Journal of Human Sciences and Extension

Volume 8 | Number 3 Article 11

11-2-2020

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Zachary D. Giano
University of Arkansas, giano@uark.edu

Jennifer N. Becnel
University of Arkansas, becnel@uark.edu

Amanda L. Williams
University of Arkansas, awl1007@uark.edu

Dylan C. Martinez
University of Arkansas, dcm005@uark.edu

Recommended Citation

Giano, Z. D., Becnel, J. N., Williams, A. L., & Martinez, D. C. (2020). Medical, Recreational, and Mixed Marijuana Users: An Examination of Physical and Mental Health Correlates. *Journal of Human Sciences and Extension, 8*(3), 11. https://doi.org/10.54718/AUBJ3403

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Medical, Recreational, and Mixed Marijuana Users: An Examination of Physical and Mental Health Correlates

Zachary D. Giano
Jennifer N. Becnel
Amanda L. Williams
Dylan C. Martinez
University of Arkansas

Marijuana use in the U.S. doubled between 2001 and 2013, largely due to increases in legalization laws. Little attention, however, is given to the type of marijuana user (e.g., recreational or medical), particularly with health outcomes. Our study used data from the 2017 Behavioral Risk Factor Surveillance System (N=5,349) to examine physical health, mental health, and demographic variables by marijuana user type (including non-marijuana users). In physical health, the non-marijuana group was generally healthier, getting the most sleep, lowest BMI, and lowest alcoholic consumption. Medical users self-reported the poorest physical health, BMI, and sleep. Similar results were found in the mental health category between non-marijuana and medical users. Future longitudinal research is needed to investigate whether medical users, over time, increase their marijuana use to include recreational use (i.e., become mixed users) as a method of coping with the combination of health, emotional, and quality of life problems. Although this is among the first nationally representative studies to examine unique marijuana user groups, future studies should track user groups over time to understand the implications of transitioning into medical or recreational user groups.

Keywords: marijuana use, substance use, recreational marijuana, medical marijuana, physical health, mental health

Introduction

Marijuana use in the United States doubled between 2001 and 2013, and this increase was largely attributed to states legalizing medical and recreational use (Hasin et al., 2015). Marijuana as been associated with both poorer mental health such as depression, anxiety, and various psychoses (Patton et al., 2002; Volkow et al., 2014) and physical health outcomes such as obesity, stroke, cardiovascular diseases, and chronic bronchitis (Volkow et al., 2014). Although a substantial body of literature addresses marijuana use, investigations disentangling recreational from medicinal use (or both types of use) are underdeveloped. Given the rapid legalization of both medical and recreational marijuana products, examining differences between medical,

Address correspondence to Jennifer N. Becnel at becnel@uark.edu

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recreational, and mixed (medical and recreational) marijuana users is essential. Understanding the physical, psychosocial, and demographic characteristics of different types of marijuana users can help health practitioners and community providers care for individuals.

The present study used data from the 2017 Behavioral Risk Factor Surveillance System (BRFSS; Centers for Disease Control and Prevention, 2017), which is the first time questions about marijuana user type (e.g., medical only, recreational only, or both) were included. To our knowledge, this is the first study to utilize a large, national dataset, as opposed to clinical samples of those seeking health care, in partitioning marijuana users by medical only, recreational only, and including mixed users (who use both medically and recreationally) as a distinct group. Addressing this gap, this study examined group differences in physical health, mental health, and demographics by marijuana user type as well as assessed whether marijuana user type predicted physical health, mental health, and demographics above and beyond control variables (e.g., predicting physical health controlling for mental health and vice-versa).

Methods

Sample

The BRFSS is an annual survey conducted by random-digit–dialed telephone both cellular and landline in all 50 U.S. states, the District of Columbia, and territories. The goal of the BRFSS is to collect information on health-related activities, behavioral risk factors, preventive-health practices, substance use, and other chronic conditions among noninstitutionalized adults over the age of 18. The full 2017 dataset includes 450,648 records. Respondents in the final reduced sample with complete data on study variables (N = 5,349) were predominately male (63.2%) with a mean age of 43.02 (SD = 16.33). The majority identified as White (68.6%), with other race/ethnicities of Hispanic (12.0%), Black (8.2%), American Indian/Alaskan Native (3.6%), Asian (1.9%), or other race/ethnicity (5.7%; values not shown in table).

Measures

Marijuana User Type. Users were asked how many days in the past month they had used marijuana, with options of 0 to 30. Participants who answered 0 were separated into a non-marijuana using group. Next, marijuana user type was assessed by the question, “When you used marijuana or hashish during the past 30 days, was it for medical reasons to treat or decrease symptoms of a health condition, or was it for non-medical reasons to get pleasure or satisfaction such as excitement, to “fit in” with a group, increased awareness, to forget worries, for fun at a social gathering.” Possible responses were 1 = *only for medical reasons to treat or decrease symptoms of a health condition,* 2 = *only for non-medical purposes to get pleasure or satisfaction,* or 3 = *both medical and non-medical reasons*. Responses were dummy coded into four marijuana use groups: non-users, medical, recreational, and mixed. Most participants in the full dataset identified as non-marijuana users (approximately 90%). It should be noted that

medical users, regardless of the marijuana legalities and their state of residence, should not be indicative of an authorized medical marijuana prescription from a medical professional. In other words, people may use marijuana for medical purposes by both legal and illegal means.

To create balanced sample comparison groups, non-marijuana users were randomly selected from the total population of non-users to match the largest marijuana user group (recreational only). This resulted in sample sizes of 1,763 non-marijuana users, 1,763 recreational users, 1,217 medical users, and 606 individuals reporting mixed use (both medical and recreational). Random sampling was done as a function of the SPSS random sample generator, where sampling was performed without replacement (the same case cannot be selected more than once).

Marijuana Use Frequency. Participants were asked, "During the past 30 days, on how many days did you use marijuana or hashish?" with responses from 0 to 30.

Physical Health. Physical health was assessed via six survey items. Perception of poor physical health was assessed by the question of "Now thinking about your physical health, which includes physical illness and injury, for how many days during the past 30 days was your physical health not good?" with responses of 0 to 30. Body mass index (BMI) was calculated in the dataset by dividing the responses of weight measured in pounds by height measured in inches squared. Sleep hours was assessed by the question of "On average, how many hours of sleep do you get in a 24-hour period?" with responses of 1 to 24. Alcohol use was measured by participants' responses to the question of "One drink is equivalent to a 12-ounce beer, a 5-ounce glass of wine, or a drink with one shot of liquor. During the past 30 days, on the days when you drank, about how many drinks did you drink on the average?" With responses of 0 to 76. Balanced meals were assessed by asking how often the individual "couldn't afford to eat balanced meals" (1 = *never true*; 3 = *often true*).

Mental Health. Mental health was assessed by three items. Poor mental health was indicated by "Now thinking about your mental health, which includes stress, depression, and problems with emotions, for how many days during the past 30 days was your mental health not good?" with responses of 0 to 30. Life satisfaction was measured by asking, "In general, how satisfied are you with your life?" (1 = *very dissatisfied*; 4 = *very satisfied*). Stress was assessed by asking, "Stress means a situation in which a person feels tense, restless, nervous, or anxious, or is unable to sleep at night because his/her mind is troubled all the time. Within the last 30 days, how often have you felt this kind of stress?" (1 = *none of the time*; 5 = *all of the time*).

Demographics. Participants were asked a variety of demographic questions. Income was measured by the question of "What is your annual household income from all sources?" Responses were coded into eight categories, where 1 was *less than $10,000*, 2 was *$10,000 to $15,000*, 3 was *$15,000 to $20,000*, 4 was *$20,000 to $25,000*, 5 was *$25,000 to $35,000*, 6 was *$35,000 to $50,000*, 7 was *$50,000 to $75,000*, and 8 was *more than $75,000*. Participants reported their age with those older than 80 being collapsed into an "80+" category (less than

.5%). Participants identified their gender as male or female. Participants reported their race/ethnicity, with options of 1 = *White*, 2 = *Black*, 3 = *Asian*, 4 = *American Indian/Alaskan Native*, 5 = *Hispanic*, or 6 = *other race/ethnicity*.

Analytic Strategy

First, the random sample of non-marijuana users was compared to the full set of non-marijuana users on all study variables via *t*-tests. Results showed no significant differences in the randomly selected non-marijuana users compared to the larger set of non-users (all *p*-values above .05, not shown in table). It should be noted that in all BRFFS questions, participants were given the option to either refuse the question or answer "I don't know." Due to low percentages of these responses (less than 1% in all analyses), these participants were excluded from analyses. To analyze differences between marijuana usage groups (recreationally only, medically only, and mixed), a one-way ANOVA was used with Tukey post-hoc testing to detect group differences. Next, a series of multiple linear regressions were conducted among study variables with the dummy-coded marijuana groups as independent variables (non-marijuana groups as reference group) and health or demographic items as dependent variables. Each regression model controlled for all other study variables.

Results

Descriptive statistics for study variables along with F-tests and Tukey post-hoc analyses are shown in Table 1 to determine group differences. With respect to the physical health variables, the non-marijuana group generally provided healthier responses, getting the most hours of sleep and reporting the most positive perceptions of their physical health, lowest BMI, and lowest average alcoholic drinks per day. Notably, the non-marijuana group had the highest scores in the "could not afford balanced meals" category (higher scores indicating more often instances of not being able to afford balanced foods). Medical users reported the poorest physical health, with significantly higher scores in perceptions of poor physical health and BMI, while also reporting the lowest average hours of sleep. The only significant difference between the recreational and mixed user groups was perception of physical health, where users in the mixed-use category indicated significantly poorer physical health.

Similar results were found in the mental health category, with the non-marijuana groups reporting better perceptions of their mental health and stress, and significantly higher life satisfaction. Medical users had the poorest perception of their mental health and life satisfaction and reported the highest degree of stress.

In examining demographic data, the recreational only group reported the highest income, the lowest age, and the lowest marijuana frequency use (excluding non-users). Medical users reported the lowest income, non-marijuana users reported the oldest age, and, unsurprisingly, the mixed-use group reported the highest frequency of marijuana use.

Table 1. Analysis of Variance (ANOVA) by Marijuana User Type

	Medical Only		Rec Only		Both Med/Rec		No MJ				
Variable	**Mean**	**StD**	**Mean**	**StD**	**Mean**	**StD**	**Mean**	**StD**	**F Statistic**	***p*-value for F**	**Sig. Group Differences**
Physical health											
Poor physical health	9.07	11.60	2.66	6.25	5.34	9.38	4.21	8.74	129.24	**<.001**	a > b,c,d; c > b,d; d > b
BMI	27.65	6.80	26.57	5.34	26.35	6.00	28.40	6.16	32.65	**<.001**	d > a,b,c; a > b,c
Sleep hours	6.74	1.96	7.05	1.52	7.18	1.67	7.17	1.30	5.25	**.001**	b,c,d > a
Avg. drinks a day in past month	1.77	2.36	2.89	3.52	2.56	3.99	1.08	2.56	111.99	**<.001**	b,c > a,d; a > d
Could not afford balanced meals	2.39	.77	2.68	.62	2.56	.68	2.86	.46	50.48	**<.001**	a > b,c,d; c > a,d; b > d
Mental health											
Poor mental health	9.90	11.53	4.64	8.08	7.83	10.28	3.10	7.77	138.99	**<.001**	a > b,c,d; c > b,d; d > d
Life satisfaction	3.06	1.13	3.31	.85	3.23	.85	3.45	.72	9.65	**<.001**	d,b > a
Stress	2.91	1.32	2.18	1.13	2.74	1.26	1.89	1.07	84.24	**<.001**	a,c > b,d; b > d
Demographics											
Income	4.84	2.43	5.81	2.20	5.49	2.21	5.62	2.26	42.51	**<.001**	b,d > a,c; c > a
Age	46.45	15.60	40.77	16.49	42.67	16.17	56.90	16.76	281.31	**<.001**	d > a,b,c; a > b,c;
MJ frequency	16.92	12.18	11.81	11.55	19.89	11.18	.01	.35	1086.08	**<.001**	c > a,b,d; a > b,d; b > d

Note. Significance is bolded. a = Medical Only, b = Rec Only, c = Both Medical and Rec, d = Not a Marijuana User

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Table 2 presents the results of the linear regression analysis. In terms of physical health, being a medical only or mixed user was significantly associated with poorer perceived physical health, while being a recreational only user was associated with more alcoholic drinks per day. Regarding mental health, being a medical only or mixed user was associated with significantly higher self-reported stress. In terms of demographic characteristics, being a medical user was significantly and negatively associated with income. All three marijuana user categories had significant and negative associations with age (the non-marijuana group was the oldest) and significant positive associations with frequency of marijuana use.

Table 2. Physical/Mental Health and Demographic Outcomes Predicted by Marijuana Group (Non-Marijuana Users as the Reference Group)

	Rec MJ			**Med MJ**			**Both MJ**				
	β	**SE**	**Sig.**	**β**	**SE**	**Sig.**	**β**	**SE**	**Sig.**	**R-Sq.**	**F**
Physical health											
Poor physical health	-.02	.68	.637	**.08**	.82	**.034**	**.08**	1.04	**.032**	**.30**	**19.899**
BMI	-.07	.55	.143	-.05	.70	.306	-.01	.84	.757	**.07**	**3.370**
Sleep hours	.01	.13	.793	.01	.17	.908	.03	.20	.425	**.08**	**4.012**
Avg. drinks a day in past month	**.11**	.33	**.014**	.04	.42	.442	.07	.51	.079	**.07**	**3.460**
Could not afford balanced meals	-.01	.05	.816	-.02	.06	.538	.01	.07	.689	**.33**	**23.012**
Mental health											
Poor mental health	.00	.65	.964	.04	.82	.332	-.03	.99	.395	**.40**	**30.242**
Life satisfaction	-.07	.07	.089	-.06	.09	.135	-.02	.11	.588	**.20**	**11.556**
Stress	.03	.08	.434	**.10**	.11	**.003**	**.12**	.13	**<.001**	**.44**	**35.872**
Demographics											
Income	-.02	.17	.665	**-.09**	.21	**.026**	-.04	.26	.321	**.31**	**20.445**
Age	**-.27**	1.30	**<.001**	**-.13**	1.69	**.001**	**-.11**	2.04	**.002**	**.32**	**21.789**
MJ frequency	**.42**	.81	**<.001**	**.50**	.99	**<.001**	**.50**	1.17	**<.001**	**.41**	**32.251**

Note. Coefficients are standardized. Significance is bolded. All regression control for marijuana groups, all health outcomes, race/ethnicity, and gender.

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Discussion

This study aimed to compare the demographic, mental health, and physical health characteristics of medical and recreational marijuana users, as well as individuals who used marijuana for both medical and recreational purposes. There were some similarities in user groups but also several important differences. Overall, non-users reported being healthier in terms of both physical and mental health characteristics. Individuals using marijuana for medical purposes reported the poorest overall health. This is not necessarily unexpected considering users may have a medical condition to which marijuana is used to medically aid symptoms. A number of health conditions for which marijuana is prescribed tend to be comorbid (Sexton et al., 2016), which further compounds their health challenges. However, while appropriately prescribed marijuana may alleviate some symptoms from one or more of these health conditions, less is known about adverse side effects related to specific health conditions and the holistic impact of marijuana use on a person's total health (physical and psychosocial). Studies have consistently linked marijuana use with a host of physical and mental health problems ranging from mild to clinical in severity (Patton et al., 2002; Volkow et al., 2014).

Given that medical marijuana users were the least healthy and reported the highest stress and lowest income, future research is needed on whether these individuals increase their marijuana use to include recreational use and become mixed users as a method of coping with the combination of health, emotional, and quality of life problems. While many individuals enjoy the benefits of marijuana without consequence, studies have also shown evidence of potential harmful sequelae. There appears to be a subset of individuals who experience greater life stress who may be more likely to use marijuana for stress-coping purposes, which in turn, leads to chronic use (Hyman & Sinha, 2009). This chronic use has shown associations with decision-making deficits, which may exacerbate compulsive drug-seeking and sensitize individuals to stress-related substance use (Hyman & Sinha, 2009). Thus, although this is among the first nationally-representative studies to examine unique marijuana user groups in terms of health and well-being, it is critical that future studies track user groups over time to understand the implications of transitioning into medical or recreational user groups, and particularly transitioning to mixed use with greater frequency of marijuana consumption.

A limitation of this study that warrants consideration is the motivation behind and legitimacy of individuals' marijuana use. Specifically, people who reported medical marijuana use could have received a prescription for documented health ailments; however, they could also have acquired the prescription through dishonest methods. Similarly, although several people reported their marijuana use as recreational, it is possible that their recreational use is actually self-medicating for a health condition for which they have not obtained a legal prescription for use (i.e., medical use is framed as recreational because they are self-medicating) and thus rating their mental health as better relative to medical users. Though some states have seen a legal shift in acquiring

marijuana for medical purposes, the BRFSS data does not denote if the acquisition of marijuana was legally prescribed – an area that warrants future research.

As most states now have legal medical marijuana use and an increasing number of states are moving toward legalized recreational use, the population of marijuana users will likely continue to grow with changing social norms (Berke & Gould, 2018; Fairman, 2016; Gallup, 2018). It is imperative to understand the profiles of the various marijuana groups, as studies suggest a rise in the number of adults with marijuana use disorders (Hasin et al., 2015). Additionally, knowing the profiles of marijuana users presenting in the community or in clinics for care can inform patient treatment or referral to resources within the community. Results suggest that individuals receiving prescriptions for medical marijuana may have the most significant health concerns (physical and mental) and the most limited resources for managing them, which will compound over time to further deteriorate their well-being and quality of life (Wickrama et al., 2016). Legalized marijuana use is also shifting youth perceptions of the drug as a safer and more commonly used substance than previous generations believed, yet they have limited-to-no understanding of the significant and multi-systemic health problems that users, especially youth, face (Center for Behavioral Health Statistics and Quality, 2016; Centers for Disease Control and Prevention, 2018; Johnston et al., 2017; Moreno et al., 2014; Volkow et al., 2014).

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Zachary D. Giano, PhD, is in the School of Human Environmental Sciences at the University of Arkansas, Fayetteville. Dr. Giano studies population disparities in racial/ethnic minorities, sexual minorities, and at-risk populations, particularly in adolescents and emerging adults.

Jennifer N. Becnel, PhD, is in the School of Human Environmental Sciences at the University of Arkansas, Fayetteville. Dr. Becnel studies adolescent and young adult substance use and sexual risk as it relates to physical health outcomes.

Amanda L. Williams, PhD, is in the School of Human Environmental Sciences at the University of Arkansas, Fayetteville. Dr. Williams studies adolescent and emerging adult physical and psychosocial health within family, community, and digital contexts.

Dylan C. Martinez, PhD, is in the School of Human Environmental Sciences at the University of Arkansas, Fayetteville. Dr. Martinez studies behavioral health with regard to food safety, obesity, substance abuse, and tourism.