relief methods included: hot showers, cold showers, fresh air, antiemetic medications, smoking marijuana, abstaining from smoking marijuana (taking a break from it), turning up the heat (increasing ambient temperature), eating, drinking water, smoking cigarettes and sleeping/napping. For the purposes of this study, we defined CHS as near-daily or daily marijuana users who rated hot showers as a nausea and vomiting relief method by five or more of the 10 point Likert scale. By asking about eleven total relief methods, we hoped to decrease potential bias that could have been created by asking specifically about only one relief method.

This research project was approved by the Institutional Review Boards (IRBs) of the New York University School of Medicine and Bellevue Hospital Center. The IRBs requested that we do not collect information about use of illegal substances unrelated to our pre-specified end-points and do not collect identifying information about the patient, so to limit the risks to our patients who were being asked about their use of an illegal substance.

Results

A total of 2127 ED patients were approached for participation in this study. Patients who refused to participate, presented to the ED with symptoms of nausea and/or vomiting, were physically/mentally unfit to provide consent or did not report 'daily' or 'near-daily' marijuana usage were not included. One hundred and fifty-five patients were identified as 'daily' or 'near-daily' marijuana users, and all provided informed consent to participate; 54.2% were between the ages of 18–29 years.

As demonstrated in fig. 1, 51 respondents reported hot showers as effective symptom relief by a score of greater than or equal to five representing 32.9% of our sample (95% confidence interval 25.5–40.3%).

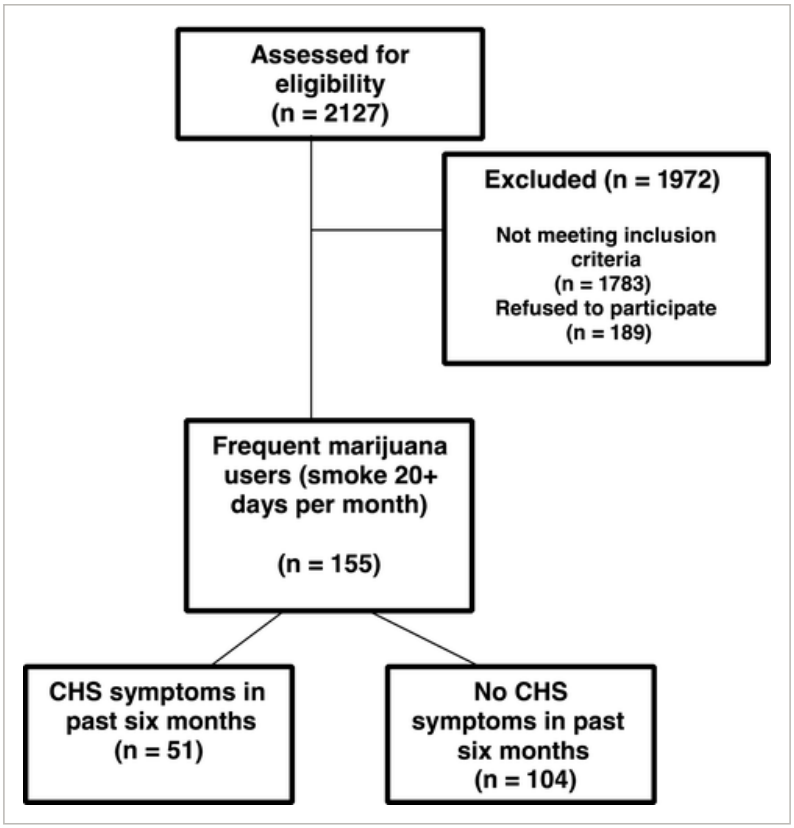

Figure 1

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Subject recruitment algorithm and classification.

Discussion

In this survey cohort of ED patients, 32.9% of self-reported frequent marijuana users met our definition of CHS. Extrapolating on a reported 8.364 million near-daily or daily marijuana smokers in the United States in 2014, we estimate between 2,130,000 to 3,380,000 individuals have suffered from CHS symptoms in the United States 5. This prevalence estimation was generated using data up to 2014, suggesting the true prevalence of CHS may be higher today given current trends in increased marijuana usage 5.

Interestingly, our data did not suggest any statistically significant differences in demographics between individuals with CHS symptoms and those without; 44% of female respondents and only 30% of male respondents met our criteria of experiencing CHS. Finally, our results suggest CHS is a far more prevalent entity than previously appreciated by society and the medical community and may continue to increase along with increased marijuana use.

Limitations

This study has several important limitations. First, the results rely on patients' self-reported marijuana usage and history of CHS symptoms, which may introduce recall bias. While public opinion surrounding marijuana use is evolving and generally less stigmatized, recreational usage remains illegal in the study location. It is likely that the number of daily users is under-reported due to either stigma or concern of legal repercussions, especially among vulnerable populations. We did not use either of the proposed definitions for CHS, recognizing their limitations in having described only those cases severe enough to seek care and eventually properly categorized, and likely missing more mild versions of the phenomenon. While we believe our estimate is likely a more accurate estimate of the disease phenomenon, following either of these stricter proposed criteria would have resulted in a smaller estimate of prevalence. Additionally, the sample size of this survey cohort was relatively small and consisted only of patients presenting to our one urban, public ED, decreasing the

generalizability of the results to the overall population. We could not find references on the THC concentrations in marijuana used in our geographic area, or specifically by patients in the hospital, which could lead to another limitation on the generalizability of our study to the larger population. However, it has been reported that THC levels have increased, in general in the United States, from ~4% in 1995 to ~12% in 2012–2014 7. The syndrome may have been caused by an interaction with some other agent, which we would not know as these additional clinical data were not obtained. Our approach presupposes that CHS only exists in patients who smoke twenty or more times per month, an assumption that may have underestimated total prevalence. Furthermore, we only asked respondents about the effectiveness of hot showers, not hot baths, which may have further underestimated total prevalence.

Conclusion

This study suggests that approximately one-third of patients in our large, urban Emergency Department reporting heavy marijuana use experience symptoms of CHS. In our study population, the condition appears to be most common in 18- to 29-year-olds, although there was no significant difference in gender, race, ethnicity, education level or employment status between frequent marijuana users with CHS and those without.

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