

Marijuana: Judgement can preclude an honest dialogue in healthcare

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Abstract

There are some topics in which medicine has a more cohesive and consistent message, but thus far, my experiences in medical school have suggested that marijuana isn't one of them. For some, it's a harmless drug with tremendous potential and for others, comparable to opioids. The discussions between physicians and patients regarding marijuana can be strongly influenced by ideologies in either direction, potentially undermining our ability to have an honest dialogue with patients. I explored this discussion through a combination of personal experiences in medical education and by sharing terminology and concepts that may be valuable in a patient-physician dialogue.

Experiences In Attitudes Toward Marijuana

Marijuana, or cannabis, is a contentious issue in medicine; regulatory bodies, physicians, researchers, and patients can and often do take polarized, emotional stances in favour or against marijuana.¹ If we take a step back from our biases, then perhaps we can have more fruitful and informative discussions with patients about their use.

Early in medical school, I observed a back-and-forth discussion between two physicians on patients using marijuana for inflammatory bowel disease (IBD). One argued that, despite some patients reporting a symptomatic benefit, there wasn't enough evidence marijuana was having an "effect" (i.e. no changes in ESR or CRP) and implied that some of these patients just liked getting high. The second physician challenged the first on who we were as physicians to suggest that patients with debilitating ailments like IBD were somehow deceiving us so they could use marijuana. He noted that, while some of our diagnostic tests may not detect changes, that doesn't necessarily equate to a lack of change. Rather, if a patient reports improved symptoms and in turn, doesn't come into hospital as often, in some regards, isn't that a success?

On one hand, the first physician was not wrong in stating that he didn't have evidence to support marijuana use for IBD, but neither was the second physician in acknowledging our limited understanding with a sense of optimism. I would, however, argue that had the patients being discussed been present for the discussion, they may have felt differently about how they discuss marijuana with their physicians. After all, were their physicians more like the first or second physician in the discussion? And what contributes to a productive discussion on marijuana between patients and physicians?

What I have learned about discussing marijuana with patients

Medicine has struggled with trust and honesty in discussing substance use, notably alcohol, but also

marijuana.² There is evidence that patients generally are not accurate about their alcohol intake.³⁻⁵ Using alcohol as an analogy, alcohol consumption, despite the obvious issues surrounding judgement and honesty, is relatively easy to track because the alcohol by volume in spirits usually tops out at around 40%. But imagine trying to discuss alcohol consumption with a patient if neither of you knew the alcohol by volume – that's been a hurdle to discussion around marijuana consumption. In addition, marijuana has changed a lot over the last few decades – that's made understanding usage much more difficult and highlights the importance of honest, non-judgemental, educational dialogue.³⁻⁵

During an elective in adolescent addictions counselling, marijuana was a frequent guest, but harm reduction approaches were predominantly favoured unless marijuana was identified as a risk factor in psychosis. Indeed, growing evidence supports that marijuana use can unmask schizophrenia in those with predispositions, but the debate on causation has yet to be settled.⁶⁻⁸ This was an important talking point when discussing marijuana in the context of psychosis because patients could relate via their own experiences. In bringing honesty to the discussion, I observed many more productive conversations between physicians and patients about marijuana use.

In discussing marijuana with adolescents, I found there were 5 consistently useful questions asked, which could be generalized to any age:

1. History/family history of schizophrenia/psychosis?
2. How much and how often?
3. What is it/what does it contain?
4. How are you using it?
5. Are you combining it with anything else?

History/family history of schizophrenia/psychosis?

Schizophrenia and psychotic disorders are complex and multifactorial in their etiology. Risk factors linked to schizophrenia and psychosis include obstetric complications, childhood trauma, and genetic predispositions. It's also well-established that

marijuana use in adolescents is associated with an increased risk of schizophrenia, an earlier onset of psychotic episodes, and a worse clinical course with more in-patient admissions; however, researchers acknowledge the risk is not felt uniformly.⁹ One need look no further than the prevalence of schizophrenia (0.4-0.6% Canada) versus the prevalence of marijuana use (43% of Canadians) to appreciate the complexity of the relationship.^{10,11} Rather, populations with particular gene variants appear more susceptible to developing psychotic symptoms secondary to marijuana use.^{10,12,13} The genes underlying these population differences and their contribution to pathophysiology remain poorly understood and are an active area of research.

The most publicized gene suggested to link cannabis use and psychosis is catechol-O-methyltransferase (COMT); however, its role is by no means definitive.¹⁴⁻¹⁶ Numerous studies have suggested the COMT variant Val158Met increases the risk of psychosis in people who use marijuana.^{14,16-18} Muddying the monogenetic waters, the same variant has been shown to interact with early-life stressors to affect decision-making capacity, cognition, memory, and affect – areas of function that can be impaired or abnormal in schizophrenia.^{19,20} In one article, researchers failed to demonstrate a link between COMT variants, cannabis, and psychosis. Instead, the authors argue against subgroup-specific risks and that public health policies should assume a causal relationship between cannabis and the relative risk of developing psychosis until proven otherwise.¹⁷ Again, given the difference between prevalence of schizophrenia/psychotic disorders and marijuana use, I would argue that not implicating one gene (e.g. COMT) does not presuppose the involvement of other genes. Rather, it suggests we still have much to learn about the complex genetic and environmental interactions that contribute to schizophrenia and psychosis. Many researchers acknowledge that further work involving large, prospective studies is required before conclusions are drawn about cannabis' relationship with any genes including COMT.^{14,15,19}

Despite conflicting studies regarding the specifics of cause and effect, evidence supports that cannabis use is an important risk factor in severity and earlier age of onset for schizophrenia and psychotic disorders in specific populations.^{9,21-24} We may currently lack the understanding and precise tools to accurately identify those populations at risk, but understanding a patient and their family's psychiatric history may provide a blunt tool for stratifying and communicating risks associated with marijuana use.

How much and how often?

The answers I've heard to this question have

varied greatly and may not be that informative without context. The overall message is that one number doesn't necessarily fit all marijuana users, but there may be questions that can help a physician better understand how its use is affecting a patient.

Self-reporting of quantity of marijuana consumed can fall victim to the same fears of judgement and biases that can occur around conversations about alcohol consumption. One study suggested concerns over both legality and perception by health care providers were obstacles to patients discussing marijuana use in a clinical setting.² While the legality issue may wane in the coming months and years, the perception of health care providers' attitudes toward marijuana use may require more effort to resolve. Some patients in the study reported threats of having to change physicians were the patient to pursue medical marijuana.² In defense of physicians, other studies suggest that primary care physicians feel they have inadequate education on marijuana and would benefit from continuing medical education on the topic.^{25,26} Obviously negative attitudes are not held uniformly across healthcare, but if patients perceive a cultural bias against marijuana within medicine, then they will likely continue to be reluctant to discuss it in a clinical setting regardless of whether the individual physician feels comfortable with the topic. If you get past the point of comfort with a patient, it may be useful to use some general references or standards to which one can understand.

Statistics Canada estimates that, amongst Canadians, Nova Scotians consume the most marijuana: 27.1g/capita/yr. But not all Nova Scotians use marijuana, so this is an underestimate for some and an over-estimate for others.²⁷ Indeed, 14% of Canadians above the age of 15 reported using marijuana in 2015, so if these numbers are reflective of actual usage in Canada, 200g/yr is a closer estimate of marijuana user consumption.^{27,28} These numbers are more in line with estimates in Washington State prior to legalization for personal use.²⁹ There are no reliable statistics for how Canadians consume marijuana (e.g. smoking, vaporizing, edibles, etc.), but understanding that a joint (marijuana cigarette) usually contains 0.66g could provide a starting point for communicating with patients about use.³⁰ For example, if one assumes 200g/yr per marijuana user and a joint is ~0.66g of marijuana, then one can extrapolate that the average user consumes ~300 joints per year or a little under 6 joints per week. While the statistics and calculations come with significant caveats, they may provide some idea for whether a patient is an average user.

Importantly, the amount of marijuana used by a patient may be better understood in the context of reason for consumption and effect on daily function.

Were a physician to suspect that a patient's marijuana use was significantly interfering with their daily function (e.g. failure to fulfill major obligations at work or school), then it may warrant a deeper look at whether the patient is developing a cannabis use disorder (DSM V criteria). I would, however, encourage reflective thought and discretion in the assessment of a cannabis use disorder, as the threshold for diagnosis is low and some of the criteria are vague. Indeed, developing tolerance and experiencing withdrawal over a 12-month period are sufficient criteria to diagnose a cannabis use disorder.³¹ In turn, one could reasonably expect that many medical marijuana users, particularly those whom consume marijuana daily, would satisfy the criteria of cannabis use disorder. Rather, there are patients that legitimately develop problematic use who would benefit from identification and appropriate therapy.

As mentioned at the opening of this section, how much and how often one uses marijuana are context-dependent which includes factors such as strength (i.e. tetrahydrocannabinol content), pharmacogenetics, desired effects, regularity of use, desired perception of use, and method of consumption.^{29,30,32-35} Some of these issues will be addressed in sections below and others are beyond the scope of this article.

Take away points:

- Marijuana use is generally measured in grams per day (g/d)
 - For reference, the maximum prescribed dose in Canada is 5g/d.
- A joint (marijuana cigarette) is a fairly useful reference for consumption
- A joint is approximately 0.66 grams
- How much and how often is dependent on (1) individual factors, (2) what it contains, (3) how it's used, and (4) whether it's mixed with another substance.
- Were a patient unsure of their consumption, a useful question may be: how much do you purchase and how long does it last?

What does it contain?

This question relates to how much of certain cannabinoids (active chemical constituents of cannabis) does the marijuana one uses contain. Marijuana comprises at least 104 different cannabinoids, of which, the majority are poorly characterized.^{32-34,36} In discussions around cannabinoids, the focus is usually the 2 more abundant and better understood cannabinoids: tetrahydrocannabinol (THC) and cannabidiol (CBD). CBD is non-psychoactive, meaning it doesn't cause the high effect of its better-known relative, THC.³⁷⁻⁴³ In addition, there is tremendous optimism about its

potential medical indications.^{44,45} Despite optimism, CBD remains poorly characterized and as such, the focus in this section will be THC with brief mention of CBD.

Our natural cannabinoid, or endocannabinoid, system is complex and has been extensively reviewed by others.^{13,46,47} It is still important to highlight that there are two well-characterized cannabinoid receptors found throughout the body: cannabinoid receptor-1 (CB-1) and cannabinoid receptor-2 (CB-2).^{32-34,36,45,48} CB-1 receptors are expressed in high concentrations in the brain, particularly in regions associated with memory, cognition, reward processing, anxiety, pain processing, and motor coordination.^{13,46,47} In contrast, CB-2 receptors tend to concentrate in immune and hematological tissues such as the lymph nodes, spleen, and bone marrow.^{13,46,47} The well-known neurophysiological effects of marijuana (e.g. perceived relaxation, euphoria, time distortion, memory impairment, and concentration difficulties) are believed to be primarily mediated by the interactions between THC and CB1 receptors.¹³ While the user's endocannabinoid system has not changed drastically in the recent past, marijuana has faced rapid selective pressures to evolve, diversify, and strengthen (i.e. increased THC).^{5,13}

In an arms race with consumers, hobbyists, scientists, and producers continue to push the marijuana plant to the limits of its potency. As such, the marijuana of today is very different from the marijuana of previous decades.³⁻⁵ For example, the percentage THC in marijuana has soared since the 1990s, as one study demonstrated an average 3x increase (4% to 12%) in nearly 40,000 samples confiscated by the Drug Enforcement Agency between 1995 and 2014.⁵ And while that increase might sound dramatic, consider the fact that some medically available strains in Canada easily reach +20% THC.⁴⁹⁻⁵¹ Moreover, THC extractions from the plant and converted to hash, oils or shatter/dabs/waxes are believed to contain up to 80-90% THC.⁵² In my experience, patients generally don't know how much THC is in their marijuana unless they are receiving it from a licensed provider. In one survey by the Canadian AIDS Society, fewer than 5% of patients with medicinal marijuana licenses purchased from a licensed provider. In a more recent survey from Statistics Canada, ~25% of people using marijuana purchased it from a licensed provider.²⁷ As we enter the age of legalized marijuana, particularly in a regulated market, patients are likely to know more about the marijuana they're consuming.

I've also heard physicians ask patients whether their marijuana is *Sativa* or *Indica*. This refers to the 2-main species of marijuana plant – *Cannabis sativa* and *Cannabis indica*. In a practical sense, *C. sativa* is

associated with what is described as a more cerebral high, whereas *C. indica* is associated with more sedative effects.^{32,33,37} The distinctions between *sativa* and *indica* has been blurred by cross-pollination and hybridization of plant strains. Rather, research suggests that the attributes of individual strains of plant are dependent on the distribution of other chemicals called terpenoids.^{32-34,37} The terpenoids myrcene and limonene are associated with a strong sedative effect and uplifting effect, respectively. Interestingly, there is some preliminary evidence that the terpenoid alpha-pinene may reduce the short-term memory impairment commonly seen with marijuana use – it should be noted that much of this evidence is pre-clinical.^{33,34} Thus, the composition of marijuana is more complex than the sativa-indica debate and this, in turn, may influence the experience a patient has using a particular strain of marijuana.

As mentioned previously, research in CBD for medical indications is still in its infancy, but preliminary evidence suggests it may have a variety of anxiolytic, antipsychotic, and anti-seizure effects in some patients.^{37,53-58} In addition, there is evidence to support a role in providing some relief from different types of inflammation.^{59,60} To offer balance to its benefits, some studies have also suggested higher doses of CBD are associated with side-effects including nausea, diarrhea, and sleepiness.^{41,53} Despite potential side effects, I've seen examples of CBD drawing patients to consider marijuana. Indeed, I've heard cancer patients ask about using CBD during chemotherapy. In a more unfortunate example, I've also met a patient who was using CBD to treat a terminal cancer because they had lost faith in the healthcare system to help. Regardless of its efficacy, the hypothesized potential of CBD will almost inevitably draw another group of people to try marijuana and those patients may be looking to prevent or help treat a condition or interested in complementary and alternative medicines. As such, CBD may be a common avenue for a patient to discuss marijuana with a physician and it will be up to physicians to be knowledgeable on the current literature, including how and whether marijuana may interact with other therapies.

The previous two paragraphs dealt with what is naturally found in marijuana, but there are also concerns regarding what can be added to marijuana. While marijuana contaminated (laced) with another drug is unusual, growing and processing the plant risks other forms of contamination.⁶¹ It may not come as a surprise that marijuana purchased on the street (i.e. non-licensed provider) can contain contaminants

Moreover, when combusted or vaporized, these contaminants decompose into potentially harmful

chemicals, such as methanol and ammonia. While some studies have suggested government-licensed marijuana to be safer, several government-licensed Canadian companies were recently caught selling marijuana contaminated with banned fungicides and pesticides, myclobutanil and bifenazate, respectively.^{62,63} When heated, myclobutanil degrades into chemicals including hydrogen cyanide. Some patients consuming the contaminated marijuana are arguing that it contributed to symptoms of nausea, vomiting, and dizziness and have filed a class-action lawsuit against the medical marijuana suppliers. In light of this, as a physician, it may be relevant to understand when a patient began purchasing from a particular provider.

Take-away points:

- Marijuana has gotten progressively stronger, as indicated by the percentage of its psychoactive component, THC.
- Marijuana can be processed into different forms (e.g. oils, hash, wax, dabs/shatter), generally with increasing strength (i.e. THC) relative to dried marijuana.
- Not all marijuana strains are bred for THC content; the market for CBD-containing marijuana is growing and may introduce different patient populations to marijuana.
- Marijuana can be contaminated during processing, potentially leading to indirect side-effects from the contaminants.
- As marijuana becomes legal and more people purchase from authorized sources, it is likely that patients will have a better idea of what they're consuming.

How are you using it?

The percentage of THC is only one factor in consumption; adding another layer of complexity is how marijuana or its extracts are consumed. Currently, the more common methods for consuming marijuana include different types of combustion, vaporizing, and edibles.

Combusting marijuana can come in many forms such as joints, pipes, and water pipes (i.e. bongs). Generally speaking, inhalation of any combustible comes with respiratory and/or vascular effects. Evidence suggests that marijuana smoke can transiently impair vascular endothelial cell function.⁶⁴⁻⁶⁶ It should be noted that these studies were performed in rodents, which can be difficult to extrapolate to human experience. Perhaps counterintuitively, large human studies do not support an association between lifetime marijuana use and the development of many forms of cancer, including head, neck, and lung cancers, suggesting important differences in the effects of tobacco relative

to marijuana.⁶⁷⁻⁶⁹ It should be noted that combusting marijuana may be associated with increased risk of bronchitis and respiratory infections, which may be particularly relevant to patient populations already at increased risk for respiratory complications.^{66,70,71} Indeed, researchers believe these effects extend to second-hand marijuana smoke and will likely need to be taken into consideration in the context of household exposure.^{72,73}

In the early 2000s, vaporizers for marijuana were introduced to the market as an alternative to combustion. Vaporizers offered a novel method for consuming marijuana that involves heating it to a sub-combustible temperature such that the cannabinoids vaporize and can be inhaled.^{74,75} Unlike combustion which sacrifices 50% of the available THC, vaporizers continue to push that limit to +70%.⁷⁵⁻⁷⁷ And while that may sound disconcerting, there are also arguments in favour of vaporization as a healthier alternative to combustion and thus, a form of harm reduction. Building on the case against combustion, evidence suggests vaporizers may reduce the risks of bronchitis and respiratory infections associated with combustion.⁷⁷ From the physician's perspective, it may be relevant to discuss vaporizers as an alternative to combustion, though that comes with the caveat (or benefit, depending on who you ask) of increased dosing.

Consuming edibles containing marijuana or THC extracts takes respiratory harm reduction another step forward but presents a challenge in the strength and duration of effect. Edibles are known for being unpredictable and potentially overwhelming.^{74,78-80} This may in part be a reflection of the unknowns of the black market and/or host factors including rate of digestion and absorption or education around marijuana. Indeed, in my travels I've met many people who knew very little about marijuana, but were adamant about not smoking – as such, edibles probably seemed like the logical first step. Each story seemed to end with variations around a theme: the effects had a slow but strong onset and the person had been virtually unable to get up from where they were sitting or lying down for hours on end. In many cases, these stories began with a single edible: a brownie, a cookie, a gummy bear, or a lollipop. Importantly, I think it could be argued that these kinds of edibles are inadvertently advertised toward younger audiences, as suggested by a recent accidental intoxication in Nova Scotia.⁸¹ In states that have already legalized marijuana, there are reports of minors consuming THC-containing edibles and presenting to emergency departments.⁸²⁻⁸⁵ Moreover, legality may not entirely change the comfort of caretakers disclosing that a child has consumed a THC-containing product. As such, it has been suggested that healthcare providers be educated on the

common symptoms of THC intoxication (e.g. lethargy, ataxia, tachycardia, mydriasis, and hypotonia).^{85,86} Given that these symptoms can be non-specific, it may be important to add marijuana intoxication to the differential diagnosis.

Thus, despite the potential harm reduction associated with edibles, it can be argued that they come with their own harms and with a greater need for education. In minimizing the potential harm to children, it will be important to educate on (1) the safe storage of marijuana (not dissimilar to how we discuss the safety of other drugs – e.g. stored away from children, safety lid, etc.) and (2) limiting potentially invasive testing for inadvertent intoxication. From the physician's perspective, were a patient planning to consume an edible containing THC, I would want to communicate the unique and potentially overwhelming effects of edibles with a tone of taking it slow until the patient knows how it may affect them.

Take away points:

- Vaporizers are generally favoured to combustion methods for respiratory harm reduction.
- Edibles are a further form of harm reduction, but not without caveats.
- Edibles can pose a greater risk to children because of inadvertent advertising.

Are you combining it with anything else?

As previously mentioned, marijuana being contaminated with another drug is not that common, but there are exceptions to everything.⁸⁷ As my experience in adolescent addictions have suggested, it's not uncommon for marijuana to be combined with tobacco for preference or to make their supply of marijuana go a bit further. It's a practice that has been argued to increase the addictiveness of marijuana consumption due to the added effects of nicotine.⁸¹ In addition, it comes with the same harms of using tobacco. From the physician's perspective, it may be important to ask whether patients are combining their marijuana with another drug because it could be an avenue to other side-effects and addictions. This also may provide an opportunity to discuss harm reduction approaches for minimizing exposure to other harmful substances.

Take home points:

- Marijuana is commonly combined with tobacco.

Conclusions

There is a lot I did not cover in this article including many aspects of medical marijuana, marijuana use in the developing brain, and socioeconomic and psychology with marijuana use. Indeed, in reading about the aforementioned topics, each seemed worthy

of its own article. As such, this article is just a glimpse of common talking points and concerns regarding a more societally open relationship with marijuana.

I was left surprised by some of the findings uncovered while researching for this article and I encourage other medical students and physicians to also approach the issue of marijuana with curiosity rather than judgement. After all, there will be patients whom know their experiences with marijuana better than we understand its pros and cons. But to all patients, I believe we owe them an informed, judgement-free dialogue, so that we can say we've done our part as physicians to encourage a better, more honest healthcare relationship.

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