Using Twitter to Identify Patient Education Topics for Using Medical Marijuana for Cancer Pain Management

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Abstract

Background: The topic of using medical marijuana (MMJ) in cancer pain management is controversial. The rate of MMJ use has been increasing, which implies that there is an increasing need for patient education.

Objective: To explore the potential patient education needs regarding the use of medical marijuana in cancer pain management from Twitter tweets.

Methods: Retrieved Twitter tweets were analyzed by using the Latent Dirichlet Allocation approach and a manual review to determine the themes embedded in the tweets.

Result: Four topic domains were identified from 1217 unique tweets: medical marijuana treatment, advertisement of medical marijuana, news related to medical marijuana, and advocacy of using medical marijuana.

Conclusion: According to the findings, healthcare providers who counsel patients regarding the use of MMJ in cancer pain management should be prepared to include these topics: research evidence related to the outcome of using MMJ, potential benefit and risk of using MMJ, types of symptoms that can be alleviated by MMJ, and recommendations regarding medical marijuana sources.

Keywords: Twitter; Tweet; Medical marijuana; Social media; Cannabinoids; Cancer pain; Patient education

Abbreviations: CBD: Cannabidiol; LDA: Latent Dirichlet Allocation; MMJ: Medical Marijuana

Introduction

According to the National Institute on Drug Abuse, "the term medical marijuana (MMJ) refers to using the whole, unprocessed marijuana (or cannabis) plant or its basic extracts to treat symptoms of illness and other conditions [1]." Cannabinoids are the active constituents found within the marijuana plant; cannabidiol (CBD), one of many cannabinoid compounds found in cannabis, has been proposed as an alternative approach to managing chronic pain [2].

Pain is prevalent and troublesome for cancer patients, especially for those with advanced cancer diagnosis. There is evidence that CBD compounds could be synergistic with opioids in alleviating cancer pain [3]. Although the use of marijuana for medicinal purposes remains controversial, the rate of MMJ use in the United States has increased from 9.9% to 13.3% of whole population between 2007 and 2014 [4]. This implies that the public has become more accepting of MMJ use and more health professional and patient education is needed.

Patient education is critical in healthcare, especially in use of a controversial intervention such as MMJ. Covering topics of interest that are most relevant to personal interests is one of keys to effective patient education and better patient outcomes [5]. Gaining understanding of the general population's opinions of using MMJ in cancer pain management will help healthcare providers determine relevant topics for patient education. Every day hundreds of millions short messages (tweets) are posted on Twitter [6] a popular social media platform for users to read and share their opinions especially for controversial topics. Published tweets are publicly available and provide a significant data source for understanding the general population's perspectives on a topic. Therefore, the purpose of this study was to use tweets to identify topics for patient educational materials regarding the use of MMJ in cancer pain management.

Material and Methods

We used RStudio (version 1.0 The R foundation for statistical computing, Boston, MA, USA) to globally collect tweets, published in English using the Twitter Application Programming Interface. To retrieve tweets for this study, we used search keywords, "cancer + pain", in combination with keywords describing MMJ: "marijuana", "weed", "cannabis", "cannabinoids", "cbd", "mmj", and "hemp". Retrieved tweets were preprocessed, removing special characters, usernames, punctuation, and hashtags, before being analyzed (ref. Sentiment analysis on tweets for social events). To identify embedded themes from the large number of retrieved tweets, we combined the Latent Dirichlet Allocation (LDA) approach with a manual review; as described in a previous study [7]. The LDA produced the suggested number of themes, the most frequently used keywords for each theme, and the most representative tweets for each theme [8]. Next, two doctorally-prepared researchers who are licensed registered nurses discussed the name for each theme based on the keywords and example tweets generated by the LDA approach.

Result

A total of 3072 tweets were retrieved between September 19 and November 14, 2017. Among them, 1217 were unique tweets, which did not contain the same content as the other tweets, and were generated by 787 users. These unique tweets were used to extract the embedded themes related to the use of MMJ for managing cancer pain. The result of LDA analysis suggested that there were 11 themes embedded in the retrieved tweets; these themes were named after manual review by two nurse researchers (Table 1). Four topic domains were created to summarize these 11 themes (Table 1).

Table 1: Topic domains, themes, and examples of tweets for retrieved tweets related to the use of MMJ for cancer pain management.

Topic Domains	Themes	Examples of Tweets
Medical marijuana treatment	Research evidence related to medical marijuana	New study looks at cannabis use among cancer patients. We need more research to inform about its risks and benefits.
	Symptoms benefited by medical marijuana	MMJ has proven to be an effective treatment for chronic pain, seizures.
	Potential population benefited by medical marijuana	About 25% of People with Cancer Use Marijuana.
Advertisement of medical marijuana	Sources of good quality of medical marijuana	We have best CBD oil and MMJ for smokers, cancer cure, insomnia, back pain.
	Effectiveness of medical marijuana use	CBD medical oil for cancer and pain treatment. Safe, discreet and priority shipping and delivery service available. Now call xxx-123-xxxx.
News related to medical marijuana	Description of how many people using medical marijuana	Nearly 1/4 of Seattle cancer patients have used cannabis to help treat symptoms like pain, nausea and depression.
	Descriptions of the current use of medical marijuana including healthcare providers' acceptance, patient's story	A poll published in the New England Journal of Medicine found that 76% of doctors would prescribe cannabis to treat pain in cancer patients.
	Medical marijuana used by celebrities	Olivia Newton-John uses cannabis as an effective way to alleviate pain from her breast cancer.
Advocacy of using medical marijuana	Exaggeration of the effect of medical marijuana	Cannabis kills pain and cures cancer. That's why it's illegal. I lived to tell.
	Supporting the use of medical marijuana by personal experience, doing more research, and policy	I have been able to come off prescription pain meds due to cancer because of cbd oil. Please don't mess this up!!!!
	Requesting legally use of medical marijuana as a treatment option	You want to fight opioid crisis? Legalize marijuana, it does a much better job for pain relief.

Table Abbreviations: MMJ=Medical Marijuana; CBD=Cannabidiol

Discussion

To be on the top of the trend of using marijuana for medical purposes, healthcare providers need to proactively develop patient education materials which contain the information most relevant to patients' interests [5]. Moreover, healthcare providers need to be prepared or trained to deliver the education since they may be called upon to assist patients in making informed choices regarding the inclusion of MMJ in the treatment plan.

This study used social media data (i.e., tweets) to identify topics, based on public opinions, for patient education materials specifically for using MMJ in managing cancer pain. Among these four topic domains, the themes from "medical marijuana treatment" domain indicated that the public would like to know research evidence related to the outcome of using MMJ, potential benefit and risk of using MMJ, and types of symptoms that can be alleviated by MMJ; the themes from "advertisement of medical marijuana" domain

implied that the public was interested in recommended medical marijuana sources. Based on a shared-decision-making model of care, it is important that patients understand the relevant evidence [9]. It was not surprising to find the domains of "news related to medical marijuana" and "advocacy of using medical marijuana" domains from the tweets because news, celebrities, politics, and health were commonly shared or discussed on Twitter [6].

Conclusion

To our knowledge, this is the first study to use Twitter tweets as public opinion source to address the general public's needs for information related to MMJ use. This study showed that published tweets are publicly available, providing a significant data source to target the general public's needs for patient education. According to this study findings, healthcare providers who counsel patients regarding the use of medical marijuana in cancer pain management should be prepared to include these topics: research evidence related to the outcome of using MMJ, potential benefit and risk of using MMJ, types of symptoms that can be alleviated by MMJ, and the recommendation medical marijuana sources.

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