



Full length article

Understanding emerging forms of cannabis use through an online cannabis community: An analysis of relative post volume and subjective highness ratings

Meredith C. Meacham^{a,*}, Michael J. Paul^b, Danielle E. Ramo^a^a Department of Psychiatry and Weill Institute for Neurosciences, University of California San Francisco, San Francisco, CA, USA^b Department of Information Science, University of Colorado Boulder, Boulder, CO, USA

ARTICLE INFO

Keywords:

Cannabis
 Online communities
 Route of administration
 Vaping
 Edible
 Digital health

ABSTRACT

Background: Legalization of medical and recreational cannabis has coincided with an increase in novel forms of cannabis use and a burgeoning cannabis product industry. This research seeks to understand the occurrence of discussions about these emerging and traditional forms of use in an online social media discussion forum.

Methods: We analyzed posts to a cannabis-specific forum on the Reddit social media platform posted from January 2010–December 2016. For each of various keywords describing smoking, vaping, edibles, dabbing, and butane hash oil (BHO) concentrate use, we analyzed (1) relative prevalence of posts mentioning these cannabis forms of use; (2) user-reported subjective ratings of “highness” on a scale of 1–10; (3) the ten most common words mentioned in posts; and (4) the frequency of adverse health effect terms.

Results: Form of use was mentioned in approximately 17.7% of 2.26 million posts; smoking was the most commonly mentioned form of cannabis use. From 2010–2016, relative post volume increased significantly for posts mentioning dabbing (3.63/1000 additional posts per year, $p < .001$), butane hash oil terms (3.16/1000, $p < .001$), and edible terms (2.84/1000, $p = .002$). Mean subjective highness was significantly greater for posts mentioning dabbing (mean = 7.8, $p < .001$), butane hash oil terms (mean = 7.5, $p < .001$), and edible terms (mean = 7.2, $p < .001$) but not significantly different for vaping (mean = 6.7, $p = .19$), when compared to smoking (mean = 6.8).

Conclusions: Despite limitations in representativeness, findings indicate a significant increase in online discussion of emerging cannabis forms of use over time and greater subjective effects of dabbing, butane hash oil, and edible use.

1. Introduction

There is growing evidence that legalization of medical and recreational cannabis in the United States and worldwide has coincided with increases in alternative methods of cannabis administration (Borodovsky et al., 2016; Krauss et al., 2017; Schauer et al., 2016) facilitated by a burgeoning cannabis product industry that is inconsistently regulated across multiple states (Gourdet et al., 2017; Room, 2014). Information on different forms (i.e., products or methods) of cannabis administration is a limited area of knowledge in the scientific literature. Such information will be critical for informing cannabis regulation efforts and reducing potential harms from cannabis legalization.

Although smoking of dried cannabis flowers or resin is the most traditional and common method of cannabis use, other methods include

inhaling vaporized dried flowers or cannabis oil (“vaping”), orally ingesting edible products (“edibles”) (Schauer et al., 2016) and, more recently, inhaling vaporized high-potency tetrahydrocannabinol (THC) butane hash oil concentrate products known as “wax” and “shatter,” sometimes through a specialized glass heating and inhalation device (referred to as “dabbing”) (Loflin and Earleywine, 2014). While technically a vaporized cannabis product, dabbing typically differs from vaping in that more highly concentrated THC products (up to 90% THC) are heated on a glass or titanium rod (“nail”) and inhaled through a glass device (“rig”) as opposed to the more general heating of cannabis concentrate or flower material to create vapor but not combusted smoke. Medical researchers have previously raised health concerns about increases in average THC concentration from seized flower samples, increasing from approximately 3% in 1992 (Compton et al., 2004) to 9% in 2008 (Mehmedic et al., 2010) and 12% in 2014 (ElSohly

* Corresponding author at: Department of Psychiatry, University of California San Francisco, 401 Parnassus Ave, San Francisco, CA 94110, USA.
 E-mail address: meredith.meacham@ucsf.edu (M.C. Meacham).

et al., 2016), with corresponding calls to better understand the effects of high-potency cannabis.

Different methods of administration produce different physiological and psychological effects, as well as variations in the timing and duration of onset and peak effects (Newmeyer et al., 2017). People may prefer one method over another based on accessibility, perceived effectiveness, motivations for use, THC or cannabidiol (CBD) content, and relative harms of different methods (e.g., smoke inhalation vs. delayed onset and longer duration of edibles). Subjective ratings of effects have also been found to vary across methods of administration and by frequency of cannabis use (Newmeyer et al., 2017).

Analysis of social media data has been used to complement other epidemiologic methods as a strategy for understanding emerging trends in real time with limited social desirability or recall bias (Althouse et al., 2015). Prior work with Twitter conversations has found significantly greater reports of emerging product use in states permitting medical and/or recreational cannabis use (Cavazos-Rehg et al., 2015; Daniulaityte et al., 2015; Lamy et al., 2016) and that physical and psychological effects of dabbing (Cavazos-Rehg et al., 2016) and edible use (Lamy et al., 2016) are often disclosed. Despite the limited ability to determine the representativeness of creators of social media content and thus inform generalizability, social media data analysis can uncover behaviors not captured in traditional surveillance (Althouse et al., 2015) and inform terminology and emerging behaviors that larger scale health surveys may wish to incorporate.

Reddit (reddit.com) is a popular web content rating and discussion forum website where users submit and vote on posts and comments in a diverse range of topic-specific online discussion communities called “subreddits.” Each subreddit has its own system of rules and guidelines as well as active and inactive members. Other studies with data from Reddit online communities have found that people use health-related subreddits to ask questions and disclose information they may not disclose in person to family members or clinicians (Chen et al., 2015; Pavalanathan and De Choudhury, 2015; Sowles et al., 2017; Tamersoy et al., 2015).

A unique feature of Reddit is that users post pseudo-anonymously under a self-chosen username that is usually distinct from one’s real name, which may engender greater tendencies to disclose substance use behavior than on other social networking sites such as Twitter, Facebook, and Instagram. As of October 2017, Reddit was the 4th most popular website in the United States and 8th most popular website in the world with 4 million daily users (Alexa, 2017). The most popular cannabis-related subreddit was created in October 2009. It has over 1 million subscribers and is in the top 100 most popular subreddits out of over 1 million subreddits. While this subreddit is decidedly pro-cannabis, a wide variety of topics and discussions occur, and any attempts to buy or sell cannabis are strictly prohibited.

In this study, we sought to determine (1) whether mentions of different cannabis products (smoking, vaping, edible terms, dabbing, butane hash oil terms) in a popular and established online cannabis-specific community are changing over time, (2) whether user-reported subjective highness differs across form of use mentions, and (3) the most commonly used words in posts containing different product mentions. We hypothesized that mentions of vaping, dabbing, and edibles would be increasing at a faster rate than mentions of smoking and that edible and dabbing mentions would be related to greater subjective highness than for smoking.

2. Material and methods

2.1. Data acquisition and cleaning

Ethical approval was provided by the University of California San Francisco Institutional Review Board (categorized as human subject exempt category 4). All posts analyzed are publicly available, and no usernames of post authors were analyzed or reported here other than

counts of anonymized unique usernames.

We downloaded timestamped post titles and content from publicly available repositories of historical Reddit data, focusing on the largest cannabis-specific subreddit from January 1, 2010 to December 31, 2016. We then created dichotomous variables to indicate whether the post title or content mentioned one of four specific forms of use: smoking, vaping, edibles, or dabbing, allowing for other word forms: smoke, smoked, smoking; vape, vaped, vaping; edible, edibles; dab, dabs, dabled, dabbing. For smoking-related posts, we excluded 4724 posts that also mentioned synthetic cannabis terms (i.e., k2, spice, synthetic). For edibles, we also added the following food term combinations: space/cosmic/special/weed/pot/medicated + brownies/cake/cookies/gummies/candy. In reading through posts as well as scientific and marketing literature, we added a category for butane hash oil concentrate terms that included: honey/hash/cannabis/CBD oil, wax, shatter, BHO, concentrate(s), budder. Edible terms and food terms were analyzed together, but dabbing and butane hash oil terms were analyzed separately given that dabbing refers to a method of use while butane hash oil terms referred to specific products. We note, however, that many posts (about 25% of each) mentioned both dabbing and butane hash oil products. This classification resulted in a total of five forms of use (i.e., product or method/route of administration): smoking, vaping, edible terms, dabbing, and butane hash oil terms. Subsets of posts were examined individually to make sure we were not capturing false positives with these keywords. For example, the terms “ate” and “eat” were not included in the edible list as these terms also picked up reports of increased appetite following cannabis consumption. To determine the number of unique username account postings, usernames were represented as a hashed random string of characters and frequencies of unique character strings were calculated.

A notable feature of cannabis-related subreddits is that people may post how “high” they are on a scale of 0–10 in brackets or, less often, parentheses or curly brackets to indicate that they are getting higher or coming down (e.g., “Just tried my new vape pen {6}”). This is somewhat similar to the numeric pain scale or visual analog scale for pain used in medical settings (Bijur et al., 2001). Using regular expression notation, we extracted numeric values between 1 and 10 that were contained in brackets. Posts that reported more than one number in brackets were excluded (3%), as were bracketed numbers of 0 (indicating soberness) or over 10.

2.2. Proportion and trends of product mentions

Counts of posts mentioning smoking, vaping, edible, dabbing, and butane hash oil terms were normalized to total number of posts in this subreddit to determine the prevalence of posts mentioning these cannabis forms of use (i.e., a relative post volume, similar to “relative search volume” in Google search term analyses) (Paul et al., 2016). To describe the rate of change in post volume over time, we ran linear regressions with relative post volume as a function of time in years, as both linear and quadratic functions.

2.3. Subjective highness

The distribution of the numerical value of subjective highness ratings was assessed for posts mentioning different forms of use. Because posts with ratings sometimes mentioned more than one form of use, only distributions of ratings mentioning one form of use were compared. Based on skewness and kurtosis values, means and standard deviations were reported. Differences in means were compared between posts mentioning smoking and posts mentioning other forms of use. Since this resulted in multiple *t*-tests on the same mean, we used a Bonferroni correction to determine statistical significance (i.e., alpha of 0.05/4 tests require a *p*-value of 0.0125 to achieve statistical significance).

Download English Version:

<https://daneshyari.com/en/article/7502981>

Download Persian Version:

<https://daneshyari.com/article/7502981>

[Daneshyari.com](https://daneshyari.com)