

## Substance use and youth violence. A study among 6<sup>th</sup> to 10<sup>th</sup> grade Israeli school children

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**Abstract:** This study examined the co-morbidity of substance use and violence among a representative sample of 8,394 6<sup>th</sup>-10<sup>th</sup> grade Israeli students. A representative national self report sample of 8,394 students in 6<sup>th</sup> through 10<sup>th</sup> grade. Measures included smoking, alcohol consumption, and illicit drug use, predicting involvement in bullying, injury during a fight and weapon-carrying in the past 30 days. We found across all grades, genders and ethnicities, daily smoking, use of hard drugs, history of drunkenness and binge drinking were the best predictors of violent behavior. Involvement in such behaviors put girls in higher risk for violent behaviors compared with boys. We concluded that use of substances immensely increased the odds of involvement in violent behavior, and this association was extremely strong for Arab girls. The study suggested that although girls were less frequently involved in substance use, the girls who did were at much higher risk for involvement in youth violence.

**Keywords:** substance use, adolescence, bullying, fighting, risk behavior, weapon carrying, school, Israel

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### INTRODUCTION

With public interest on the rise, youth violence has been gaining increasing recognition as a social problem. Whether due to the increased rates of youth violence (1,2), the aggravation of the profile of violence (3) or a heightened awareness of the issue, questions of involvement in violence are being asked more frequently. Lowery et al (1) claimed that adolescents were disproportionately represented as both victims and perpetrators of fatal and nonfatal assaultive acts of violence. The growing role of adolescents in serious and fatal acts of violence, as well as the increased use of firearms among adolescents, was reported by Stanton et al (3).

Although violent behavior has been the focus of much attention, both theory and

research hold that violent behavior should not be treated as a singular episode in the life of an adolescent (4), but rather as one behavior among a cluster of behaviors. In many cases, youth violence coexists with additional behavioral problems (5). One of the leading theories in the field of youth risk behavior is Jessor and Jessor's problem behavior theory (6). According to this theory, risk behaviors should be regarded as a syndrome or as a cluster of behaviors commonly appearing together, such as drinking behavior, illicit drug use, early sexual intercourse and delinquency, rather than as a list of symptoms.

The correlation between substance use and violent behavior is well documented (1,7-12), as is the correlation between alcohol consumption and delinquency (13-

15). In fact, alcohol abusers have been found to be involved in many violent crimes, including homicide, assaults, sexual assault and physical abuse within the family (16,17). Cross-sectional analyses of 12,272 high school students in 50 states in the United States shows that all forms of substance use (excluding cigarette smoking) were significantly correlated with weapon carrying and physical fighting (18). DuRant et al (19) found that cigarette smoking, among other substances used, is also correlated with youth violence, and particularly with weapon carrying.

With regard to both male and female adolescents, behavioral risk factors appear to be the best predictors of involvement in violence (19). However, numerous studies have asserted that boys are more likely than girls to be involved in all types of violence (1,7,20). Indeed, Saner and Ellickson (7) employed logistic regression to reveal gender as the only significant demographic predictor of involvement in youth violence (other demographic variables included income, socioeconomic status (SES) dropout, etc.). The researchers also found that as the number of risk factors increases, so does the likelihood of engaging in violent behavior. Drug use is generally a stronger predictor of violence for boys than it is for girls (7). However, Dukarm et al (18) found that adolescent male and female illicit substance users are equally at greater risk for engagement in various violence-related behaviors.

Based on Kandel (21), we now know that illicit drug use is normally a stage that proceeds legal drug use (e.g., alcoholic drink beverages and cigarettes), and that each stage represents a "cumulative" pattern of drug use, whereby substances increasing in severity are used over time. Considering this theory along with problem behavior theory (6), we may infer that drug use is part of a behavioral cluster rather than a singular behavior. According to

Harel, Kanny and Rahav (22), there is also a cumulative pattern of youth involvement in risk behavior, that is, involvement in various risk behaviors may escalate over time. In this study we examine the comorbidity of cigarette smoking, alcohol drinking and drug use and involvement in various types of violence. Evidence closely tying youth violence to cigarette smoking, alcohol consumption, and drug use will provide us with a better understanding of youth violence and its relationship with substance use.

## METHODS

### Data source

The study utilizes data collected from the second Israeli Health Behaviors among School-Aged Children (HBSC) survey, conducted in 1998. The database consists of 8,394 students in 6<sup>th</sup> through 10<sup>th</sup> grades in the secular and religious public school systems, including both Jewish and Arab schools. The sample was drawn from a list of schools and classrooms provided by the Ministry of Education. A full description of the sampling procedure may be found elsewhere (23). The sample was weighted in the interest of obtaining greater accuracy with respect to the estimates of student populations.

### Measures

Respondents were asked about their involvement in violence at various points in time. Three types of violence were examined in this study: a) bullying – this measure was derived from the question "How often have you taken part in bullying other students in school this term?". Students were defined as "bullies" if they were involved in bullying three times or more (3+); b) involvement in a physical fight resulting in an injury at least once during the past 12 months; and c) carrying any sort of weapon at least once during the past 30 days (P30D).

### Demographic measures

Two demographic factors found significant in earlier studies were tested. The first was gender, in which being male was considered a risk factor. The second was ethnicity – comparing involvement in violence among Jewish and Non-Jewish populations (the Non-Jewish population includes Moslems, Druze, Christian Arabs and Bedouins, and will be regarded as Arab, since over 80% of the Non-Jewish population is Arab). Scholastic grade was also considered to examine the effects of age group.

Students were asked about the following frequencies with respect to substance use: smoking frequency (as an ordinal scale, suggested frequencies ranged from daily to never smoked; and as open-ended questions, respondents were asked to indicate the number of cigarettes smoked weekly); number of times that the respondents were ever drunk and number of times that respondents were involved in binge drinking (five or more drinks in one sitting) during the past 30 days; and the frequency of drug use over the past 12 months (list of drugs provided). The frequency of drug use was asked among 10<sup>th</sup> grades students in the Arab and secular Jewish schools only. Based on these questions, the following eight measures were computed: 1) weekly smoking – students that reported weekly smoking or indicated smoking at least one cigarette per week; but not every day 2) daily smoking - students that reported daily smoking or indicated smoking at least seven cigarette per week; 3) ever been drunk – students who reported that they were drunk at least once; 4) involved in binge drinking at least once during the past 30 days; 5) both being drunk and binge drinking – students that gave a positive answer to both questions; 6) used diet pills, sleeping pills, speed or sedatives at least once in the past 12 months; 7) used marijuana at least once during the past 12

months; and 8) used ecstasy, LSD, methadone, opium, heroin, cocaine or crack at least once during the past 12 months. With respect to each of the three substance categories (cigarettes, alcohol and illicit drugs), each measure indicates a more severe behavior than the preceding measure within a particular substance category. To avoid multi-collinearity, each measure excludes the other measures. For example, a student who reported daily smoking was classified as a daily smoker only – although he/she fits into the weekly smoking category as well (smokes more than one cigarette a week).

The last set of measures were cumulative measures, counting the number of risk behaviors in which a student was involved, regardless to type of behavior. Students that were involved in either one of the smoking behaviors or drinking behaviors received the value 1. Students who were involved in both smoking and drinking behaviors received the value 2. Those who were not involved in any of these behaviors were coded as no risk behavior (value 0). For 10<sup>th</sup> graders, the value 3 was also added, for involvement in any type of drug use additional to the two other types of behaviors.

### RESULTS

One third of the respondents reported involvement in at least one type of measured violent behavior over the past year. Indeed, according to student reports, 17.4% bullied someone else at school three times or more (43.0% participated in bullying at least once); 14.3% participated in a physical fight that resulted in an injury requiring medical attention (44.7% participated in a physical fight with or without being injured); and 15.5% carried a weapon at least once during the past 30 days. Boys were between three to five times more likely than girls to be involved in any of the above indicated behaviors, while Arabs

were approximately one and a half to two times more likely than Jews to be involved in such behavior.

Table 1 provides the distribution of the independent variables within the different populations. Males were more likely than females to be involved in the majority of risk behaviors (with the exception of using pills, in which female involvement was three times that of males). More variation existed among the Jewish and the Non-Jewish populations. A relatively similar rate of Jewish and Non-Jewish reported weekly smoking, but with respect to daily smoking, Jewish students smoked twice as much as Non-Jewish students. While there was little or no variance with respect to smoking behavior, the picture was more complicated regarding all other variables. Whereas Jewish students were six times as likely as Non-Jewish students to have ever been drunk, Non-Jewish students were twice as likely as Jewish students to have been involved in current binge drinking behavior. Regarding illicit drug use, only a small variance existed between the two populations with respect to heavy drug use. However, Non-Jews were found to take pills more frequently, whereas Jews were found to use soft drugs more frequently.

Table 2 presents logistic regression models predicting youth violence among 6<sup>th</sup> to 10<sup>th</sup> grade students, and Table 3 presents logistic regression models predicting youth violence among 10<sup>th</sup> grade students only. As depicted in Table 2, the demographic variables of gender, grade and ethnicity were found to be statistically significant ( $P < 0.05$ ) with respect to all three measures of violence for the entire sample. Consistent with previous findings, boys were found to be more involved in violent behavior than girls. A relationship between age and violence was also apparent, with younger pupils at greater risk for involvement in violence. Regarding ethnicity, Non-Jewish pupils as compared to Jewish pupils were

consistently more at risk with respect to all three measures of violence. Indeed, non-Jewish pupils were over five times as likely to be injured during a fight (o.r. 5.15 for total sample; o.r. 6.31 for 10<sup>th</sup> grade only, see Table 3). Further examination of the ethnicity variable with respect to gender differences showed that Arab boys were particularly at risk for injury during a fight (o.r. 4.86), as were Arab girls (o.r. 6.33; please see Table 2). Not only were Arabs at greater risk for weapon carrying in comparison with Jews (o.r. 2.50), but Arab girls were more at risk than Jewish girls (2.00 times as much) and Arab boys were at greater risk than Jewish boys (o.r. 2.73). An examination of bullying behavior according to ethnicity and gender revealed that being Arab appeared to be a greater risk factor for girls (o.r. 3.28) than for boys (o.r. 1.35). With respect to the 10<sup>th</sup> grade population, the risk of being injured during a fight is strikingly larger for an Arab girl (o.r. 31.35) than for an Arab boy (o.r. 4.59; please see Table 3).

Adolescents who smoked on a weekly basis were more likely to be involved in youth violence, as depicted by all three violence measures (please see Table 2). Moreover, girls who smoked on a weekly basis were at greater risk for violence than boys who smoked on a weekly basis, as depicted by the odds of participation in all three violence measures. The picture changed slightly with the examination of tenth graders only. Weekly smoking was no longer a significant predictor of bullying behavior for tenth grade students (see Table 3). But with respect to injury during a fight, girls who were weekly smokers were over ten times as likely to be injured during a fight, as compared to weekly smoking boys who were almost twice as likely (girls o.r. 10.37; boys o.r. 1.99). Similarly, weekly smoking was a greater predictor of weapon carrying for tenth grade girls (o.r. 2.52) than for tenth grade boys (o.r. 1.52).

Table 1. Percent Distribution of The Independent Variables : HBSC-Israel 1998, Grades 6<sup>th</sup> - 10<sup>th</sup>, Weighted Estimates

	Grades 6 <sup>th</sup> to 10 <sup>th</sup>									
	Weekly Smoking	Daily Smoking	Ever Been Drunk	Binge Drinking P30D	Been Drunk + Binge Drinking	Used Pills P12M*	Used Cannabis P12M*	Used Hard Drugs P12M*	10 <sup>th</sup> Grade only	
Total %	5.4	6.8	10.3	3.7	6.8	-	-	-	-	-
Total Sd	0.23	0.25	0.30	0.19	0.25	-	-	-	-	-
Boys N=4,190	6.7	9.0	11.4	5.4	9.9	-	-	-	-	-
Girls N=4,204	4.1	4.5	9.2	1.9	3.7	-	-	-	-	-
Jews N=5,288	5.1	6.8	12.1	3.2	6.6	-	-	-	-	-
Arab N=3,106	6.7	6.8	2.9	5.7	7.7	-	-	-	-	-
Total %	8.2	15.1	16.7	3.6	12.8	4.3	3.2	6.4		
Total Sd	0.27	0.36	0.37	0.19	0.33	0.20	0.18	0.24		
Boys N=667	7.9	20.7	18.4	5.0	18.5	2.1	4.1	10.5		
Girls N=722	8.5	9.3	14.9	2.2	6.9	6.5	2.3	2.1		
Jews N=805	8.7	16.7	20.1	3.6	14.2	3.5	3.9	6.2		
Arab N=584	6.5	8.4	2.6	3.8	7.1	7.4	0.6	7.2		

\* Drug use items were restricted to 10<sup>th</sup> grade students, and thus presented to this grade only.

Table 2. Logistic Regression Models Predicting Youth Violence with Smoking and Drinking Behaviors: HBSC-Israel 1998, Grades 6<sup>th</sup> - 10<sup>th</sup>

	Bullied Someone Else 3+	Injured During Fight	Carried Weapon P30D
Male	3.09***	3.52***	4.95***
Grade	0.83***	0.78***	0.87***
Ethnicity (1 Jewish 2 Arab)	1.83***	5.15***	2.50***
Weekly Smoking	1.50***	2.47***	2.47***
Daily Smoking	2.24***	2.15***	3.12***
Been Drunk At Least Once	1.94***	1.24***	2.98***
Binge Drinking P30D	2.49***	4.02***	4.84***
Been Drunk and Binge Drinking P30D	2.66***	5.18***	6.26***
N	8,001	7,909	7,974
Nagelkreke R Square	0.154***	0.279***	0.302***
<i>Boys only</i>			
Grade	0.85***	0.81***	0.88***
Ethnicity (1 Jewish 2 Arab)	1.35***	4.86***	2.73***
Weekly Smoking	1.47***	2.02***	2.23***
Daily Smoking	2.18***	1.75***	3.04***
Been Drunk At Least Once	1.88***	1.21*	2.65***
Binge Drinking P30D	2.49***	4.15***	4.59***
Been Drunk and Binge Drinking P30D	2.55***	4.74***	6.01***
N	3,933	3,895	3,915
Nagelkreke R Square	0.083***	0.233***	0.259***
<i>Girls only</i>			
Grade	0.78***	0.71***	0.85***
Ethnicity (1 Jewish 2 Arab)	3.28***	6.33***	2.00***
Weekly Smoking	1.81***	4.36***	2.94***
Daily Smoking	2.61***	4.38***	3.21***
Been Drunk At Least Once	2.21***	1.27*	4.06***
Binge Drinking P30D	2.72*	3.12***	5.73***
Been Drunk and Binge Drinking P30D	3.23***	6.35***	7.09***
N	4,086	4,050	4,059
Nagelkreke R Square	0.096***	0.212***	0.215***

\*\*\* P&lt;0.005; \*\* P&lt;0.01; \* P&lt;0.05

Table 3. Logistic Regression Models Predicting Youth Violence with Smoking Drinking and Drug Use Behaviors: HBSC-Israeli 1998, 10<sup>th</sup> Grades Only

	Bullied Someone Else 3+	Injured During Fight	Carried Weapon P30D
Male	2.68***	5.60***	5.41***
Ethnicity (1 Jewish 2 Arab)	1.90***	6.31***	2.04***
Weekly Smoking	0.65	2.42***	1.73***
Daily Smoking	1.60	1.49	2.22***
Been Drunk At Least Once	1.47	1.18	1.65
Binge Drinking P30D	4.07***	3.34*	2.81**
Been Drunk and Binge Drinking P30D	3.82***	3.29***	3.47***
Used Pills P12M	0.43	1.55	1.69
Used Cannabis P12M	1.06	1.06	1.40
Used Hard Drugs P12M	1.63*	3.99***	4.49***
N	1,352	1,331	1,350
Nagelkreke R Square	0.185***	0.312***	0.320***
<i>Boys only</i>			
Ethnicity (1 Jewish 2 Arab)	1.16	4.59***	1.97***
Weekly Smoking	0.63	1.99***	1.52*
Daily Smoking	1.35	1.28	1.96***
Been Drunk At Least Once	1.85	1.04	1.50
Binge Drinking P30D	4.88***	3.94*	2.81*
Been Drunk and Binge Drinking P30D	3.46***	3.42***	3.63***
Used Pills P12M	0.53	1.44	2.75
Used Cannabis P12M	1.52	1.64	1.58
Used Hard Drugs P12M	1.71	3.67***	4.33***
N	645	633	643
Nagelkreke R Square	0.134***	0.236***	0.246***
<i>Girls only</i>			
Ethnicity (1 Jewish 2 Arab)	4.38***	31.35***	2.29*
Weekly Smoking	0.80	10.37**	2.52
Daily Smoking	3.63**	8.39**	4.26***
Been Drunk At Least Once	0.41	2.37	2.34
Binge Drinking P30D	2.03	0.37	2.41*
Been Drunk and Binge Drinking P30D	6.75	1.34	2.73
Used Pills P12M	0.25	2.06	0.92
Used Cannabis P12M	0.00	0.59	0.61
Used Hard Drugs P12M	2.34	8.04*	6.05***
N	707	698	707
Nagelkreke R Square	0.189***	0.309***	0.154***

\*\*\* P&lt;0.005; \*\* P&lt;0.01; \* P&lt;0.05

Whereas daily smoking was a significant predictor of all three measures of violent behavior for all three populations (total, boys, and girls), the variable proved significant among the total sample of tenth graders only with respect to injury during a fight, (o.r. 2.42) and weapon carrying (o.r. 1.73). Daily smoking had the strongest effect predicting 6<sup>th</sup>-10<sup>th</sup> grade girls' likelihood of injury during a fight (o.r. 4.38). With regard to boys as well as the total sample of 6<sup>th</sup> to 10<sup>th</sup> graders, daily smoking was a stronger predictor of weapon carrying than of other violence measures (boys: o.r. 3.04; total: o.r. 3.12).

The variable "been drunk at least once" was found to have the greatest effect on the likelihood of weapon carrying among 6<sup>th</sup> - 10<sup>th</sup> grade pupils, particularly girls (o.r. 4.06). Binge drinking proved to predict weapon carrying most strongly, followed by likelihood of being injured during a fight. Among the sample of tenth graders as well as tenth grade boys, the effect of binge drinking was strongest with respect to bullying someone else, followed by injury during a fight and weapon carrying, respectively. For tenth grade girls, binge drinking remained significant only in relation to weapon carrying.

With respect to the total sample, the variable "been drunk and binge drinking" proved to be most significant as a predictor of weapon carrying (o.r. 6.26), followed by being injured during a fight (o.r. 5.18) and bullying someone else (o.r. 2.66) (see Table 2). Both boys and girls depicted this pattern, while the effect for girls was much stronger. For example, the odds ratio for being injured during a fight was 6.35 for girls as compared with 4.74 for boys. Regarding the tenth grade sample, this variable most strongly predicted the likelihood of bullying someone else (o.r. 3.82) (see Table 3). Interestingly, among tenth grade girls, the same variable no longer had significance with respect to the three

violence measures.

Among tenth graders' hard drug use appeared to have the strongest effect on weapon carrying (o.r. 4.49), followed by injury during a fight (o.r. 3.99) and bullying someone else (o.r. 1.63). For boys, hard drug use remains a significant predictor only of weapon carrying (o.r. 4.33) and injury during a fight (o.r. 3.67). Among girls, hard drug use had a marked correlation with injury during a fight (o.r. 8.04) and weapon carrying (o.r. 6.05), respectively. In general, the relationships between hard drug use and all three indices of violence were far stronger for tenth grade girls than tenth grade boys.

As depicted in Table 4, an examination of variables along lines of ethnicity and gender revealed that weekly smoking remained a significant predictor of injury during a fight among Jewish boys and girls, but not of bullying or weapon carrying. Moreover, the effect of weekly smoking on Jewish girls (o.r. 3.30) was much higher than its effect on Jewish boys (o.r. 1.87) with respect to injury during a fight. An analysis of the Arab population showed that weekly smoking was significantly correlated with all three measures of violence for both girls and boys. Moreover, Arab girls who smoked on a weekly basis were at the greatest risk of violence, as evidenced by odds ratio scores of 17.44 on the injured during a fight measure and 15.99 on weapon carrying (in comparison with Arab boys' scores of 2.58 and 4.41, respectively).

Being drunk at least once posed a greater threat to Arab boys than to Jewish boys, as measured by weapon carrying frequencies (o.r. 5.82 as compared to o.r. 2.44). However, being drunk at least once placed Arab girls in the highest risk group with respect to weapon carrying (o.r. 40.97). Binge drinking places Jewish boys at greater risk than Jewish girls on all three measures of violence. However, Arab girls who binge drink were at greater risk of



Table 4. Logistic Regression Models Predicting Youth Violence with Smoking and Drinking Behaviors by Gender and Ethnicity: HBSC-Israel 1998, Grades 6<sup>th</sup> - 10<sup>th</sup>

	Bullied Someone Else 3+	Injured During Fight	Carried Weapon P30D
<b>Jewish Boys</b>			
Grade	0.84***	0.78***	0.88***
Weekly Smoking	1.38	1.87***	1.78***
Daily Smoking	2.09***	1.82***	3.16***
Been Drunk At Least Once	1.97***	1.11	2.44***
Binge Drinking P30D	2.20***	4.49***	5.12***
Been Drunk and Binge Drinking P30D	2.99***	4.59***	5.13***
N	2,531	2,506	2,503
Nagelkreke R Square	0.078***	0.120***	0.174***
<b>Jewish Girls</b>			
Grade	0.76***	0.64***	0.90
Weekly Smoking	1.42	3.30***	1.73
Daily Smoking	2.41***	4.73***	2.12
Been Drunk At Least Once	2.32***	1.13	3.28***
Binge Drinking P30D	2.96	1.77	2.51***
Been Drunk and Binge Drinking P30D	3.46***	5.07***	5.18***
N	2,525	2,515	2,500
Nagelkreke R Square	0.058***	0.110***	0.79***
<b>Arab Boys</b>			
Grade	0.89***	0.92**	0.89***
Weekly Smoking	1.68*	2.58***	4.41***
Daily Smoking	2.26***	1.67*	3.01***
Been Drunk At Least Once	1.53	2.17**	5.82***
Binge Drinking P30D	3.13***	3.37***	3.48***
Been Drunk and Binge Drinking P30D	1.66***	5.64***	12.57***
N	1,402	1,353	1,412
Nagelkreke R Square	0.084***	0.165***	0.302***
<b>Arab Girls</b>			
Grade	0.83***	0.79***	0.74***
Weekly Smoking	3.87***	17.44***	15.99***
Daily Smoking	3.74***	5.61***	30.47***
Been Drunk At Least Once	2.05	2.88*	40.97***
Binge Drinking P30D	1.98	5.04***	27.18***
Been Drunk and Binge Drinking P30D	2.51***	19.59***	29.30***
N	1,543	1,535	1,559
Nagelkreke R Square	0.077***	0.236***	0.510***

\*\*\* P&lt;0.005; \*\* P&lt;0.01; \* P&lt;0.05

Table 5. *Accumulative Logistic Regression Models Predicting Youth Violence with Number of Risk Behaviors: HBSC-Israel 1998, Grades 6<sup>th</sup> - 10<sup>th</sup>*

	Bullied Someone Else 3+	Injured During Fight	Carried Weapon P30D
Male	3.14***	3.57***	5.00***
Grade	0.83***	0.78***	0.87***
Ethnicity (1 Jewish 2 Arab)	1.85***	5.55***	2.57***
One Risk Behavior	2.10***	3.06***	4.32***
Two Risk Behaviors	4.55***	6.78***	12.18***
N	8,001	7,909	7,974
Nagelkreke R Square	0.151***	0.260***	0.295***
<i>10<sup>th</sup> grade only</i>			
Male	3.24***	5.94***	6.19***
Ethnicity (1 Jewish 2 Arab)	1.84***	7.52***	2.27***
One Risk Behavior	1.83***	3.41***	2.82***
Two Risk Behaviors	3.63***	7.79***	6.66***
Three Risk Behaviors	4.32***	9.22***	14.23***
N	1,352	1,331	1,350
Nagelkreke R Square	0.143***	0.297***	0.299***

\*\*\* P<0.005; \*\* P<0.01; \* P<0.05

injury during a fight and weapon carrying than Arab boys (o.r. 5.04 > o.r. 3.37 and o.r. 27.18 > o.r. 12.57, respectively). In addition, Arab boys who binge drink were more likely to carry weapons (o.r. 12.57) than are Jewish boys (o.r. 5.12). For children who had been drunk and had engaged in binge drinking, Jewish girls were more at risk than Jewish boys on all three measures of violence, while Arab boys were markedly more at risk for weapon carrying than Jewish boys (o.r. 12.57 as compared to o.r. 5.13, respectively). Arab girls were more at risk than Arab boys on all three measures of violence, particularly injury during a fight and weapon carrying). However, Jewish girls who had been drunk and binge drank were more likely to participate in bullying than Arab girls (o.r. 3.46 as compared to

o.r. 2.51, respectively).

Finally, we examined accumulative models predicting youth violence, in which we counted the number of risks behaviors in which one was involved, rather than examining the type of these behaviors. As depicted in Table 5, on all three measures of violence, the risk increased with the number of risk behaviors. In the total sample, involvement in any risk behavior (either smoking or drinking) increased the risk for violent behavior in two or more (bullying: o.r. 2.10; injured during a fight: o.r. 3.06; and weapon carrying: o.r. 4.32). Odd ratios immensely increased with the increase in the number of risk behaviors. Same pattern was found with the tenth grade students. Children who were involved in a growing number of risk behaviors were far more likely to be involved in violent

behaviors, with odd ratios that reached up to 14.23 with respect to weapon carrying.

## DISCUSSION

The existing literature regarding youth violence suggests that this behavior is normally part of a cluster of behaviors rather than a singular episode in life (4,6), and therefore should be treated as any other risk behavior. Previous studies also suggest that boys are at a higher risk for violent behavior than girls (1,7,20), and that involvement in other risk behaviors (such as drinking and smoking) increases the likelihood of involvement in violence for both boys and girls (19). This study focuses on the co-morbidity of substance use and youth violence among boys and girls both in the Jewish and Arab sectors in Israel.

In accordance with previous research, the current study confirmed that participation in various types of risk behavior increased the likelihood of involvement in violent behavior. On the whole, as the severity of examined risk behaviors increased (e.g., been drunk at least once to binge drinking to been drunk and binge drinking), so did the likelihood of engagement in violent behavior. This finding lends evidence to Jessor & Jessor's (6) problem behavior theory as well as to Harel, Kanny and Rahav's (22) conception of a cumulative pattern of involvement in risk behavior. Indeed, the current study found cumulative substance use (as risk behaviors increasing in number and in severity) highly correlated with increasing involvement in various types of violence.

As in previous research, the current study also found boys to be more involved in risk and violent behaviors than girls. However, unlike previous studies, controlling for gender reveals that girls engaging in risk behavior may even be at greater risk for various types of violent behavior than boys. That is, substance-using girls are more at risk for violent

behavior in comparison with substance-using boys. As such, the current findings indicated that engagement in risk behavior was a greater predictor of involvement in youth violence for girls than for boys.

Controlling for both gender and ethnicity reveals that Non-Jewish girls engaging in risk behaviors were more likely to be involved in youth violence, as compared to Jewish girls, Jewish boys and Arab boys. These findings were most poignant with respect to the injury during a fight and weapon carrying measures, as girls tended not to bully others. However, it should be noted that the relatively small sample size may somewhat distort this picture, as approximately only seven percent of the sampled sixth to tenth grade pupils engaged in risk behaviors.

The generally higher odds ratio scores of girls as opposed to boys and of Arabs as opposed to Jews may have cultural or normative explanations. As girls are socialized to take fewer risks than boys, any atypical or "risky" behavior would be socially unacceptable. Thus participation in one (such as being drunk) might facilitate participation in another (weapon carrying); as such pupils are already on the fringes of society. This may be the case particularly with Arab girls who are the product of a comparatively more traditional and less tolerant society, as evidenced by their high odds ratio scores, particularly with respect to weapon carrying.

In past studies, the focus was mainly on boys, who are generally more involved in risk behaviors than girls, while girls' involvement in violent behavior remains understudied. Therefore, findings regarding the increased risk for violent behavior among girls who consume licit and illicit substances are important and unique.

Previous studies in the field of risk behaviors and violence had often emphasized gender differences in the tendency to these behaviors, claiming that boys are far

more involved in risk behaviors than are girls. Hence, more emphasis was given to intervention strategies in boys. Our findings do suggest that boys are, indeed, more involved in both substance use and violent behavior; however, this is not to say that girls are free from these behaviors. Our findings suggest that despite the small percentages of girls who are involved in substance use, these girls are at extremely high likelihood for involvement in violent behavior. In fact, the risk for violence for girls who drink, smoke and take drugs is far higher than the risk for boys. We think that these findings should raise awareness among policy makers toward this small group of young girls, who may well be at the fringe of their society, at risk for violent behavior and in need of help.

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#### REFERENCES

1. Lowery R, Sleet D, Duncan C, Powell K, Kolbe L. Adolescent at risk for violence. *Edu Psychol Review* 1995; 7(1):7-39.
2. Dahlberg LL. Youth violence in the United States. Major trends, risk factors and prevention approaches. *Am J Preventive Med* 1998;14(4): 259-72.
3. Stanton B, Baldwin RM, Rachuba L. A quarter century of violence in the United States. An epidemiologic assessment. *Psychiatr Clin North America* 1997;20(2):269-82.
4. Orpinas PK, Basen-Enquist K, Grunbaum JA, Parcel GS. The comorbidity of violence-related behaviors with health-risk behaviors in a population of high school students. *J Adolesc Health* 1995;16:216-55.
5. Ellickson P, Saner H, McGuigan KA. Profiles of violent youth: substance use and other concurrent problems. *Am J Public Health* 1997; 87(6):985-91.
6. Jessor R, Jessor S. Problem behavior and psychosocial development: A longitudinal study of youth. New York: Academic Press, 1997.
7. Saner H, Ellickson P. Concurrent risk factors for adolescent violence. *J Adolesc Health* 1996;19: 94-103.
8. Baker DP, O'Neal B, Ginsburg MJ. The injury fact book. New York: Oxford University Press, 1992
9. Kingery PM, Pruitt BE, Hurley RS. Violence and illegal drug use among adolescents: Evidence from the U.S. National Adolescent Student Health Survey. *Int J Addict* 1992;27:1445-64.
10. Johnston LD, O'Mally PM, Bachman JG. Drugs and American high school students, 1975-1983. Washington: National Institute on Drug Abuse. U.S. Department of Health and Human Services, 1984.
11. Newcomb M, Bentler P. Consequences of adolescent drug use: Impact on the lives of young adults. Newbury Park: Sage, 1988.
12. Garrison CZ, McKeown RE, Valois RF et al. Aggression, substance use, and suicidal behaviors in high school students. *Am J Public Health* 1993; 83(2):179-184.
13. Fergusson DM, Lynskey MT, Horwood LJ. Alcohol misuse and juvenile offending in adolescence. *Addiction* 1996;91:483-94.
14. Shepherd J. Violent crime: the role of alcohol and new approaches to prevention of injury. *Alcohol Alcohol* 1994;29:5-10.
15. Osgood DW, Johnston LD, O'Mally PM, Bachman JC. The generality of deviance in late adolescence and early adulthood. *Am Sociol Rev* 1988; 53:81-93.

16. Brain PF. Alcohol and aggression. London: Croom Helm, 1986.
17. Murdoch D, Pihl RO, Ross D. Alcohol and crimes of violence: Present issues. *Int J Addictions* 1990;25:1065-81.
18. Dukram CP, Byrd RS, Auinger P, Weitzman M. Illicit substance use, gender, and the risk of violent behavior. *Arch Pediatr Adolesc Med* 1996;150(8):797-801.
19. DuRant RH, Kahn J, Beckford PH, Woods ER (1997). The association of weapon carrying and fighting on school property and other risk and problem behaviors among high school students. *Arch Pediatr Adolesc Med* 1997;151(4):360-6.
20. Valois RF, McKeown RE, Garrison C, Vincent M. Correlation of aggressive and violent behaviors among public high school adolescents. *J Adolesc Health* 1995;16:26-34.
21. Kandel D. Stages in adolescent involvement in drug use. *Science* 1975;190:912-4.
22. Harel Y, Kanny D, Rahav G. Youth in Israel, Jerusalem: Joint-Brookdale Institution, 1997. [Hebrew]
23. World Health Organization (WHO), Regional Office for Europe. Health behavior in school-aged children – A WHO cross-national survey (HBCS): Research Protocol for the 1997-98 Study. Edinburgh: University of Edinburgh, 1998.

## BITS 'N PIECES

### Hospital attendance patterns in long term survivors of cancer

*Aims:* To identify attendance patterns in a childhood cancer long term follow up clinic, in order to inform decision making strategies for efficient, cost effective local and national surveillance of survivors. *Methods:* Cross-sectional review of 385 individuals >5 years from completion of cancer therapy in childhood or adolescence, attending a regional paediatric oncology and haematology centre. *Results:* Attenders were younger than non-attenders in the <18 age group; no differences were found for 18 year age group. Those attending clinic were more recently off treatment; no significant difference existed for those <7 years from completion of therapy. A greater proportion of attenders were in the most affluent socioeconomic groups with a greater proportion of non-attenders in the lower groups. Those in full time education or training were more likely to attend and those unemployed were less likely. Multiple regression analysis confirmed a significant trend in reduction in attendance with increasing social deprivation, and that attenders were more than twice as likely to be in full time education or training. *Conclusions:* Following cancer treatment in childhood and adolescence, attendance at long term follow up programmes is determined by social factors including education, employment, and deprivation.

Johnson R, Horne B, Feltbower RG, Butler GE, Glaser AW. *Arch Dis Child* 2004;89:374-7.