



VERIHEAL

VERIHEAL'S

ANNUAL

MEDICAL CANNABIS PREFERENCE REPORT

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INTRODUCTION

There is an array of medical cannabis products available on the market which allows patients to customize the way they administer their cannabis medicine. From smoking, to ingesting, to topical administration, there are indeed diverse methods and options that are preferred more than others. Veriheal aims to discover preferences based on patients' sex to help healthcare providers and the cannabis industry understand patients better.

▲ 70%

According to Veriheal's patient database, 71% of female patients prefer medical cannabis edibles, deeming edibles the leading product type of interest among female consumers, while 80% of male patients prefer medical cannabis flower.

A survey question we ask patients prior to their physician consultation is, "What product are you most interested in?" The leading medicinal cannabis product of interest is flower, for the purpose of inhalation administration like smoking or vaping; the second most popular are edibles. According to Veriheal's patient database, 71% of female patients prefer medical cannabis edibles, deeming edibles the leading product type of interest among female consumers, while 80% of male patients prefer medical cannabis flower. Several assumptions can be made to explain this preference, of particular significance being the discreet nature of edibles; it is odorless and easier to store, edibles are also easier to dose. This study aims to address these factors, as well as other aspects of the desired cannabis experience in women, to assess why women prefer cannabis edibles.

In this study, Veriheal utilizes survey data to analyze several suppositions about cannabis use in women. Responses from a nation-wide cohort of cannabis patients are used to draw connections between cannabis use in women and their preference for edibles. Supporting research is also assessed in order to evaluate the validity of these claims.

This study was conducted using patient survey data from the Veriheal platform, which operates via electronic health records that mirror those used in the traditional medical industry—which generally does not include separate fields for birth sex and self-identified gender identity in its electronic health records. Future Veriheal reporting aims to be more inclusive of transgender and gender nonconforming people.



HYPOTHESIS



There is a statistically significant difference between the likelihood of women versus men who choose edibles as their cannabis consumption method. From a nationwide population of medical cannabis patient respondents, there is a significant difference in self-identified men and women who choose edibles and this is not due to chance alone. From this, we can use more data collected in this same study, as well as supplementary research, to understand why women are more likely to choose edibles than men are.

METHODS

This survey utilizes a population of over 200,000 patient sign ups from the Veriheal database. The patients in this study are sign-ups that registered with Veriheal from October 7, 2020 through October 7, 2021. Patient data was acquired from across the United States, with patients ranging in age from 18 to 85. The majority of respondents were in the 25-29 year age range. Patients were surveyed regarding cannabis use preferences, user experience, medical conditions, and several other variables which inform and impact their cannabis use. The data used in this analysis resulted from the following questions:

- What products are you most interested in?
- What products do you wish they (dispensaries) had more of if any?
- What conditions do you have?
- How do you want to feel?
- Are there any CBD to THC ratios that you look for in your cannabis products?

The data was segregated into respondent groups based on self-identified sex (male or female) as presented in electronic health records. This was done to assess sex-dependent differences in response to each question regarding product preferences.

After data was parsed into responses regarding gender, it was analyzed in relation to cannabis matrix choice and reported medical conditions. With initial overview of pertinent survey response data, a notable pattern was seen in women respondents reporting cannabis use for nausea versus men. Due to this, statistical analysis was run on not only data regarding gender and matrix choice, but also gender and reports of nausea. First, the data was made binary by assigning a “0” value to respondents who did not indicate an interest in edibles, and a value of “1” to respondents who did. Similarly, respondents who indicated cannabis use for nausea were assigned a value of “1” while those who did not were assigned a “0” value. This reorganization allowed for a chi-square test to be performed and a margin of error to be determined for both sets of data. This made it possible to assess the statistical significance of gender in cannabis matrix choice, as well as the significance in gender in reported medical conditions.

The statistical analysis needed to derive correlation between female edible choice and reports of nausea was not conducted. This in-depth analysis should be performed in order to derive direct conclusions about women choosing edibles for easement of nausea symptoms.

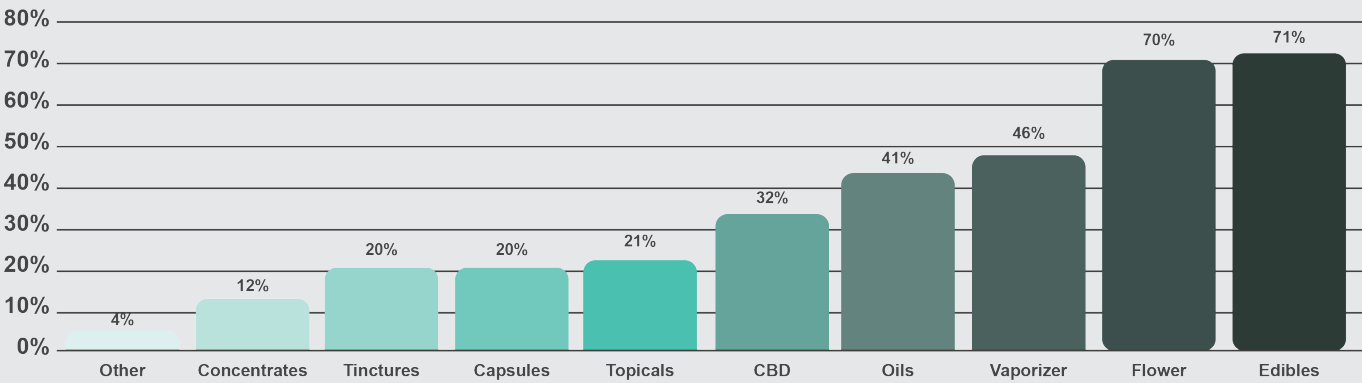
THE DATA

When assessing the data for cannabis product choice, it was found that women prefer edibles (71%) to flower (70%) while men prefer flower (80%) to edibles (63%).

While women do not have a strong preference between edibles and flower, the data from surveyed men showed a large discrepancy in their preference for flower over edibles.

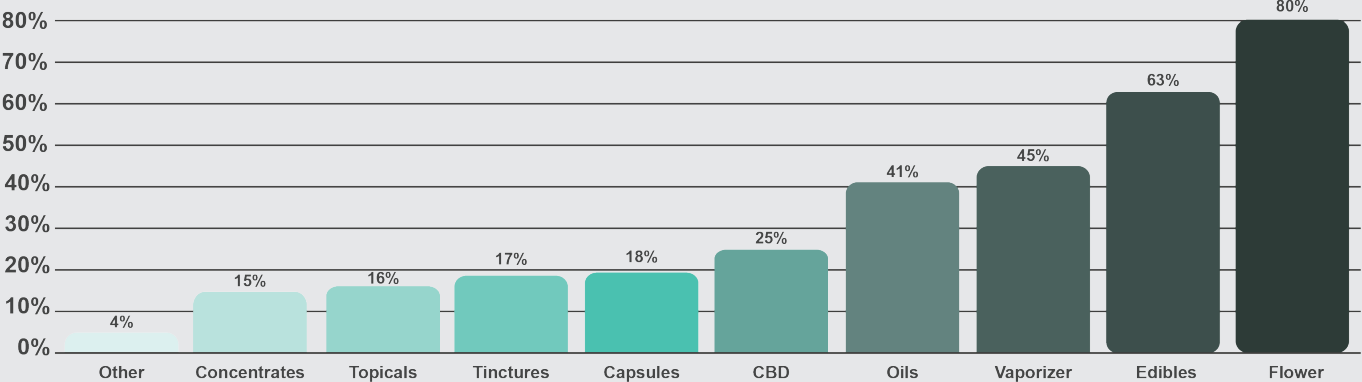
PRODUCT CHOICE

What products are you interested in?



02 Female respondents' product choice. Respondents were asked, "What products are you interested in?" The figure represents the percentage of the 125,000 possible cannabis patients registered with Veriheal which indicated interest in the listed cannabis matrices. These patients were surveyed between October 7, 2020 and October 7, 2021.

What products are you interested in?

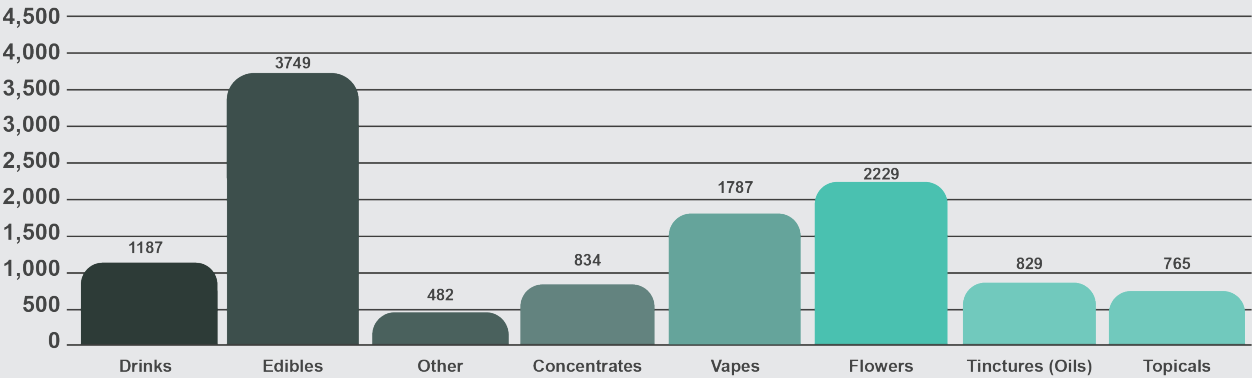


03 Male respondents' product choice. Respondents were asked, "What products are you interested in?" The figure represents the percentage of the 125,000 possible cannabis patients registered with Veriheal which indicated interest in the listed cannabis matrices. These patients were surveyed between October 7, 2020 and October 7, 2021.

An important product to also consider is tinctures, as they are also a means of oral ingestion which offer the benefit of a shorter onset time. Female patients expressed a higher preference for tinctures than male patients as well. Female interest in tinctures was reported by 20% of the respondents, while only 17% of males reported tincture use.

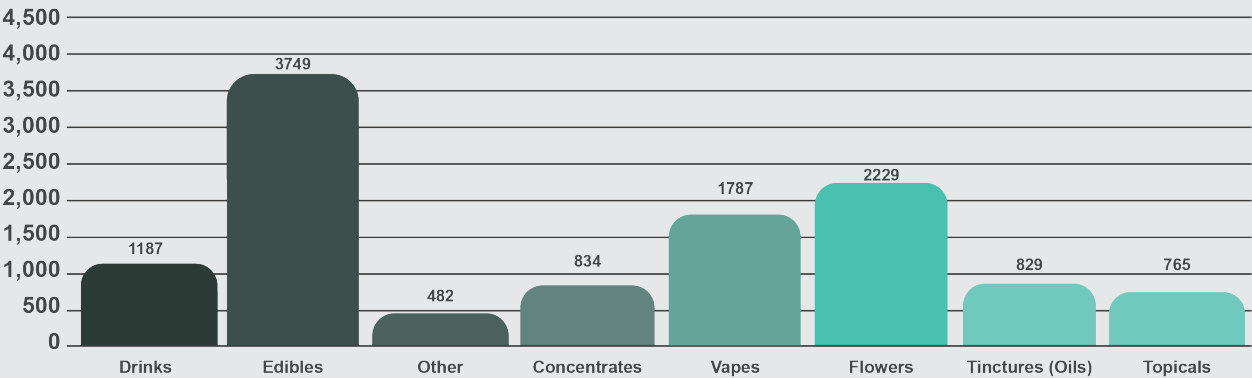
When assessing the products that women would like to see more of on the market, the results were consistent with the gender-associated patterns seen elsewhere in this study. The survey revealed that 31% of women would like to see more edibles on the market, and only 18% of women would like to see more flower. Additionally, 30% of male respondents would like to see more edibles and 25% of men would like to see more flower. While both genders would like to see more edibles in dispensaries, female responses were more heavily stratified towards the preference for edibles over flower.

What products do you wish they had more of if any?



03 Female respondents' products of interest. Respondents were asked, "What products do you wish they (dispensaries) had more of if any?" The figure represents the percentage of the 125,000 possible cannabis patients registered with Veriheal which indicated interest in seeing more of the listed cannabis matrices. These patients were surveyed between October 7, 2020 and October 7, 2021.

What products do you wish they had more of if any?



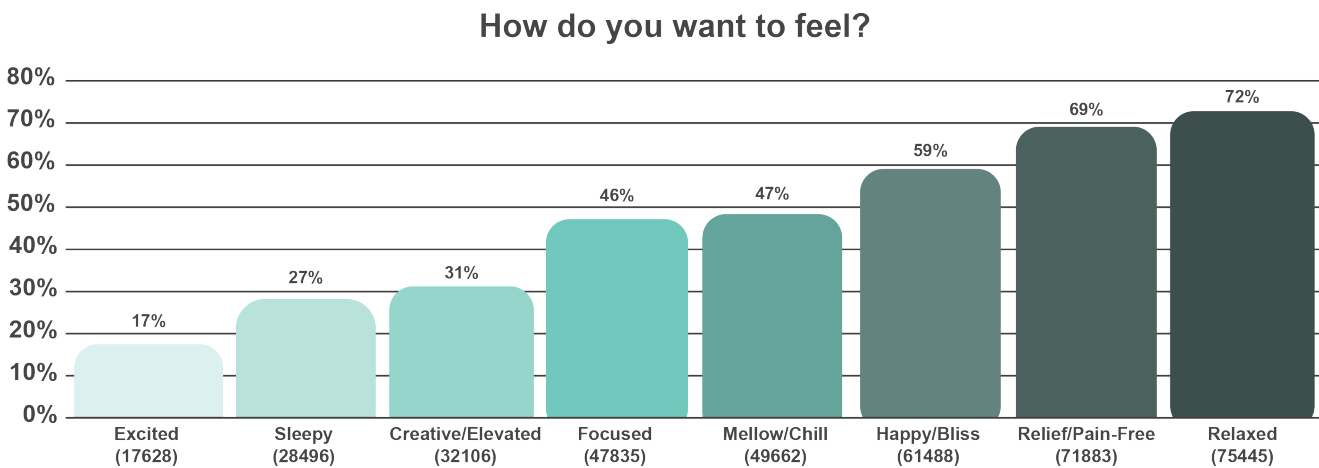
04 Male respondents' products of interest. Respondents were asked, "What products do you wish they (dispensaries) had more of if any?" The figure represents the percentage of the 125,000 possible cannabis patients registered with Veriheal which indicated interest in seeing more of the listed cannabis matrices. These patients were surveyed between October 7, 2020 and October 7, 2021.

PRODUCT USE



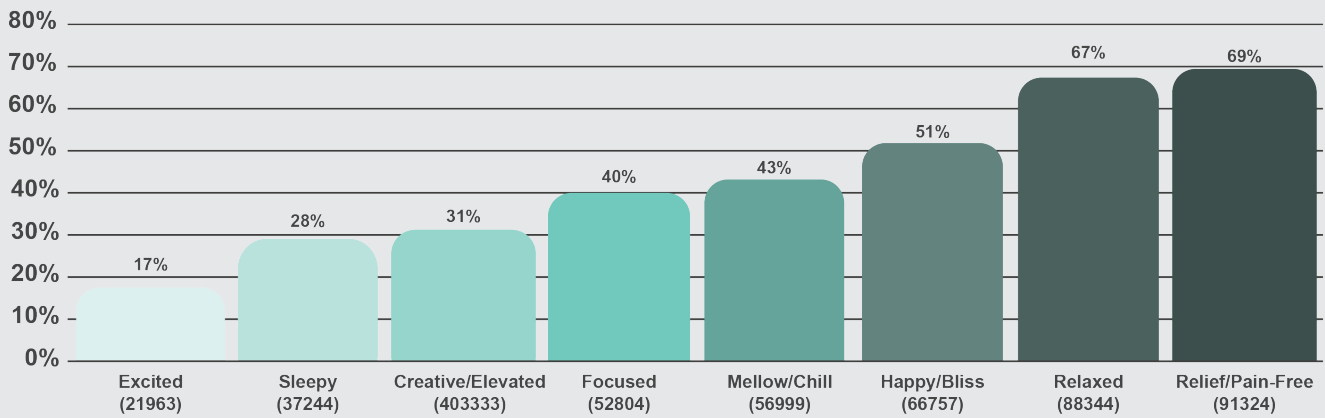
Analyzing this data leads to the question of why women would prefer to purchase and use edibles more than flower. This prompts a deeper look at why cannabis is being used by women. For this we assessed the patient's desired feeling from their cannabis use. We also asked about any preference in CBD to THC ratio when shopping for products. Lastly, the respondents were asked about any medical conditions they may use cannabis for.

Data regarding the patients' desired feelings revealed similarities between genders. Women respondents primarily reported a desire to feel relaxed (72%) as well as pain-free (69%) while men requested feeling pain free (67%) and feeling relaxed (69%).



05 Female respondents' desired feelings from cannabis use. Respondents were asked, "How do you want to feel?" as a result of their cannabis use. The figure represents the percentage of the 125,000 possible cannabis patients registered with Veriheal that indicated they would like to experience one of the listed feelings after cannabis consumption. These patients were surveyed between October 7, 2020 and October 7, 2021.

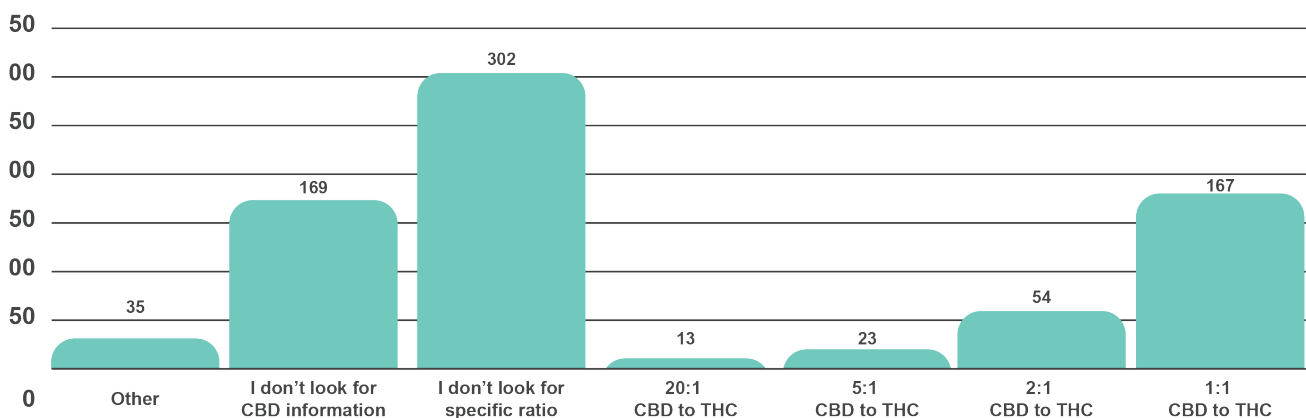
How do you want to feel?



06 Male respondents' desired feelings from cannabis use. Respondents were asked, "How do you want to feel?" as a result of their cannabis use. The figure represents the percentage of the 125,000 possible cannabis patients registered with Veriheal that indicated they would like to experience one of the listed feelings after cannabis consumption. These patients were surveyed between October 7, 2020 and October 7, 2021.

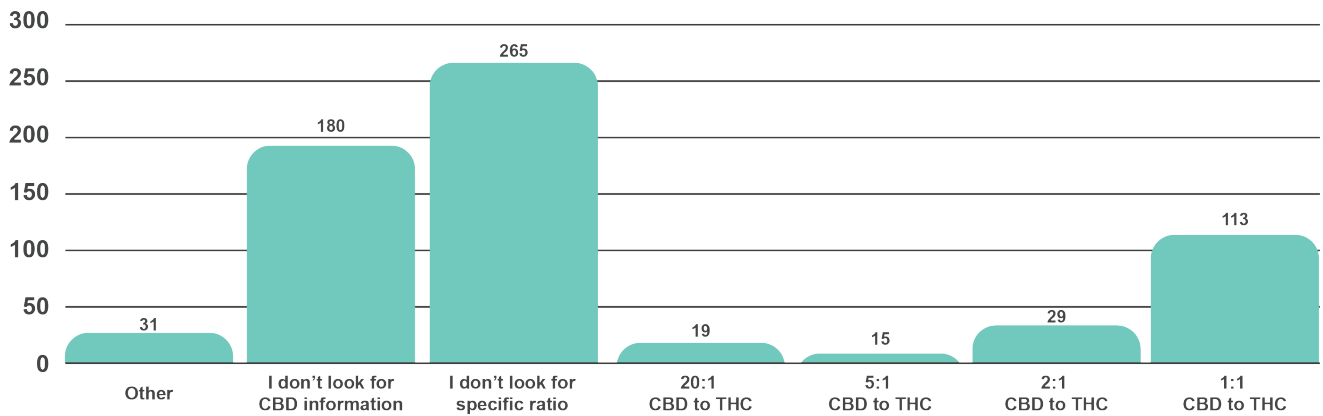
There was more to be said for differences in desire for a particular CBD to THC ratio. While 33.5% of women reported a preference for a certain CBD to THC ratio, only 26.2% of men reported having this preference. These kinds of dosing ratios are more readily available and easier to dose in cannabis edibles.

Are there any CBD to THC ratio that you look for in your cannabis products?



07 Female respondents' desired CBD: THC ratio. Respondents were asked, "Are there any CBD to THC ratios that you look for in your cannabis products?" The figure represents the percentage of the 125,000 possible cannabis patients registered with Veriheal that indicated they are searching for one of the listed CBD: THC ratios in their products. These patients were surveyed between October 7, 2020 and October 7, 2021.

Are there any CBD to THC ratio that you look for in your cannabis products?



08 Male respondents' desired CBD: THC ratio. Respondents were asked, "Are there any CBD to THC ratios that you look for in your cannabis products?" The figure represents the percentage of the 125,000 possible cannabis patients registered with Veriheal that indicated they are searching for one of the listed CBD: THC ratios in their products. These patients were surveyed between October 7, 2020 and October 7, 2021.

▲ **14%**

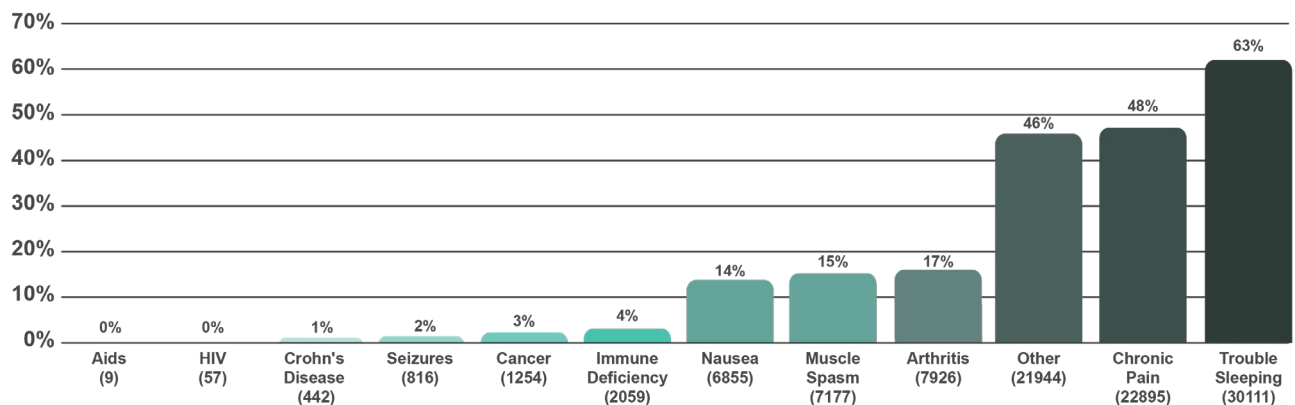
Nausea was reported in 14% of women

▼ **8%**

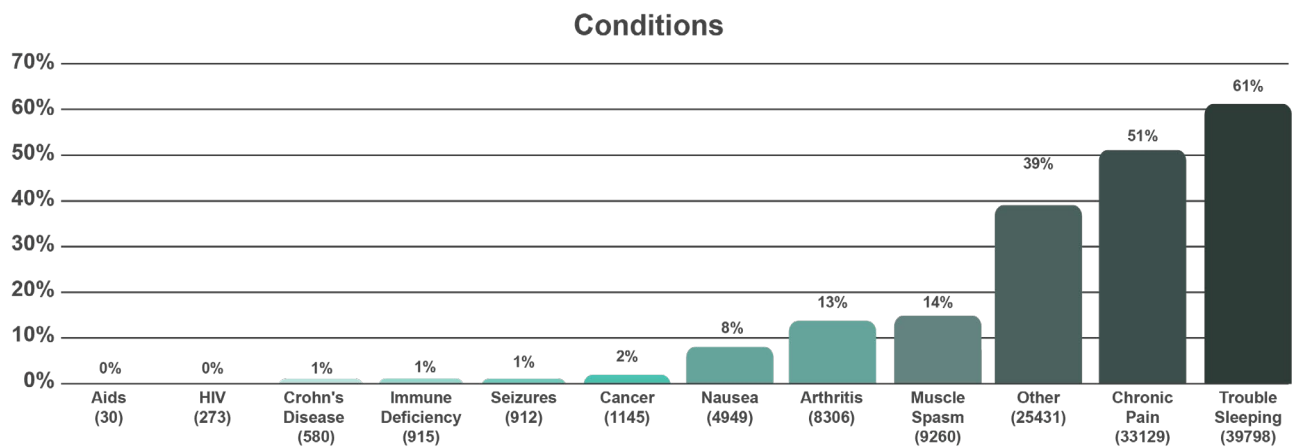
while it was only reported in 8% of men.

Finally, medical conditions for which the patients use cannabis were assessed. Women and men both reported using cannabis predominantly for trouble sleeping, with 63% of females and 61% of males choosing this response. There was one condition for which we did not expect to derive such interesting data, and that was nausea. Our data revealed a significant discrepancy pertaining to the percentage of women who reported using cannabis for nausea. Nausea was reported in 14% of women while it was only reported in 8% of men.

Conditions



09 Female respondents' conditions for cannabis use. Respondents were asked, "Which medical conditions do you use cannabis for?" The figure represents the percentage of the 125,000 possible cannabis patients registered with Veriheal that indicated one of the listed pre-existing conditions for which cannabis is often used. These patients were surveyed between October 7, 2020 and October 7, 2021.



10 Male respondents' conditions for cannabis use. Respondents were asked, "Which medical conditions do you use cannabis for?" The figure represents the percentage of the 125,000 possible cannabis patients registered with Veriheal that indicated one of the listed pre-existing conditions for which cannabis is often used. These patients were surveyed between October 7, 2020 and October 7, 2021.

RESULTS

GENDER AND PRODUCT CHOICE

A chi square test was run on the data regarding cannabis product choice and gender. Through this test it was shown that there is a statistically significant difference between men and women and their preference for edibles. This was supported by a chi square value of 545 and a margin of error of 0.15%. The margin of error for this data set was particularly low due to the high sample size of over 200,000 respondents. Therefore, it is reasonable to conclude that this discrepancy in cannabis product choice did not happen by chance and can indeed be attributed to gender.



GENDER AND CONDITIONS FOR CANNABIS USE

In the data section of this paper, nausea was reported by 14% of women and 8% of men. These percentages were automatically calculated by the Veriheal data collection dashboard and are impacted by the fact that respondents were allowed to select more than one condition at the time of polling. When the data was assigned binary values for chi-square analysis, nausea was more accurately reported by 7% of women and 4% of men. This maintained a similar difference in response rate and was shown as statistically significant. The chi-square value for this analysis was over 1000, and the margin of error was 0.20%.

Margin of error for both data sets was thus determined to be less than or equal to 0.20%, which is reflective of the vast sample size used during this analysis. Statistical analysis of higher complexity needs to be performed on this data set in order to show correlation between nausea and edible choice.

DISCUSSION

There are several factors which impact the decision-making process of cannabis consumers and medical cannabis patients.

Assessing the choices of cannabis users based on sex can provide insight regarding medicinal uses of cannabis, as well as societal stigmas and gender roles around cannabis use. Veriheal collects a unique data set of patients interested in medical cannabis from across the nation. This data set has proven a valuable resource when drawing conclusions about gender and cannabis product choice. The findings in this study support our hypothesis and suggest a preference for edibles in women, which is also supported by a variety of studies detailed throughout this discussion. This data set also revealed a higher tendency for women to use cannabis for a variety of symptoms, most notably nausea, when compared to males.

PREFERENCE FOR EDIBLES IN WOMEN

The drive for edible consumption in women is a pattern that has been observed with cannabis use for many years. This study efficiently demonstrates that there is a statistically significant difference between the choice of men and women for edibles, with a margin of error that is less than 0.20%.

Due to the large sample size of this study, it is clear that this result did not occur by chance, and this is supported by the results of a chi-square test. A similar tendency of women towards choosing edibles has already been shown in a variety of studies. For instance, a 2016 study published in Cannabis and Cannabinoid Research analyzed the chosen route of administration for women and men. Women reported oral consumption consisting of edibles, tinctures, or capsules as 7.9% of their means of consumption. Men reported oral consumption under these same parameters at 3.9%.² This pattern has persisted to the current day, as more people turn to holistic medicines like cannabis as a replacement for their prescriptions. Women also have been shown to stray from smoking cannabis due to inconvenience, difficult dosing, and societal standards placed on women.²

This paper aims to help understand the motives for such a choice based on these factors. Data from other, related questions that were asked during this survey are included in this report in order to provide supplementary information about the respondents that may be used to better understand their choices. For this purpose, the symptoms for which the respondents use cannabis are also analyzed and shown to be statistically significant. However, more statistical analysis needs to be completed in order to derive any correlation between reported symptoms and cannabis product choice.

WOMEN MORE COMMONLY REPLACE PHARMACEUTICALS WITH CANNABIS THAN THEIR MALE COUNTERPARTS

According to the Journal of Women's Health in 2021, women are more likely than men to use cannabis as a replacement for their prescriptions.¹ The oral administration of cannabis edibles is more familiar to patients that are accustomed to the administration of traditional prescriptions, making it easier for them to replace prescriptions with cannabis-based medicines. Women also report using cannabis for a more varied list of conditions than men, and aspects of cannabis edible consumption such as longer lasting effects support a higher potential for therapeutic benefit.⁷

The typical onset of orally administered prescriptions in comparison to the onset of orally consumed cannabis may be one of the factors promoting edible cannabis use in women.

According to Palo Alto University, oral cannabis consumption produces an onset time of 30 minutes to 3 hours.⁷ These effects longer than smoking cannabis flower as well and can therefore provide a more potent therapeutic effect for medicinal uses.⁵ It has also been reported that edible consumption of cannabis induces more effective pain relief and relaxation related to better sleep.⁵ These therapeutic benefits were also some of the most prevalent reported uses for cannabis in this Veriheal study.

THE DISCREET NATURE OF EDIBLES AND WOMEN



Gender roles and stigmas play a large role in how women decide upon their method of cannabis consumption. Substance use in women is generally perceived as less frequent than in men, and the desire to conceal cannabis use in women may be a natural byproduct of this stigma.⁸



Edible consumption also circumvents the unique odor that is produced by smoking cannabis. In particular, it has been found that adolescent females are concerned about the lasting odor related to cannabis smoke.⁴



There are also reports of women who prefer cannabis edibles due to the possible health effects of smoking, but it has been found that the predominant reason that women choose edibles is for their discreet nature.³



The three previously cited studies directly support our hypothesis regarding the preference for cannabis edibles in women and the contributing factors. In general, edible consumption can lead to less societal stigma around women's substance or medicine of choice, which can be an appealing asset to many women.

Women who wish to avoid negative associations related to their cannabis use are more likely to seek out edibles as a more discreet means of obtaining the therapeutic effects of cannabis.

WOMEN REPORT NAUSEA MORE FREQUENTLY THAN MEN

An interesting outcome of the data analyzed in this study was the increased report of nausea in women versus men. In this study, women were almost twice as likely to use cannabis for nausea than men, and this was determined statistically significant with a margin of error of less than 0.20%. Cannabis has been well regarded for its antiemetic effects by the scientific community for over a decade. In a 2006 study of women with morning sickness, cannabis proved an “extremely effective” antiemetic for over half of respondents.¹⁰ Cannabis use for the treatment of nausea has had a significant association with women for this reason. This association may also be contributing to the stratification of women reporting cannabis use for nausea in comparison to men.



The general prevalence of nausea in women over men has been confirmed in a number of other studies as well. A 2016 study from Cannabis and Cannabinoid research confirmed that female cannabis consumers report nausea more often than men. In this study, women reported approximately a third of their cannabis use for the purpose of reducing nausea, while only about a fifth of men reported using cannabis for this same purpose.² This study concluded responsibly, suggesting that these patterns could be attributed more to the increased predisposition of women for nausea in general, rather than specific anti-emetic effects of cannabis or cannabis edibles.

For instance, a 2021 study of gender differences in cannabis use from the Journal of Women's Health reported that, in general, women report nausea more frequently than men do, with 52.7% of women and 37.5% of men reporting nausea.¹ This predisposition for nausea is a confounding factor worth consideration and reveals a possible gap in current research which should be studied further. While the desire for cannabis edibles in women versus men is pronounced, this could also be attributed to therapeutic effects of cannabis edibles that are less prevalent in other routes of administration.

BENEFITS OF ORAL ADMINISTRATION OF CANNABIS

Oral administration of cannabis is beneficial for reasons that are mainly based on therapeutic benefit. The therapeutic benefits offered by edibles coincide well with the presumption that consuming edible cannabis is also more familiar to those replacing their pharmaceuticals with cannabis products. The benefits of cannabis edibles are also based in pharmacodynamics. Cannabis patients who consume edibles or tinctures report longer lasting highs, which can mean longer lasting relief from uncomfortable symptoms. More specifically it has been shown that users of edibles report better pain relief and sleep when consuming cannabis edibles than when smoking or vaping cannabis.³ However, it is worth considering that consuming edibles requires the patient is experiencing nausea that is mild enough to allow the patient to consume an edible. This is where the preference for tinctures found in this study may be significant. While tinctures still require oral administration, most tinctures are administered in a sublingual fashion, leading to detectable cannabinoid concentration in the blood plasma within 15-30 minutes¹¹. They achieve this faster onset through a period of sustained exposure to the blood vessels under the tongue, meaning the patient technically does not have to swallow the tincture to get the effects. Theoretically, this may prove to be a more tolerable means of consumption for patients experiencing nausea and should be addressed in future research. The benefits of this route of administration are compounded by the relatively quick onset and long duration of cannabis tinctures.

DOSING CONSIDERATIONS



Another interesting finding of this study is the difference between women and men when shopping for a desired CBD: THC ratio. Veriheal found that 33.5% of women and 26.2% of men preferred a certain CBD dose in a cannabis product. This brings about the discussion of whether the dosing and labeling of edibles is a large consideration for those who choose and buy edibles. When purchasing edibles in the adult use market, any well-regulated cannabis product will have distinct dosing labels which state these ratios. They are also often segregated or cut into several serving sizes, with an indication of the cannabinoid content of each serving size. Paired with dosing instructions which most often recommend starting with a low dose and ample time to assess the effects, these regulated edibles are a clear-cut choice when assessing safety in edible consumption. Lastly, well-regulated adult use cannabis edibles are tested for state compliance, which means they are upheld to strict standards regarding their labeled dosage. All of these factors make edibles sold in the regulated, adult use market an obvious choice for consumers, especially those consuming cannabis for medical purposes.

This indication is supported by a 2018 study in which several respondents reported that they had indeed turned to purchasing edibles in the adult use market due to concerns about the reliability of dosing in homemade cannabis edibles.⁵ Inconsistencies in edible production and the inability to parse out reliable doses are equally valid concerns worth addressing. As a result of these concerns, there is most likely a shift of edible purchases from the black market to the adult use market. This shift may amplify the observable trend toward increased interest in edible cannabis. Female respondents' preference for CBD:THC ratios also implies a desire for consistency in edibles. Considering both of these observed patterns in female cannabis users, implications can be made as to why women would be more drawn to purchasing cannabis edibles.

CONCLUSION

This study demonstrates the complexity of decisions made by medical patients when choosing a route of administration for cannabis products. The preference for cannabis edibles in women is evident, and the factors contributing to this preference are varied. First, women have indeed cited the ease and discretion of consumption as a reason for choosing edibles over smoking. Women have also been shown to prefer discretion while consuming cannabis due to societal gender roles about substance use. Lastly, women and men report using cannabis for very similar purposes, but women report using cannabis for nausea more than men.

It is more difficult to draw the conclusion that women choose oral ingestion due to this increased predisposition for nausea, as nausea implies difficulty with oral ingestion. However, there are therapeutic benefits, such as prolonged symptom relief, which are associated with oral ingestion. This may be appealing to consumers who use cannabis for a variety of ailments. In general, women report using cannabis for more ailments than men, so this could explain some of the discrepancy between male and female choices in route of administration. The use of oral cannabis formulations as medicine in women is also supported by the increased tendency for women to replace their pharmaceutical medications with cannabis, as well as the preference for specific cannabinoid ratios in cannabis products.

In summary, the choice of route of administration for medicinal products can be due to a variety of factors. Women and men vary in the conditions that they experience and use cannabis for, therefore it is understandable that women may prefer a different route of administration. While this study evaluated general preference, this presents a limitation which could be improved upon by asking more in-depth and specific

questions regarding preference in order to determine any measurable significance for practical application. More surveys like this should be conducted to assess the precise aspects of cannabis edibles that women prefer. However, there seems to be a desire from both men and women for more cannabis edibles in the market, and with improved educational efforts about cannabis edibles this paradigm may shift. Societal stigmas which influence women in their cannabis consumption choices may become outdated as society begins to accept cannabis as medicine. An increased use of cannabis as medicine is likely to lead to more oral formulations as a parallel to or part of the pharmaceutical industry. While oral consumption may have stark differences from smoking, its popularity seems to be increasing, and women are apt to support their growth in the adult use market.

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