Short Communication

Perceptions of the relative harmfulness of marijuana and alcohol among adults in Oregon

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ABSTRACT

This study documents perceptions of the relative harmfulness of marijuana and alcohol to a person's health among adults in Oregon just before the first legal sales of marijuana for recreational use. We surveyed 1941 adults in Oregon in September 2015. Respondents were recruited using an address-based sampling (ABS) frame (n = 1314) and social media advertising (n = 627). Respondents completed paper surveys (ABS-mail, n = 388) or online surveys (ABS-online, n = 926; social media, n = 627). We used descriptive statistics and logistic regression models to examine perceptions of the relative harmfulness of marijuana and alcohol by sample characteristics, including substance use. About half of adults in Oregon (52.5%) considered alcohol to be more harmful to a person's health than marijuana. A substantial proportion considered the substances equally harmful (40.0%). Few considered marijuana to be more harmful than alcohol (7.5%). In general, respondents who were younger, male, and not Republican were more likely than others to consider alcohol more harmful than marijuana. Respondents who were older, female, and Republican were more likely to consider marijuana and alcohol equally harmful. Most individuals who reported using both marijuana and alcohol (67.7%) and approximately half of those who used neither substance (48.2%) considered alcohol to be more harmful than marijuana. Perceptions about the relative harmfulness of marijuana and alcohol may have implications for public health. As state lawmakers develop policies to regulate marijuana, it may be helpful to consider the ways in which those policies may also affect use of alcohol and co-use of alcohol and marijuana.

1. Introduction

Although marijuana is classified by the federal government as an illegal drug having "high potential for abuse" (United States Drug Enforcement Administration, 2017) and has been legalized for recreational use in only eight states, most of the U.S. population does not think marijuana use poses great risk of harm. Data from the 2015 National Survey on Drug Use and Health (NSDUH) indicate that approximately one-third (35.8%) of U.S. adults perceive "great risk of harm" in smoking marijuana "once or twice a week" (Center for Behavioral Health Statistics and Quality (CBHSQ), 2015). NSDUH data cannot be used to determine whether U.S. adults consider marijuana more or less harmful than alcohol.

Legalization of marijuana for adult recreational use likely will lead to both negative and positive public health outcomes (Pacula et al., 2014; Rogeberg and Elvik, 2016; Degenhardt and Hall, 2002; Wang et al., 2013; van Ours and Williams, 2009; Horwood et al., 2010;

Oregon Public Health Division, 2016; Kral et al., 2015; Bradford and Bradford, 2017; Lucas et al., 2016; Bachhuber et al., 2014; Drug Policy Alliance, 2017). In states that have legalized recreational marijuana, policy makers and public health professionals are developing laws and regulations to minimize the former and maximize the latter. A challenge they face in this work is reliance on an emerging body of research that does not always provide clear answers to urgent questions, such as how to define and test for driving under the influence of marijuana (Rogeberg and Elvik, 2016) and how to set tax rates to eliminate the underground market without increasing youth prevalence (Pacula et al., 2014).

Evidence shows that legalizing recreational marijuana will likely affect use of other substances, such as opioids and alcohol. For example, a growing body of research suggests that greater availability of marijuana may reduce reliance on opioids and other pain medications (Kral et al., 2015; Bradford and Bradford, 2017; Lucas et al., 2016; Bachhuber et al., 2014). A recent review of the literature suggests that the

relationship between marijuana and alcohol is more complex; marijuana functions as a substitute for alcohol in some contexts and as a complement in others (Guttmannova et al., 2016). Factors that may influence the relationship between marijuana and alcohol use are price, availability, and perceived relative harmfulness (Alter et al., 2006; Arria et al., 2008). At this time, it is unclear whether legalization of marijuana for recreational use will increase or decrease the significant social costs associated with alcohol (Gonzales et al., 2014).

This study documents perceptions of the relative harmfulness of marijuana and alcohol to a person's health among adults in Oregon in September 2015, ten months after recreational marijuana was legalized by voter initiative and just before the first legal sales for recreational use. We examine perceived relative harmfulness of marijuana and alcohol and differences in perceptions by demographic variables, including age, gender, education, and political affiliation. We also examine the effect of current marijuana and alcohol use on perceived relative harmfulness of the substances.

2. Methods

2.1. Design and sample

We conducted a survey of 1941 adults in Oregon in September 2015. The survey was designed to complement existing surveillance systems by documenting marijuana-related beliefs, norms, and behaviors; and to serve as a baseline against which future data could be compared. The 20-min survey measured use of marijuana and other substances, beliefs about and attitudes toward marijuana and legalization, and knowledge of marijuana laws. The research design and survey were approved by RTI International's Institutional Review Board.

Respondents were recruited using an address-based sampling (ABS) frame and social media advertising. A mailing to ABS-sampled households included a paper survey and return envelope (ABS-mail, n = 1060 households) or an invitation to complete an online survey (ABS-online, n = 2650 households). A $5 pre-incentive was enclosed in all mailings. Approximately 1 week after the initial mailing, we sent a reminder and an additional $2 pre-incentive to households that had not yet responded. In this second mailing, we offered individuals from households that originally received the paper survey the option of completing the survey online. Respondents recruited through social media completed the online version of the survey. All respondents provided informed consent to participate in this study, and all received a $15 incentive for completing the survey. The final sample of 1941 is composed of 388 ABS-mail respondents, 926 ABS-online respondents, and 627 social media respondents. The response rate for the ABS sample was 37.7%. The social media sample was a convenience sample with no calculable response rate.

2.2. Measures

We measured perceived relative harmfulness of marijuana and alcohol by asking, "Which do you think is more harmful to a person's health, alcohol or marijuana?" Response options were (1) alcohol, (2) marijuana, or (3) they are equally harmful.

Other variables of interest are age, gender, race/ethnicity, education, political affiliation, and current marijuana and alcohol use. Political affiliation was measured using the Pew Research Center item, "In politics TODAY, do you consider yourself a Republican, Democrat, or independent?" Response options included no preference. Current marijuana use was measured using the NSDUH item, "During the past 30 days, on how many days did you use marijuana?" Respondents who reported past-30-day marijuana use were classified as current marijuana users. Current alcohol use was measured using an item adapted from the Health Information National Trends Survey: "Do you now drink alcohol every day, some days, rarely, or not at all?" Respondents who reported using alcohol every day or some days were classified as

current alcohol users.

We created a single variable to assess current use of marijuana and alcohol. Categories include (1) current user of both marijuana and alcohol; (2) current user of marijuana, but not alcohol; (3) current user of alcohol, but not marijuana; and (4) not a current user of marijuana or alcohol.

2.3. Weighting and analysis

Unweighted sample demographics differed by mode of recruitment (ABS, social media) and mode of survey completion (ABS-mail, ABS-online). Specifically, the ABS-recruited sample was older and more male than the social media-recruited sample, and the ABS-mail sample was older than the ABS-online and social media samples.

We weighted the ABS data to match the demographic distribution of the Oregon population in terms of age, sex, and education by using the WTADJX procedure in SUDAAN 11® to calibrate data to the 2014 American Community Survey (ACS). Initially, we separately weighted the social media data to the Oregon population using the same procedures used to weight the ABS data. Through that process we learned that the social media respondents could not be made to represent the entire Oregon population; they could only represent that segment of the population that would respond online when given the opportunity. Therefore, we weighted the social media data to match the ABS-online data in terms of age, sex, education, and political affiliation. The weights for the ABS-online and social media respondents were then scaled so this segment of the population was not double-counted.

We created thirty sets of delete-a-group jackknife weights (Kott, 2001) for the combined sample, and used these to produce standard errors and conduct significance tests for estimates computed using the calibrated weights. We used descriptive statistics to examine differences in perceived relative harmfulness of marijuana and alcohol by sample characteristics. We used logistic regression models to produce relative harmfulness estimates for marijuana and alcohol that control for age, gender, education, political affiliation, and survey mode (ABS-mail, ABS-online, social media). Control variables were selected because of their association with substance use (age, gender, education) marijuana attitudes (political affiliation) or study characteristics (survey mode). Analyses were conducted using Stata 14.1.

3. Results

3.1. Sample characteristics

The age distribution of the weighted sample was 29.2% aged 18 to 34, 50.5% aged 35 to 64, and 20.3% aged 65 or older (Fig. 1). Approximately half of the sample identified as female (51.0%) and half as male (49.0%). Nearly half had completed some college (46.4%), and just over one-quarter had a college degree or more education (28.0%) or a high school degree, GED equivalent, or less (25.6%). Politically, 28.5% of the sample described themselves as Democrat, 23.1% as Independent, and 20.8% as Republican; 27.6% had no preference. We do not report race/ethnicity because the sample was predominantly white (82.2%), and estimates for respondents describing themselves as Latino/a, (8.3%), black or African American (1.6%) or another race (8.0%), are imprecise due to small sample sizes.

3.2. Findings

Just over half of adults in Oregon (52.5%) considered alcohol to be more harmful to a person's health than marijuana (Fig. 1). This was the most commonly endorsed belief about the relative harmfulness of marijuana and alcohol. The second most commonly endorsed belief was that marijuana and alcohol are equally harmful (40.0%). Few considered marijuana to be more harmful than alcohol (7.5%).

The belief that alcohol is more harmful than marijuana was