

## ORIGINAL RESEARCH

# Gender Differences in Risk Behaviors Among High School Youth

高中青年危险行为的性别差异

Diferencias de género en las conductas de riesgo entre estudiantes de secundaria

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## INTRODUCTION

The US Centers for Disease Control and Prevention's (CDC) Youth Risk Behavior Surveillance System (YRBSS) demonstrates that American youth engage in a wide variety of risky behaviors.<sup>1</sup> The frequency and type of these behaviors often differ by a number of factors, such as socioeconomic status, race, and ethnicity. For example, results of the 2011 YRBSS revealed that white high school students were most likely to have texted or e-mailed while driving or been bullied on school property, while black high school students were most likely to have engaged in risky sexual behaviors, to have been physically inactive, and to be obese.<sup>1</sup> Conversely, Hispanic high school students were most likely to have ridden with a driver who had been drinking alcohol; to have ever used cocaine, inhalants, or ecstasy; and to have failed to use protection to prevent pregnancy during last sexual intercourse.<sup>1</sup> However, it is difficult to discern whether differences in risk-taking behaviors between and among ethnic groups can actually be attributed to differences in group norms, socioeconomic status, or cultural beliefs regarding acceptance or rejection of such behaviors,<sup>1</sup> suggesting a need for more comprehensive regional investigations.

Much behavioral research has focused on identifying disparities in risk behaviors among ethnic and racial youth.<sup>2-4</sup> Fewer studies conducted in the United States have focused on gender differences in risk-taking behaviors.<sup>5-7</sup> Those that have done so have observed significant changes in behavior by gender over time, with females' risk-taking behavior on the rise, especially related to violence<sup>8,9</sup> and heavy episodic drinking.<sup>10-12</sup> Furthermore, significant differences have been observed in behavior by gender. For example, males are more likely than females to report impaired driving. Using a sample selected from the National Epidemiologic Survey on Alcohol and Related Conditions (N = 43 093), Chou et al observed that 10.2% of male adolescents 18 to 29 years of age reported drinking while driving compared to only 3.5% of females. Moreover, 16.0% of males reported riding with a drinking driver compared to 9.1% of females.<sup>13</sup> These findings were corroborated by a study of 14 to 17-year-olds that found that more than twice as many males as females reported driving after having consumed three or more servings of alcohol.<sup>14</sup>

Both males and females who report risky driving behaviors also are more likely to engage in other risky

behaviors, including smoking and drug use.<sup>14-15</sup> However, while female adolescents in general have lower risk-taking profiles, those exhibiting high-risk driving behaviors are more likely to engage in other high-risk behaviors than other females. This differs from males: those engaging in high-risk driving behaviors tend to have similar risk profiles to those who do not.<sup>15</sup> Males' aggressive driving behaviors also have been associated with marijuana use<sup>16</sup> and the thrill associated with driving unsafely.<sup>17</sup> Perhaps of graver significance is the impact of distracted driving, given that one in six fatal accidents is the result of a distracted driver, and drivers who text are 23 times more likely to be involved in an accident.<sup>18</sup> Female teens are, however, at disproportionate risk, given that they are nearly twice as likely to use cell phones and other electronic devices while driving and approximately 10% more likely to engage in other distracting behaviors, including eating and drinking.<sup>19</sup>

With regard to risky sexual behaviors, gender differences appear to be even more pronounced. For female adolescents, engaging in early onset, frequent, and unprotected sexual intercourse has been found to be associated with an increased risk for HIV infection.<sup>20</sup> Those who use two or more illegal substances increase the odds of early sexual debut twelve-fold.<sup>21</sup> Substance use, including cocaine as well as alcohol, cigarettes, and marijuana, also has been found to be linked to engaging in unprotected sexual intercourse among males.<sup>21,22</sup> Perception of risk among injection-drug users differs between males and females, with males less likely to perceive risk of HIV infection through casual sexual encounters.<sup>23</sup> As a result of these observed differences, public health practitioners have concluded that the most successful interventions will be those that are both culture and gender specific.<sup>6,7,23-26</sup>

While national data on risk behaviors are critical to understanding trends across the United States, they may not reflect behaviors in certain regions. This is especially true when areas experience life-changing events, such as major natural disasters. For example, an increase in risky behaviors was observed among youth of both genders immediately following Hurricane Ike in Galveston, Texas, where the storm made landfall. Due to this increase, few gender differences were observed during the year following the hurricane.<sup>27</sup> This lack of differences in most risk behaviors between boys and girls

differed sharply from the rest of the United States during this time period.<sup>28</sup> The current survey was conducted in this same community in 2012, several years after this disaster to determine if gender differences, similar to those in the remainder of the United States, re-emerged once recovery was underway. Overall, these data will provide a better understanding of patterns that occur in risk behaviors among youth residing in communities affected by natural disasters.

## METHODS AND PARTICIPANTS

The 2012 Galveston Children's Report Card survey included the following categories, among others, all questions of which are derived from the YRBSS survey:

- demographic characteristics of high school respondents,
- family characteristics and educational levels achieved by parents,
- risks associated with students' driving behaviors
- substance use, and
- sexual behaviors

Data-collection protocols observed in the Galveston study are consistent with CDC guidelines for administration of the YRBSS<sup>29,30</sup> and were approved by the University of Texas Medical Branch Institutional Review Board. Trained staff presented an overview of the survey purpose and process to administrators at the district and school levels prior to its deployment. Questionnaires were delivered to the school, and teachers of the selected classes administered the survey to their students following a standardized introduction. The school then sent the completed questionnaires and accompanying documentation forms back to the university for processing. YRBSS procedures are specifically designed to protect student privacy through anonymous, voluntary participation. In all YRBSS studies, students complete the self-administered questionnaire during one class period and record their responses directly into a computer-scannable booklet or on a computer-scannable answer sheet. In the Galveston surveillance study, students completed the self-administered questionnaire during a single English class in April 2012.

Quality assurance checks were completed for all surveys in a manner consistent with YRBSS procedures.<sup>29,30</sup> Logical edits were performed for each questionnaire, and in the event that responses were identified that conflicted with one another, both were set to missing. If, for example, a student reported never having consumed an alcoholic drink but indicated alcohol consumption in the past 30 days, then both responses were recorded as missing, given the impossibility of determining which response was correct. Likewise, height and weight were assessed for biological feasibility prior to calculation of body mass index. Also consistent with CDC guidelines, if questionnaires had fewer than 20 valid responses remaining after editing, they were deleted from the dataset prior to analysis. Surveys

were processed using eListen software (Scantron, Tustin, California), in conjunction with an Fi-5650C image scanner (Scantron, Tustin, California). The Fi-5650C handles up to 55 single-sided documents per minute, and scans data into a Microsoft Access database (Microsoft Corp, Redmond, Washington) to facilitate the data analysis process.

## STATISTICAL ANALYSIS

Bivariate analyses between females and males were conducted using chi square tests or Student's *t*-test, as appropriate. We used multivariate logistic regression analyses to examine the association between gender and different types of health risk behaviors after adjusting for demographic variables such as age, race/ethnicity, grade level, parental education level, and whether or not the student lived with both parents. Using these analyses, the associations between gender and perceived risk and disapproval from parents and friends with regard to risky behaviors were also examined. The associations are presented as odds ratios (OR) with 95% confidence intervals (CI) after adjusting for demographic variables. The interaction terms between age and gender and between race/ethnicity and gender were included in the multivariate logistic regression models to examine whether associations between gender and risky behaviors differ by age categories and race/ethnicity. All analyses were performed using STATA 12 (Stata Corporation, College Station, Texas).

## RESULTS

A total of 890 students completed the survey, which, based upon enrollment figures from the Texas Education Agency, was a response rate of 51%. Response rates differed by grade, to include 168 of 462 in ninth grade (36.4%), 220 of 391 in 10th grade (56.3%), 282 of 458 in 11th grade (61.6%), and 213 of 433 in 12th grade (49.2%). For purposes of comparison, most indicators are presented in the context of Galveston's four main ethnic groups: non-Hispanic blacks, Hispanics, non-Hispanic whites, and non-Hispanic all others (primarily small numbers of Asians, Native Americans, and multiple race codes). Of the 890 participants (mean age 16.4 y, standard deviation 1.1, range 13-18 y), 48.2% were females (n=429), 51.8% were males (n=461), and more than three-fourths (77.3%) were ≥16 years old. Approximately 50% were either Hispanic (51.8%), living with both parents (49.8%), or had a parent with a high school diploma (50.6%) (Table 1). There were no significant differences between males and females based on mean age, race/ethnicity, and parental education level. However, differences were observed with regard to proportion of females and males in different grades and whether or not they were living with both parents. The proportion of males (53.8%) living with both parents was higher than that of females (45.5%), while the opposite was true for the proportion living with a single mother: 38.5% of females vs 27.2% of males.

**Table 1** Demographic Characteristics of Adolescents (9th to 12th graders) by Gender

	Total N=890	Female <sup>a</sup> n=429	Male <sup>b</sup> n=461	P value <sup>c</sup>
Age, y, mean (±SD)	16.4 (1.1)	16.4 (1.1)	16.4 (1.2)	.881
Race/ethnicity, n (%) <sup>d</sup>				.347
White	188 (21.1)	100 (23.4)	88 (19.2)	
Black	186 (21.0)	88 (20.6)	98 (21.3)	
Hispanic	459 (51.8)	211 (49.4)	248 (54.0)	
Asian and others	53 (6.0)	28 (6.6)	25 (5.4)	
Grade level, n (%) <sup>e</sup>				.047*
9th grade	172 (19.4)	71 (16.5)	101 (22.1)	
10th grade	220 (24.8)	99 (23.1)	121 (26.4)	
11th grade	282 (31.8)	151 (35.2)	131 (28.6)	
12th grade	213 (24.0)	108 (25.2)	105 (22.9)	
Parental education level, no. (%)				.105
Did not complete high school	440 (49.4)	200 (46.6)	240 (52.1)	
Completed high school	450 (50.6)	229 (53.4)	221 (47.9)	
Live with, no. (%) <sup>f</sup>				.004*
Both parents	441 (49.8)	194 (45.5)	247 (53.8)	
Mother	289 (32.7)	164 (38.5)	125 (27.2)	
Father	55 (6.2)	26 (6.1)	29 (6.3)	
Grandparents and others	100 (11.3)	42 (9.9)	58 (12.6)	

Abbreviation: HS, high school.

<sup>a</sup> Numbers do not total 429 due to missing data.

<sup>b</sup> Numbers do not total 461 due to missing data.

<sup>c</sup> Chi-square test was used to compare proportions of given variables between female and male adolescents; Student's *t*-test was used for comparison of mean age.

<sup>d</sup> 2 females and 2 males did not identify their race/ethnicity.

<sup>e</sup> 3 males did not indicate their grade level.

<sup>f</sup> 3 females and 2 males did not answer the question.

\**P* <.05 considered statistically significant.

Bivariate analyses showed that males and females differed with regard to a number of high-risk behaviors (Table 2). Lifetime use of cocaine and illegal intravenous drugs were more common among males than among females. On the other hand, lifetime drinking history was more common among females. Past-month behaviors such as driving while drinking alcohol, smoking and using marijuana on school property, and using hashish were more common among males than among females. A significantly higher percentage of males practiced risky sexual behaviors, such as oral sex and having had sex with four or more partners during their lifetime, compared to females. Significant differences were also observed with regard to age of initiation of drinking alcohol, using marijuana, and having sexual intercourse, where a higher percentage of males initiated at an early age than females (Table 3). A greater percentage of males never indulged in alcohol (31.7%) than females (21.9%). However, age at initiation of smoking did not differ by gender.

Multivariate logistic regression models adjusted for demographic characteristics showed that all five lifetime risky behaviors (drinking alcohol, using any form of cocaine, injecting any illegal drugs, having had oral sex, and having ≥4 sexual partners) that were significantly different in bivariate analysis also remained significant in these models. In addition, lifetime use of dextromethorphan (DXM) also was significantly different with males more likely to use it than females (Table

4). With regard to risky behaviors occurring during the past month, males were approximately three times as likely as females to smoke cigarettes (OR=2.91, 95% CI 1.54-5.52) or use marijuana on school property (OR=3.02, 95% CI 1.85-4.92), as well as to use hashish (OR=2.88, 95% CI 1.64-5.05). Moreover, males were 40% more likely than females to use marijuana during the past month (OR=1.43, 95% CI 1.06-1.94). Additionally, males were more likely than females to have had oral sex (OR=1.72, 95% CI 1.28-2.31), sex with four or more partners during lifetime (OR=2.43, 95% CI 1.69-3.48), or to use alcohol or drugs during their last sexual intercourse (OR=1.43, 95% CI 1.00-2.06). The association between gender and risky behaviors did not differ by age categories. However, a few differed by race/ethnicity. A lower percentage of black females had a history of drinking alcohol and using DXM during their lifetime, and a lower percentage of Hispanic females used marijuana during the previous month. On the whole, a lower percentage of minority females had a history of oral sex over the lifetime.

Unadjusted and adjusted logistic regression models showed that males were less likely than females to perceive parental disapproval with regard to smoking, drinking alcohol, and using marijuana or prescription drugs (Table 5). They were also less likely than females to perceive disapproval from friends related to smoking and prescription drug use. Data were also available on self-perception of risk on drinking alcohol and using

**Table 2** Prevalence of Health Risk Behaviors Among Adolescents (9th to 12th graders) by Gender

Risk Behaviors	Female <sup>a</sup> n (%)	Male <sup>b</sup> n (%)	P value <sup>c</sup>
Riding with a drinking driver during past 30 days	128 (30.0)	139 (30.3)	.921
Driving while drinking during past 30 days	48 (11.2)	73 (16.0)	.038*
Texting while driving during past 30 days	144 (33.7)	155 (33.8)	.989
Smoking cigarettes during lifetime	187 (43.8)	203 (45.0)	.717
Smoking cigarettes during past 30 days	65 (15.2)	87 (19.2)	.115
Smoking cigarettes on school property during past 30 days	14 (3.3)	43 (9.5)	<.001*
Smoking cigars/cigarillos during past 30 days	92 (21.7)	105 (23.4)	.551
Drinking alcohol during lifetime	322 (75.8)	286 (64.1)	<.001*
Drinking during alcohol past 30 days	198 (46.6)	192 (43.2)	.322
Drinking alcohol on school property during past 30 days	31 (7.3)	46 (10.4)	.107
Drinking ≥5 drinks of alcohol in a row during past 30 days	134 (31.5)	126 (28.6)	.342
Using marijuana during lifetime	234 (55.7)	234 (52.9)	.414
Using marijuana during past 30 days	127 (30.1)	156 (35.5)	.089
Using marijuana on school property during past 30 days	26 (6.2)	74 (16.8)	<.001*
Using hashish during past 30 days	20 (4.8)	52 (11.8)	<.001*
Using any form of cocaine during lifetime	26 (6.2)	49 (11.3)	.009*
Sniffing/inhaling glue, paints or spray during lifetime	33 (7.9)	45 (10.2)	.226
Using methamphetamines during lifetime	18 (4.3)	28 (6.4)	.176
Using ecstasy/MDMA during lifetime	67 (15.9)	67 (15.3)	.780
Using DXM during lifetime	20 (4.7)	33 (7.5)	.090
Injecting any illegal drug during lifetime	5 (1.2)	16 (3.8)	.017*
Using prescription drugs during lifetime	87 (20.7)	102 (23.2)	.363
Using prescription drugs during past 30 days	61 (14.6)	77 (17.7)	.218
Having had sexual intercourse during lifetime	263 (63.2)	265 (60.9)	.489
Having had oral sex during lifetime	165 (39.9)	217 (50.5)	.002*
Having ≥4 sexual partners during lifetime	64 (15.4)	127 (29.7)	<.001*
Using alcohol/drugs during last sexual intercourse	71 (17.1)	93 (21.7)	.090
Using condom during last sexual intercourse	172 (41.4)	193 (44.8)	.328

<sup>a,b</sup> 2-16 females and 2-33 males did not answer at least one question mentioned above.

<sup>c</sup> Chi-square test was used to examine the differences by gender.

\**P* <.05 considered statistically significant.

Abbreviations: MDMA, 3,4-methylenedioxy-N-methylamphetamine; DXM, dextromethorphan.

marijuana (not shown). Adjusted logistic regression analyses showed that males were less likely than females to consider drinking alcohol (OR 0.33, 95% CI 0.22-0.49) and using marijuana (OR 0.42, 95% CI 0.31-0.58) to be risky. Sources of getting alcohol and illegal drugs also differed by gender where females were more likely to borrow, steal, or receive alcohol from adults during the past month and males were more likely to report that someone offered/sold/gave illegal drugs to them on school property during the past 12 months (Table 6). Sources of tobacco did not differ by gender.

## DISCUSSION

Findings in this study differ in several instances from the published literature. For example, while other studies have reported that drinking among youth is primarily a problem among males,<sup>31,32</sup> we observed in southeast Texas that females were actually more likely than males to report ever drinking and as likely to engage in more problematic drinking, drinking on school property, and binge drinking. While differences

in binge drinking could have resulted from a slight difference in definitions used by the YRBSS between males and females,<sup>30,31</sup> the other differences cannot be explained as easily and suggest that females are now adopting male patterns of risky behavior in our region.

Moreover, high school girls were as likely as boys to report ever using marijuana. This finding is especially concerning as research has shown that females transition faster to regular use than males once they initiate use of this drug.<sup>33</sup> Differences by gender in motivation for smoking marijuana also have been shown with females demonstrating a greater likelihood for use when they are experiencing stress.<sup>34</sup> Although the cross-sectional nature of this study does not permit us to determine the cause of this high level of marijuana use in our region among females, it is possible that the stress invoked by living in a community heavily damaged by the hurricane may have led to this finding.

Consistent with previous studies,<sup>35,36</sup> we observed that males were more likely than females to have engaged in smoking on school property. Previous

**Table 3** Age at Initiation of Health Risk Behaviors by Gender

Age of Initiation	Female <sup>a</sup> n (%)	Male <sup>b</sup> n (%)	P value <sup>c</sup>
<b>Smoking cigarettes<sup>d</sup></b>			.075
<13 y	35 (8.2)	58 (13.0)	
13 y or older	108 (25.4)	107 (24.0)	
Never smoked	282 (66.3)	281 (63.0)	
<b>Drinking alcohol<sup>e</sup></b>			<.001*
<13 y	106 (24.9)	135 (30.1)	
13 y or older	226 (53.2)	171 (38.2)	
Never indulged	93 (21.9)	142 (31.7)	
<b>Using marijuana<sup>f</sup></b>			<.001*
<13 y	46 (10.9)	91 (20.5)	
13 y or older	193 (45.6)	150 (33.9)	
Never used	184 (43.5)	202 (45.6)	
<b>Having had sexual intercourse<sup>g</sup></b>			<.001*
<13 y	14 (3.4)	83 (19.3)	
13 y or older	253 (60.7)	193 (44.8)	
Never had	150 (36.0)	155 (36.0)	

<sup>a</sup> Numbers do not total 429 due to missing data.  
<sup>b</sup> Numbers do not total 461 due to missing data.  
<sup>c</sup> Chi-square test was used to examine the differences by gender.  
<sup>d</sup> 4 females and 15 males did not answer the question on smoking.  
<sup>e</sup> 4 females and 11 males did not answer this question.  
<sup>f</sup> 6 females and 17 males did not answer this question.  
<sup>g</sup> 12 females and 17 males did not answer this question.  
 \*P <.05 considered statistically significant.

research has demonstrated that there are significant differences between genders in the reasons they give for choosing whether or not to smoke. Males, for example, are more likely to be influenced by peer perception of approval or disapproval, while females are less so.<sup>37,38</sup> That males were more likely to smoke on school property in view of their peers suggests that their friends approve of this risk behavior or may even admire it. However, this did not lead to an overall difference in the prevalence of smoking by gender, suggesting that females chose to smoke outside of school hours. Thus, both genders were really at equal risk of experiencing adverse effects from this behavior.

Although we did observe some difference in risky driving by gender, we did not observe gender differences in one of the most recent problems to affect youth—texting while driving. In contrast, Goodwin et al noted in their study of youth residing in North Carolina that female teens were twice as likely as males to text while driving.<sup>19</sup> However, they noted texting in only a small percentage of their subjects in contrast to our observation that about one-third of both genders engaged in this risky behavior while driving. Although it is possible that differences between our studies may have resulted from differences in populations or methodology, it also is possible that those differences were due to an absence of laws in our state preventing use of cell phones while operating an automobile. In contrast,

**Table 4** Odds Ratios (ORs) of Health Risk Behaviors Among Male Adolescents (9th to 12th graders)

Risk Behaviors	Male <sup>a,b</sup> OR (95% CI)
Riding with a drinking driver during past 30 days	1.01 (0.75-1.37)
Driving a car while drinking during past 30 days	1.40 (0.92-2.11)
Texting while driving during past 30 days	1.08 (0.80-1.46)
Smoking cigarettes during lifetime	1.05 (0.79-1.39)
Smoking cigarettes during past 30 days	1.22 (0.84-1.76)
Smoking cigarettes on school property during past 30 days	2.91 (1.54-5.52)*
Smoking cigars/cigarillos during past 30 days	1.19 (0.85-1.66)
Drinking alcohol during lifetime	0.60 (0.44-0.81)*
Drinking alcohol during past 30 days	0.89 (0.68-1.18)
Drinking alcohol on school property during past 30 days	1.45 (0.88-2.40)
Drinking ≥5 drinks of alcohol in a row during past 30 days	0.90 (0.67-1.23)
Using marijuana during lifetime	1.01 (0.76-1.34)
Using marijuana during past 30 days	1.43 (1.06-1.94)*
Using marijuana on school property during past 30 days	3.02 (1.85-4.92)*
Using hashish during past 30 days	2.88 (1.64-5.05)*
Using any form of cocaine during lifetime	1.91 (1.13-3.22)*
Sniffing/inhaling glue, paints, or spray during lifetime	1.57 (0.95-2.59)
Using methamphetamines during lifetime	1.39 (0.73-2.66)
Using ecstasy/MDMA during lifetime	1.09 (0.73-1.62)
Using DXM during lifetime	1.88 (1.02-3.45)*
Injecting any illegal drugs during lifetime	3.71 (1.16-11.83)*
Using prescription drugs during lifetime	1.27 (0.90-1.80)
Using prescription drugs during past 30 days	1.41 (0.96-2.06)
Having had sexual intercourse during lifetime	0.94 (0.70-1.26)
Having had oral sex during lifetime	1.72 (1.28-2.31)*
Having ≥4 sexual partners during lifetime	2.43 (1.69-3.48)*
Using alcohol/drugs during last sexual intercourse	1.43 (1.00-2.06)*
Using condom during last sexual intercourse	1.17 (0.88-1.55)

<sup>a</sup> Females considered as reference category.  
<sup>b</sup> Adjusted by age, race/ethnicity, education level, parental education level, and whether or not they live with both parents.  
 \*P <.05 considered statistically significant.  
 Abbreviations: CI, confidence interval; DXM, dextromethorphan; MDMA, 3,4-methylenedioxy-N-methylamphetamine.

North Carolina passed a law in 2006 preventing use of cell phones while operating an automobile. In the absence of a law targeting cell phone use, rapid interventions need to be implemented in high schools to inform youth of the morbidity and mortality associated

**Table 5** Adolescents' Perception of Disapproval of Abusing Substances From Parents and Friends by Gender

	Female <sup>a</sup> n (%)	Male <sup>b</sup> n (%)	Male <sup>c</sup> Unadjusted OR (95% CI)	Male <sup>d</sup> Adjusted OR (95% CI)
<b>Smoking cigarettes</b>				
Perceived parental disapproval	402 (95.3)	395 (88.2)	0.37 (0.22-0.63)*	0.34 (0.19-0.59)*
Perceived friends' disapproval	178 (42.1)	153 (34.4)	0.72 (0.55-0.95)*	0.73 (0.55-0.97)*
<b>Drinking alcohol</b>				
Perceived parental disapproval	391 (92.6)	386 (87.1)	0.54 (0.34-0.85)*	0.46 (0.29-0.75)*
Perceived friends' disapproval	163 (38.8)	148 (33.7)	0.80 (0.61-1.06)	0.76 (0.57-1.01)
<b>Using marijuana</b>				
Perceived parental disapproval	396 (94.5)	398 (90.2)	0.54 (0.32-0.91)*	0.48 (0.27-0.83)*
Perceived friends' disapproval	145 (34.8)	130 (29.6)	0.79 (0.59-1.05)	0.77 (0.57-1.04)
<b>Using prescription drugs</b>				
Perceived parental disapproval	395 (94.9)	392 (89.7)	0.46 (0.27-0.79)*	0.43 (0.24-0.75)*
Perceived friends' disapproval	201 (48.8)	174 (40.3)	0.71 (0.54-0.93)*	0.71 (0.53-0.94)*

<sup>a,b</sup> 6-17 females and 13-29 males did not answer at least one question mentioned above.

<sup>c,d</sup> Females considered as reference category.

<sup>d</sup> Multivariate logistic regression analysis was used; adjusted by age, race/ethnicity, education level, parental education level, and whether they live with both parents or not.

\**P* <.05 considered statistically significant.

Abbreviations: CI, confidence interval; OR, odds ratio.

with texting while driving. Interventions that include parents would be desirable, as monitoring by parents has been demonstrated to be effective, provided that messaging is consistent between the child's parents.<sup>39,40</sup>

Results of the YRBSS are used by both public and private health agencies to drive policy and intervention activities. Additional information that could facilitate future, targeted interventions are available from this study. First, we observed that gender differences reemerged for a number of risk behaviors several years after a national disaster. This suggests that targeted interventions may need to differ immediately after a major catastrophe but then can return to US standards in the following years. Furthermore, we found that females were more influenced than males by parental disapproval with regard to smoking, drinking alcohol, and using marijuana or prescription drugs. This is consistent with the literature, which reported that risk-taking among males is far more likely to result from shared peer norms, especially related to sexual behaviors,<sup>41</sup> and that marketing pressures are different for males than females.<sup>37-43</sup> This suggests that substance-use programs that strive to decrease the number of girls participating in these risk behaviors may benefit from involving parents. Some programs may need to be held in the evenings when one or both parents could attend.

Interpretation of these findings must be made in light of the study's limitations. The response was 51%, and thus the study may not be generalizable to the entire student population. However, the school population itself is representative of the community, as it is the only public high school in the city. All measures were self-reported, and despite efforts to prevent differential bias, in the absence of objective measures, error may have

**Table 6** Means of Obtaining Cigarettes, Alcohol, and Illegal Drugs Among Adolescents by Gender

Sources	Female <sup>a</sup> n (%)	Male <sup>b</sup> n (%)	<i>P</i> value <sup>c</sup>
<b>Cigarettes during the past 30 d<sup>d</sup></b> .210			
Purchased	25 (5.9)	39 (8.8)	
Borrowed/stolen/provided by adults	25 (5.9)	27 (6.1)	
Others	21 (5.0)	31 (7.0)	
Did not smoke	351 (83.2)	347 (78.1)	
<b>Alcohol during the past 30 d<sup>e</sup></b> .008*			
Purchased	47 (11.1)	47 (10.6)	
Borrowed/stolen/provided by adults	104 (24.6)	69 (15.6)	
Others	69 (16.3)	80 (18.1)	
Did not indulge	203 (48.0)	247 (55.8)	
<b>Illegal drugs on school property during the past 12 mo<sup>f</sup></b> .048*			
Offered/sold/given by someone	99 (23.7)	130 (29.7)	
Not	319 (76.3)	308 (70.3)	

<sup>a</sup> Numbers do not total 429 due to missing data.

<sup>b</sup> Numbers do not total 461 due to missing data.

<sup>c</sup> Chi-square test was used to examine the differences by gender.

<sup>d</sup> 7 females and 17 males did not answer this question.

<sup>e</sup> 6 females and 18 males did not give information on alcohol drinking.

<sup>f</sup> 11 females and 23 males did not reply this question.

\**P* <.05 considered statistically significant.

been introduced. Furthermore, the cross-sectional nature of the study itself is a limitation as we cannot determine whether these behaviors changed as a result of the hurricane. Perhaps most importantly, gender was examined

exclusively rather than in the context of ethnicity and gender, which may preclude identification of findings that are both gender and culture specific.

## CONCLUSION

We observed in this population of high school students surveyed 3 years after a natural disaster that males were more likely than females to engage in multiple risk behaviors. Moreover, there were differences in the type of risk behaviors preferred by boys vs girls. This suggests that gender differences did reemerge after the immediate aftermath of the hurricane. However, future work needs to be done to determine why males remain at such high risk of these behaviors. Furthermore, our work confirms that intervention programs should be gender specific, so the motivation for the behaviors can be addressed, rather than the more common approach of involving the entire study body.

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