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Relationship between driving while impaired and riding with an impaired driver among adolescents in the United States

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ABSTRACT

Background: Alcohol, tobacco, and other drug use (ATOD) and sexual risk-taking are contributors to the health and welfare of adolescents and a significant percentage engage in these behaviors. These behaviors may contribute to other risk-taking such as driving while impaired (DWI) or riding with an impaired driver (RWI). The purpose of this study was to assess the relationship between DWI and RWI and ATOD use, sexual risk-taking, and physical fighting among adolescents.

Methods: Data for this study were derived from the 2017, 2019, 2021 Youth Risk Behavior Survey (YRBS) ($n = 45,132$). Logistic regression models were used to estimate the association between DWI and RWI and ATOD use, sexual risk-taking, and physical violence.

Results: Heavy smoking, binge drinking, prescription pain medication without a prescription, sexual intercourse with four or more people, and being in a fight on school property were associated with DWI. Binge drinking, prescription pain medication without a prescription, alcohol or drug use before last sexual intercourse, and being in a fight in or out of school were associated with RWI.

Conclusions: The results seem to suggest that risk behaviors are intertwined with DWI and RWI. There may be a combined effect of engaging in one risk behavior, influencing engagement in other risk behaviors.

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adolescents

Introduction

Alcohol, tobacco, and other drug use (ATOD) and sexual risk-taking behaviors are major contributors to the health and welfare of adolescents. In the United States, it has been reported that 24.1% of adolescents have tried cigarettes, 6% currently smoke cigarettes, and 32.7% currently use electronic vaping products. Additionally, 15% of adolescents have used alcohol before the age of 13 and 29.2% have reported current alcohol use. Also, 36.8% of adolescents report ever use of marijuana with 21.7% being a current user (Centers for Disease Control [CDC], 2021). According to the CDC, 3.2% of adolescents have had sexual intercourse before the age of 13 and 6.0% have had sexual intercourse with 4 or more people. Additionally, 10.6% of adolescents drank alcohol or used drugs before last sexual intercourse and only 48.2% used a condom during last sexual intercourse (CDC, 2021). These behaviors may contribute to other risk-taking behaviors such as driving while impaired (DWI) and riding with an impaired driver (RWI) among adolescents.

A major contributor to motor vehicle crashes and subsequent morbidity and mortality among adolescents is DWI and RWI. According to the National Highway Traffic Safety Administration (NHTSA), 29% of adolescents who were killed in a motor vehicle crash had consumed alcohol while driving with 82% of those adolescents having a blood alcohol content



(BAC) of .08 or higher (2022) which is above the legal limit in the United States for driving an automobile. Additionally, DWI and fatal crashes are higher among males, with a reported 24% being involved in fatal crashes compared to 17% of adolescent females (NHTSA, 2022). It has also been reported that adolescents who RWI are more likely to DWI (CDC, 2021).


There is limited research on the factors that influence DWI and RWI. This study seeks to determine if other risky behaviors (i.e., ATOD, sexual behaviors, physical violence) are associated with DWI and RWI. Some studies to date have focuses on parental influence, parental monitoring, and laws and regulations (Hosseinichimeh et al., 2022; Vaca et al., 2020), yet fewer have focused on the influence of risk behaviors and subsequent DWI and RWI (Li et al., 2013, 2014). Therefore, the purpose of this study was to assess the relationship between DWI and RWI and risk behaviors of adolescents.

Methods

Procedures

The data for this study were derived from the 2017, 2019, 2021 Youth Risk Behavior Survey (YRBS) ($n = 45,132$). The combined 3 years of data were needed in order to have

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enough responses of the DWI variable to be able to properly conduct logistic regression analysis. As some students were not of legal driving age, the combined 3 years of data were needed in order to have a large enough sample of students who reported DWI ($n = 1267$). This national study is conducted every odd year by the CDC and measures alcohol, tobacco, and other drug use, dietary behaviors, physical activity, sexual behaviors, unintentional injury and violence, and other health priorities such as mental health in order to determine health-risk behaviors among high school students. The YRBS is a cross-sectional survey administered among representative samples of students in the United States. The YRBS includes school-based national, state, and local data conducted among representative samples of students in grades 9–12. The sampling frame for the 2017, 2019, and 2021 national YRBS consisted of all regular public and private schools with students in at least one of grades 9–12 in the 50 states and the District of Columbia. The institutional review board at the CDC approved the protocol for the YRBS. Participation was voluntary, and local parental permission procedures were followed before survey administration. A detailed description of the methodology used for the YRBS has been published elsewhere (Kann et al., 2018; Mpofu et al., 2023; Underwood et al., 2020).

Measures and data analysis

First, frequencies of demographic variables including race, sex, age, and grade in school were conducted to describe the sample. For race, only black, white, Hispanic, and mixed race were used in the analysis as all other racial groups consisted of very small percentages of participants. Second, crosstabs were conducted to describe the prevalence of DWI and RWI by risk behaviors. The DWI and RWI variables consisted of: “During the past 30 days, how many times did you drive a car or other vehicle when you had been drinking alcohol?” and “During and past 30 days, how many times did you ride in a car or other vehicle driven by someone who had been drinking alcohol?” The DWI question was recorded into a dichotomous variable with yes, the student engaged in the behavior or no the student did not engage in the behavior. Those who did not report driving a car or other vehicle during the past 30 days were excluded from the analysis. The RWI question was recorded into a dichotomous variable with yes, the student engaged in the behavior or no the student did not engage in the behavior. The risk behavior variables consisted of: used cigarettes, alcohol, and marijuana before the age of 13, current binge drink and marijuana use, smoked more than 10 cigarettes per day, consumed more than 10 drinks in a row, and ever used prescription pain medication without a doctor’s prescription. Additional risk variables included sexual intercourse before the age of 13, sexual intercourse with 4 or more people, drank alcohol or used drugs before last sexual intercourse, were in a physical fight, and were in a physical fight on school property. These variables were dichotomous. Next, two logistic regression models were conducted to estimate the association between DWI and RWI and risk behaviors, controlling for sex, grade in school, and race.

Results

Table 1 describes demographic characteristics of the sample. Participants in this study consisted of an equal distribution of sex with 50% males and females. Ninth graders were the largest group sampled (27.0%) followed by tenth, eleventh, and twelfth graders. Whites were the largest group sampled (62.2%) followed by black (20.2%), Hispanic (10.6%), and mixed race (7.0%). The mean age was 16.1 with a range from 12 to 18 years.

Of the sample of adolescents who reported driving a car or other vehicle during the past 30 days, 5.2% ($n = 1267$) reported DWI and 16.0% ($n = 7111$) reported RWI. The results of this study found that those adolescents who smoked 10 or more cigarettes per day were 2.39 (CI = 1.21–4.69) time more likely to DWI (19.2%, 5.1%). Also, current binge drinking and ever used a prescription pain medication without a doctor’s prescription were significantly more likely to DWI. Specifically, the current binge drinkers were 7.71 (CI = 2.26–23.21) times more likely to DWI (21.0%, 0.50%) and those adolescents who had used a prescription pain medication without a prescription were 1.54 (CI = 1.01–2.36) times more likely to DWI (39.1%, 9.3%). Those adolescents who had sex with four or more people were 1.73 (CI = 1.03–2.88) times more likely to DWI (41.0%, 13.6%). Lastly, those adolescents who reported being in a physical fight on school property were significantly more likely to have DWI (OR = 2.46; CI = 1.48–4.10) compared to those who had not engaged in the behavior (22.1%, 10.4%) (see Tables 2 and 4).

Current binge drinking and ever used a prescription pain medication without a doctor’s prescription were associated with RWI. Specifically, current binge drinkers were 3.04 (CI = 1.70–5.43) times more likely to RWI (40.9%, 14.1%) and those adolescents who ever used a prescription pain medication without a prescription were 1.63 (CI = 1.16–2.31) times more likely to RWI (22.0%, 8.5%). Additionally, those adolescents who drank alcohol or used drugs before last sexual intercourse were 1.81 (CI = 1.17–2.81) times more likely to RWI (41.5%, 28.6%). Lastly, those adolescents who reported being in a physical fight and being in a physical fight on school property were 1.81 (CI = 1.28–2.57; 28.3%, 13.4%) and 1.63 (CI = 1.06–2.51; 22.1%, 10.4%) times more likely to RWI. No significant differences were found in sex, but males who DWI or RWI had higher prevalence rates for all risk behaviors compared to females who DWI or RWI (see Tables 3 and 4).

Table 1. Demographics of adolescents participating in the youth risk behavior survey.

% (n)	
Female	50.0 (22,563)
Male	50.0 (22,569)
Race	
Black	20.2 (7158)
White	62.2 (22,080)
Hispanic	10.6 (3765)
Mixed Race	7.0 (2484)
Grade in School	
Ninth	27.0 (12,204)
Tenth	26.3 (11,898)
Eleventh	24.4 (11,042)
Twelfth	22.3 (10,076)
Age	
Mean	16.1 (45,423)

Table 2. Prevalence of driving while impaired (DWI) and risk behaviors among adolescents.

Item	Percentage
Were in a physical fight	
DWI	44.2
No	14.7
Were in a physical fight on school property	
DWI	33.8
No	10.4
First tried smoking before the age of 13	
DWI	30.8
No	6.6
Smoke more than 10 cigarettes per day	
Drinking and driving	19.2
No	5.1
Had first drink of alcohol before the age of 13	
DWI	63.8
No	29.4
Current binge drinker	
DWI	21.0
No	0.50
Reported 10 or more drinks in a row	
DWI	36.4
No	8.0
Tried marijuana before the age of 13	
DWI	49.2
No	15.3
Currently use marijuana	
DWI	53.9
No	14.6
Ever used prescription pain medication without a doctor's prescription	
DWI	39.1
No	9.3
Had sexual intercourse before the age of 13	
DWI	47.5
No	18.9
Had sexual intercourse with 4 or more people	
DWI	41.0
No	13.6
Drank alcohol or used drugs before last sexual intercourse	
DWI	57.8
No	34.2

Table 3. Prevalence of riding with an impaired driver (RWI) and risk behaviors among adolescents.

Item	Percentage
Were in a physical fight	
RWI	28.3
No	13.4
Were in a physical fight on school property	
RWI	22.1
No	10.4
First tried smoking before the age of 13	
RWI	16.3
No	6.4
Smoke more than 10 cigarettes per day	
RWI	13.3
No	5.2
Had first drink of alcohol before the age of 13	
RWI	46.8
No	26.7
Current binge drinker	
RWI	40.9
No	14.1
Reported 10 or more drinks in a row	
RWI	17.0
No	6.2
Tried marijuana before the age of 13	
RWI	27.7
No	13.3
Currently use marijuana	
RWI	28.2
No	12.0
Ever used prescription pain medication without a doctor's prescription	
RWI	22.0
No	8.5
Had sexual intercourse before the age of 13	
RWI	26.3
No	14.8
Had sexual intercourse with 4 or more people	
RWI	19.5
No	10.6
Drank alcohol or used drugs before last sexual intercourse	
RWI	41.5
No	28.6

Table 4. Odds ratio and 95% confidence intervals of driving while impaired (DWI) and riding with an impaired driver (RWI) among adolescents.

Item	DWI			
	OR	95% CI	OR	95% CI
Race				
Black ^a				
White	1.88	0.75–4.67	1.99	0.98–4.03
Hispanic	1.75	0.57–5.38	1.74	0.74–4.06
Mixed race	1.41	0.42–4.70	2.14	0.86–5.33
Grade in School				
Ninth ^a				
Tenth	0.59	0.21–1.65	0.61	0.34–1.10
Eleventh	0.37	0.14–1.99	0.84	0.47–1.49
Twelfth	0.22	0.86–1.38	0.51	0.29–1.91
Sex				
Female ^a				
Male	1.70	1.09–2.67	0.87	0.62–1.20
Were in a physical fight	1.44	0.92–2.24	1.81*	1.28–2.57
Were in a physical fight on school property	2.46*	1.48–4.10	1.63*	1.06–2.51
First tried smoking before the age of 13	0.73	0.45–1.19	0.73	0.50–1.08
Smoke more than 10 cigarettes per day	2.39*	1.21–4.69	1.28	0.70–2.32
Had first drink of alcohol before the age of 13	1.04	0.54–2.00	1.16	0.69–1.95
Current binge drinker	7.71*	2.26–23.21	3.04*	1.70–5.43
Reported 10 or more drinks in a row	1.00	0.66–1.51	1.13	0.80–1.61
Tried marijuana before the age of 13	1.22	0.66–2.26	0.85	0.52–1.39
Currently use marijuana	0.99	0.61–1.61	1.07	0.73–1.55
Ever used prescription pain medication without a doctor's prescription	1.54*	1.01–2.36	1.63*	1.16–2.31
Had sexual intercourse before the age of 13	0.72	0.39–1.32	0.79	0.48–1.28
Had sexual intercourse with 4 or more people	1.73*	1.03–2.88	1.32	0.87–1.98
Drank alcohol or used drugs before last sexual intercourse	1.44	0.83–2.49	1.81*	1.17–2.81
Used a condom during last sexual intercourse	1.14	0.75–1.73	1.24	0.89–1.74

a = Indicates Reference Group.

* = significant < .05.

Discussion

The purpose of this study was to assess the relationship between DWI and RWI and risk behaviors of adolescents. The results of this study found that certain ATOD, sexual behavior, and physical fight variables were associated with DWI and RWI. Specifically, heavy smoking, current binge drinking, prescription pain medication without a prescription, sexual intercourse with four or more people, and being in a physical fight on school property were associated with DWI. For RWI, current binge drinking, prescription pain medication without a prescription, alcohol or drug use before last sexual intercourse and being in a physical fight in or out of school were associated with the behavior.

Vaca et al. (2020) in a study assessing the association between binge drinking and risky driving among 12th graders, found that binge drinking was associated with DWI and RWI. Li et al. (2013) found that among 11th graders, binge drinking was associated with DWI. Other researchers have found similar results in that binge drinking was associated with DWI or RWI or both (Bergen et al., 2012; Naimi et al., 2009; Terry-McElrath et al., 2014). The current study found similar results in that being a current binge drinker was associated with both DWI and RWI. These results are troubling in that higher levels of consumption of alcohol is related to higher probability of injury and death due to motor vehicle crashes (Centers for Disease Control [CDC], 2022; Insurance Institute for Highway Safety [IIHS], 2022).

The use of prescription pain medicine without a doctor's prescription was also associated with DWI and RWI. Li et al. (2013) found that illicit drug use was associated with both DWI and RWI. The illicit drug variable used in Li's study included a host of drugs including marijuana, ecstasy, and prescription pain medication to get high. This variable did not measure prescription medication without a prescription as one individual drug but was a combination of drugs, whereas the present study specifically measured prescription drug use without a doctor's prescription. Buckley et al. (2017) in a study of predictors of DWI and RWI among adolescents, found that prescription drug misuse was associated with RWI among females and was associated with DWI for both males and females. The result of the present study is another indicator that engaging in certain risk behaviors may influence DWI and RWI.

When assessing sexual behavior, it was found that sexual intercourse with four or more people was associated with DWI and alcohol or drug use before last sexual intercourse was associated with RWI. No research in the literature was found that directly assessed these relationships. Studies assessing sexual behavior and other risk behaviors have found an association between sexual risk taking and alcohol and drug use (Hass et al., 2017; Okumu et al., 2019; Schauer et al., 2020). In the case of DWI and RWI and sexual risk-taking it may be that risk behaviors are intertwined in that if one engages in risky sexual behaviors, one may also be more likely to engage in DWI and RWI.

This study also found that being in a physical fight on school property was associated with both DWI and RWI.

No research was found in the literature that assessed the relationship between physical fights and DWI and RWI. It may be that those adolescents who disregard rules at school or engage in deviant behaviors are more apt to take additional risks such as DWI and RWI. Wojciechowski (2022) in a study on antisocial personality disorder and substance-impaired driving among adolescents and young adults, found that a diagnosis of antisocial personality disorder was associated with an increased risk for impaired driving. McCarty and McCarthy (2019) found that hostility among adolescents was predictive of alcohol-impaired driving.

The results of this study must be considered in light of several limitations. First, the study was cross-sectional. Thus, causation cannot be determined. Second, this study was self-reported behaviors of high school students in the US. Thus, there is no way to ensure the accuracy of the responses such as under or over reporting behaviors, however, the questions have been shown to demonstrate good test-retest reliability (Underwood et al., 2020). Lastly, these data apply to teens who attend school. They are not representative of people who are homeschooled or are school dropouts.

Conclusions

In conclusion, it was found that certain risk behaviors were associated with DWI and RWI. The results seem to suggest that risk behaviors are intertwined with DWI and RWI. It seems as if there may be a combined effect of engaging in one risk behavior, influencing engagement in other risk behaviors. Efforts to address DWI and RWI should focus on risky behaviors such as binge drinking, prescription pain medication without a doctor's prescription, and sexual risk-taking as a means to develop interventions based on the factors for DWI and RWI. As this research found, certain risk behaviors were associated with DWI and RWI among adolescents.

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