Marijuana use and impaired driving behavior among adolescents in Pinellas County, Florida

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Abstract

An objective of the Cannabis Youth Treatment Study is to increase the level of awareness regarding marijuana use among adolescents and its consequences. Marijuana is the illegal drug most frequently abused by adolescents in the United States. Since it is often combined with alcohol, it is believed to be one of the major contributing factors in reckless/impaired driving behavior of adolescents. Based on preliminary data, study adolescents, between 12 and 18 years old, reported using alcohol an average of 7.4 days out of the past 90 days. Yet, study participants used marijuana an average of 27 days out of the past 90 days. While 61% reported using alcohol and marijuana in a car, 22% responded "yes" to having driven a vehicle while under the influence of alcohol or marijuana. These adolescents reported having received an average of 2.6 tickets for minor traffic violations and being arrested and charged with a crime an average of 2.4 times. This data is further confirmed by the 1998 Prevalence of Substance Use Among Pinellas County Students study and corresponding national data. This information addresses the public health issue that few law enforcement officers, parents and public health professionals associate adolescent reckless driving behavior with marijuana use and impairment.

Introduction

Compared to the published literature on adolescents driving under the influence of alcohol, very little data is available regarding the prevalence of adolescents driving under the influence of marijuana. However, marijuana is by far the most commonly used illicit drug among both adolescents and adults. Driving while impaired by alcohol or drugs and failing to use safety belts are two of the most important risk factors for motor vehicle injury (US Preventive Services Task Force, 1996).

As reported in the Monitoring the Future Study, marijuana use among 8th graders increased from 4% in 1991 to 10% in 1997. Marijuana use among 10th graders increased from 9% in 1991 to 21% in 1997 and 12th graders' use increased from 14% to 24% during that same time frame (Monitoring the Future Study, 1998).

The 1998 Household Survey indicates similar trends are evident among major demographic subgroups of youth, including boys and girls, whites, blacks, and Hispanics, in all four geographic regions, and in metropolitan and nonmetropolitan areas. Total population estimates for 1998 reveal that 14.4% of males age 12-17 and 13.7% of females age 12-17 used marijuana within the past year. The rates jump to 17.7% for males and 16.1% for

females in this age group who reported ever having used marijuana (Household Survey, 1998). These findings imply an alarming trend of abuse that characterized the 1990s.

It is accepted in the medical and forensic community that physiological symptoms of marijuana impairment may include a distorted sense of time and perception, slowed reaction time, anxiety, paranoia, and panic (Weiss and Millman, 1998). Information processing may be altered so that multi-tasking events such as driving an automobile are impaired. This may lead, among other things, to increased vehicular crashes and injuries. Impaired judgement and motor coordination may also be present (Kleber, Califano, Demers, 1997; Losken, Maviglia & Friedman, 1996) as well as impairment of short term memory and the ability to concentrate (Gold, 1989).

Marijuana-induced panic attacks are a common acute adverse psychological reaction. The anxiety can range from mild to severe, depending on the amount used, the degree of experience of the user, the setting in which the drug is used and the psychological predisposition of the user (Weiss and Millman, 1998). Grave consequences can result if an inexperienced adolescent marijuana user suffers a severe panic attack while driving a car.

Willette and Walsh, 1983, pointed out that the full impact of drugs on traffic safety was unknown in 1983. Unfortunately this remains somewhat true today. Some data has emerged over the last decade. This, however, gives insight as to the extent of the problem in the United States.

Studies evaluating the effects of marijuana on driving have taken three approaches: epidemiological studies of marijuana use and accident or fatality rates; performance studies of cognitive or psychomotor impairment; and driving/flying simulator or closed/open course driving tests (Huestis, 1994). In general, laboratory performance studies indicated that while sensory functions are not highly impaired, perceptual functions such as the user's ability to concentrate, process information, and maintain attention, are significantly affected.

Reeve, 1983b, found that following standardized smoking of marijuana, 94% of subjects failed roadside sobriety and coordination tests 90 minutes after smoking; there was a 60% failure rate after 60 minutes. In general, marijuana use impaired performance on driving simulator tasks, and on open and closed driving courses. In inexperienced adolescent drivers, one might expect an even poorer performance on such tests. Williams, et al, 1985, reported on a "high risk" sample of 440 male auto drivers, aged 15-34, who were killed in California motor vehicle crashes. The analysis of blood specimens collected from these drivers indicated two or more drugs were detected in 43%. Marijuana was found in 37% of the drivers.

Soderstrum, et al, 1988, evaluated marijuana and alcohol use in 1,023 trauma patients admitted to The Maryland (Baltimore) Shock-Trauma Unit. In those whose trauma resulted from a motor vehicle crash, 33.8% had very recently used marijana. Marijuana was significantly greater in those 30 years of age or younger and among men. Brookoff, et al, 1994, conducted a study in Memphis, Tennessee, in which individuals arrested for reckless driving, who were not apparently impaired by alcohol, were tested for marijuana and cocaine at the scene of the arrest with 59% testing positive (18% for both drugs, 33% for marijuana alone, and 20% for cocaine alone).

Walsh, et al, 1999, reported on juvenile drivers who were tested for drugs while being processed through the Juvenile Assessment Center subsequent to an arrest in Hillsborough County, Florida. Of the 93 juvenile drivers tested, 45 (48%) tested positive for marijuana. Everett, et al, 1999, found indications that college students who report being substance abusers are more likely than non-users to practice behaviors that increase their risk of a motor vehicle crash and injuries. Those behaviors include being more likely to drive impaired, more likely to ride with a driver who is impaired and less likely to wear safety belts while driving or riding in a car as a passenger. A longitudinal study of Michigan high school

students found that among females who smoked cigarettes, drank alcohol, and used marijuana and among males who drank alcohol and smoked marijuana, the risk of a motor vehicle crash increased significantly (Lang, et al, 1996). It is clear from the literature review that driving under the influence of drugs other than alcohol is a growing cause of traffic crashes, injuries and deaths, and is beginning to rival alcohol in prevalence on our roads nationwide.

Methods

The Cannabis Youth Treatment Consortium Grants study the effectiveness, cost and cost-effectiveness of five outpatient treatment protocols for adolescent marijuana users. This study is conducted in four sites throughout the nation. Yet, this report will provide data only from the Operation PAR, Inc. treatment site located in Pinellas County, Florida. Data was gathered using the GAIN (Global Appraisal of Individual Needs; Dennis, 1991). The GAIN is designed as a standardized bio-psycho-social assessment battery for clinical and/or research use. It has been normed on both adults and adolescents (Dennis, et al, 1999) and includes over 1500 questions and 100 scales. The PAR treatment site will eventually have 168 adolescents randomized into this study. This report will reflect data that has been collected from the GAIN on the first 126 adolescents in the study. Along with basic demographic information, data was collected from questions identifying substance use patterns, risk taking behavior, and law enforcement involvement.

The frequency distribution of each variable was evaluated in order to (1) determine if there were any out of range values, (2) determine the amount of missing data, and (3) describe the characteristics of the study population of adolescents.

Results

Table 1 reflects basic demographic data.

Table 1 – Demographic percentages of Gender, Race, and Age of Study Adolescents

Characteristics (n=126)	Total Number	Percent
Subject Population by Gender		
Male	108	86
Female	18	14
Subject Population by Race		
White, non-Hispanic	97	77
Black, non-Hispanic	16	13
Hispanic	4	3
Other	9	7
Subject Population by Age		
13	7	6
14	10	8
15	35	28
16	37	29
17	33	26
18	4	3

Overwhelmingly, the study population was white and male at a mean age of 15.7 years. A total of 83% of adolescents were between 15 and 17 years old.

Table 2 – Use of Alcohol and Marijuana and Age of Onset of Activity

Questionnaire (n = 126)	Mean	# and (%)

During the past 90 days...	Response	Responses
1. on how many days did you use any alcohol, marijuana, or other drug?	28.5 days	126 (100)
2. on how many days were you drunk or high for most of the day?	14.7 days	87 (70)
3. on how many days did you use any kind of alcohol?	7.4 days	90 (71)
4. on how many days did you use any kind of marijuana?	27.4 days	126 (100)
5. what was the most joints or other forms of marijuana you used in one day?	7.1 joints	126 (100)
6. over how many hours did you have this marijuana?	6.6 hours	121 (96)
7. did you use alcohol or drugs in a car?	yes	77 (61)
How old were you when you first got drunk or used any drugs?	12.9 yrs.	126 (100)
At what age did you first drink alcohol?	13.3 yrs.	62 (49)
At what age did you first use marijuana?	13.1 yrs.	126 (100)

Table 2 reveals a snapshot of drug and alcohol use within the past 90 days. Marijuana, alcohol and other drug use was reported as having been used almost 29 out of the past 90 days. Of the 70% of adolescents who reported having been drunk or high for most of a day, they reported having been drunk or high for 15 out of the past 90 days. Alcohol was used for 7 days but marijuana was used over 27 of the past 90 days. Study adolescents reported having used 7 joints in one day over an average 6.6 hour period. When asked if alcohol or drugs had been used in a car, 77% said yes.

Table 3 – Risk Taking Behavior and Law Enforcement Involvement

Questionnaire	Response	# and (%) Responses
During the past year, have you driven a vehicle while under the influence of alcohol or illegal drugs?	n = 82 Yes	 18 (22)
During the past year, have you used alcohol or drugs where it made the situation unsafe or dangerous for you?	n = 35 Yes	 32 (91)
In the unsafe or dangerous situation, did you use marijuana?	n = 35 Yes	 26 (74)
In your lifetime, how many tickets have you gotten for minor traffic violations (no arrest)?	n = 126 1 ticket 2^+ tickets	36 (29) 16 (44) 20 (56)
How many times have you been arrested, charged with a crime and booked?	n = 126 1 arrest 2^+ arrests	101 (80) 48 (47) 53 (53)
Have you been arrested for motor vehicle theft?	n = 101 Yes	 9 (9)
Have you been arrested for Driving under the Influence?	n = 101 Yes	 3 (3)

The average age of first use of marijuana, alcohol, or other drugs is fairly consistent at 13 years old. However, eight adolescents reported alcohol and drug use prior to the age of 10 years old. The earliest age of reported first use was one year old.

Epidemiological evidence suggests that marijuana use may cause an increase in the risk of motor vehicle crashes. Two surveys of self-reported crashes among adolescent drug

users found a relationship between marijuana use and self-reported involvement in crashes, with marijuana smokers having approximately twice the risk of being involved in crashes that non-marijuana smokers do (Hingson, Heeren, et al, 1982; Smart & Fejer, 1976).

As indicated in Table 3, nearly one-fourth (22%) of the study adolescents who drive said they had driven while under the influence of drugs or alcohol. Yet, only 3 % had been arrested for driving impaired. Almost 30% of these adolescents had received a ticket for a minor traffic violation and more than half (56%) had received two or more tickets. The more unfortunate news is that a full 80% had actually been arrested for a crime and, again, more than half had two or more arrests. Of those arrested, 9% had been arrested for motor vehicle theft.

McGwin and Brown, 1999, present data that, per licensed driver, the overall motor vehicle crash rates are highest for young drivers primarily due to risk-taking and lack of driving skill. A full 91% of the study adolescents admitted to using alcohol or drugs where it made the situation unsafe or dangerous and 74% admitted using marijuana in that unsafe and dangerous situation.

Discussion

It is apparent that the prevalence of marijuana use and risk-taking behavior found in this study is revealing only the tip of a very serious problem. Driving under the influence of illegal drugs provides a new dimension to a serious public health problem not well recognized by the general community. It is an important element in traffic crashes, injuries, and deaths that has not been fully acknowledged and these fatal consequences often leave our youth as victims.

It is important that health economists, public health professionals, physicians, educators, and our law enforcement agencies recognize that the next major step in improving the general health, safety, and well-being of our youth should be largely behavioral rather than solely medical. Instituting more drug education programs and more referrals to drug treatment and rehabilitation centers will go a long way to protecting our youth from the ravages of drug abuse.

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References:

Brookoff, C.; Cook, C.S.; Williams, C.; Mann, C.S. Testing reckless drivers for cocaine and marijuana. *New England Journal of Medicine*, 1994;331:518-22.

Dennis, M.L. (1991) Global Appraisal of Individual needs (GAIN), Bloomington, IL: Lighthouse Institute, Chestnut Health Systems, Copyrighted 1999 by Chestnut Health Systems.

Dennis, M.L.; Scott, C.K.; Titus, J.; Godley, S.H. (1999). Methodical Challenges in Doing Adolescent Treatment Research. Presentation at the NIAAA Adolescent Research Methods Conference, November 19-20, 1998.

Everett, S.A.; Lowry, R.; Cohen, L.R.,; Dellinger, A.M. Unsafe motor vehicle practices among substance-using college students. *Accident Analysis & Prevention*, 1999;31:667-673.

Gold, M. *Marijuana*. New York: Plenum, 1989.

Hingson, R.; Heeren, T.; Mangione, T,; Morelock, S.; & Mucatel, M. Teenage driving after using marijuana or drinking and traffic accident involvement. *Journal of Safety Research*, 1982;13:33-37.

Huestis, M.A. Marijuana. *Drug Monographs: Marijuana*. Society of Forensic Toxicologists/American Academy of Forensic Sciences Committee on Driving Under the Influence of Drugs, 1994.

Kleber, H.D.; Califano, Jr., J.A.; Demers, J.C.; Clinical and Societal Implications of Drug Legalization. In J.H. Lowinson, P. Ruiz, R.B. Millman, & J.G. Langrod (Eds.), *Sustance Abuse: A Comprehensive Textbook*, Third Edition, Baltimore, MD:Williams & Wilkins, 1997:p. 860.

Lang, S.W.; Waller, P.F.; Shope, J.T. Adolescent driving: characteristics associated with single-vehicle and injury crashes. Journal of Safety Research. 1996;27(4):241-257.

Losken, A.; Maviglia S.; Friedman, L.S., Marijuana. In: *Source Book of Substance Abuse and Addiction*. Maryland: Williams & Wilkins, 1996: p.182.

McGwin, Jr.,G.; Brown, D.B. Characteristics of traffic crashes among young, middle-aged, and older drivers. *Accident Analysis & Prevention*, 1999;31;181-198.

National Institute on Drug, U.S. Department of Health and Human Services National Institutes of Health, *National Survey Results on Drug Use from The Monitoring the Future Study, 1975-1997*, *Volume I, Secondary School Students,* The University of Michigan, NIH Publication No. 95-4026, Rockville, MD: NIDA (1998).

Office of Applied Studies, U.S. Department of Health and Human Services Substance Abuse and Mental Health Services Administration, *National Household Survey on Drug Abuse, Population Estimates 1998*, DHHS Publication no. (SMA) 99-3327, Rockville, MD: SAMHSA (August 1999), Tables 1A and 3A.

Office of Applied Studies, U.S. Department of Health and Human Services Substance Abuse and Mental Health Services Administration, *Summary of Findings from the 1998 National Household Survey on Drug Abuse*, DHHS Publication no. (SMA) 99-3328, Rockville, MD: SAMHSA (August 1999), Page 15.

Reeve, V.C.; Robertson, W.B.; Grant, J.; Soares, J.R.; Zimmermann, E.G., Gillespie, H.K.; Hollister, L.E. Hemolyzed blood and serum levels of Δ^9-THC: Effects on the performance of roadside sobriety tests. *Journal of Forensic Sciences.* 1983b;28:963.

Smart, R.G.; Fejer, D. Drug use and driving risk among high school students. *Accident Analysis and Prevention*. 1976;8:33-38.

Soderstrum, C.; Trifillis, A; Shankar, B.; Clark, W.; Cowley, R. Marijuana and alcohol use among 1023 patients, *Archives of Surgery*, 1988;123:733-37.

Walsh J.M., Leaverton, P.E., Buchan B.J., Kramer R.T. Use of illegal drugs by drivers: A multi-assessment period-prevalence study in a major metropolitan area. 1999:Publication pending.

Weiss, C.J.; Millman, R.B.; Hallucinogens, Phencyclidine, Marijuana, Inhalants. In R.J. Frances & S.I. Miller (Eds.), *Clinical Textbook of Addictive Disorders*, Second Edition, New York: Guilford Press, 1998: pps. 208-209, 220.

Willette, R.; Walsh, J.M. Drugs, Driving, and Traffic Safety, *World Health Organization*, Pub. #78, 1983, World Health Organization, Geneva, Switzerland.

Williams, A.F.; Peat, M.A.; Crouch, D.J.; Wells, J.K.; Finkle, B.S. Drugs in fatally injured young male drivers, *Public Health Reports*, 1985;100(1):19-25.

US Preventive Services Task Force. *Guide to Clinical Preventive Services*, 2nd Edition. Baltimore, MD:Williams and Wilkins, 1996.