

# Excessive alcohol use and its association with risky sexual behaviour: a cross-sectional analysis of data from Victorian secondary school students

## Abstract

**Objective:** Estimate the prevalence of sexual behaviour and alcohol use and examine the association between excessive alcohol use and risky sexual behaviour in late secondary students in Victoria, Australia.

**Method:** The sample of Year 11 students from government and independent schools participating in the 2008 International Youth Development Study (n=450) was representative of the Victorian school population. Logistic regression analyses examined the associations between sexual behaviour, binge and compulsive drinking, adjusting for socio-demographic, school and family factors.

**Results:** Under half (44%) the students had experienced sex in the past year, half (50%) had engaged in binge drinking in the past two weeks and 26% reported compulsive drinking in the past year. Of those who reported sex in the past year (n=197), 34% had sex without a condom at the last sexual encounter and 28% later regretted sex due to alcohol. The likelihood of experiencing sex was increased by binge (OR=2.44, 95%CI 1.44-4.12) and compulsive drinking (OR=2.15, 95%CI 1.29-3.60). For those sexually active, binge drinking increased the risk of having three or more sexual partners (OR=3.37, 95%CI 1.11-10.26) and compulsive drinking increased the likelihood of regretted sex due to alcohol (OR=4.43, 95%CI 2.10-9.31). Excessive drinking was not associated with condom non-use.

**Conclusion and implications:** Risky sex – multiple sexual partners and regretted sex due to alcohol – and excessive drinking are highly prevalent and co-associated among Victorian late secondary students.

**Key words:** adolescent, sexual behaviour, drinking, alcohol, risky sex

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Unsafe sex refers to behaviours that increase the risk of sexually transmitted infections (STIs) and unwanted pregnancy. Unsafe sex and the adverse health outcomes that can result are important areas of public health research. The prevalence of unsafe sex is particularly concerning among adolescent and young adult populations given that they typically demonstrate low levels of sexual health knowledge and high rates of short-term or casual sexual partnerships.<sup>1</sup> Excessive alcohol use has been positively associated with being sexually active and with risky sexual practice.<sup>2-7</sup> Given the increases in prevalence of these behaviours in Australia over the past decade,<sup>8-10</sup> this association offers an important focus for empirical research.

In Australia, the Secondary Students and Sexual Health (SSASH) study reports nationally representative data on the sexual behaviour of young people aged 15 and 17 years over time, using a repeated cross-sectional methodology. In 1997, 34% of

students reported experiencing sex in their lifetime and this figure had increased to 40% in the 2008 study.<sup>8</sup> Similarly, the rate of young people having sex with multiple partners had increased significantly in Australia, with the proportion of those reporting sex with three or more people in the previous year rising from 16% in 1997 to 30% in 2008. The study also found that although the majority of students (64%) reported using a condom when they had sex the last time, this rate had not increased since 1997.

Rates of harmful alcohol use by young people have also increased in Australia. A nationally representative study of secondary students in Australia found that between 1999 and 2008 the proportion of young people aged 12 to 17 years drinking harmful levels of alcohol increased from 26% to 29%.<sup>10</sup> In a cross-national study of young people's (Grades 5, 7 & 9) alcohol use and related harms conducted in Victoria, Australia, and Washington State, United States (US), Toumbourou et al. found the rates of alcohol

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use and related harms for the Victorian sample of the study were noticeably higher than those for young people in Washington State.<sup>11</sup>

Although situational factors such as excessive drinking are clearly important in terms of understanding adolescent sexual practice, other factors, such as the formation of normative behaviour through socialisation, may also play a role. Family and school are important socialisation sites. Family factors have been shown to influence a range of adolescent behaviour including risky sexual practices, with cohesive and supportive family environments found to be protective.<sup>12-18</sup> Risky adolescent sexual practice is also associated with experiences in school and education with studies demonstrating that educational attainment<sup>18-20</sup> and connectedness to school<sup>18,21,22</sup> are protective.

This paper responds to the need for current Australian information by analysing data relating to young people's sexual behaviour and its association with alcohol – specifically binge (five or more drinks) and compulsive drinking (unable to stop). In this paper we define risky sex as sex with multiple partners in the past year, sex without using a condom at the most recent sexual encounter and sex in the past year that the young person later regretted due to alcohol use. We also examine the association between drinking behaviour and young people's exposure to sexual intercourse in the past year. Given the high prevalence of alcohol use demonstrated among Australian youth, we chose to model two measures of excessive episodic drinking to test the comparative effects these different drinking behaviours may have on sexual risk taking. Moreover, we seek to explore the relationship between young people's sexual behaviour and drinking, taking into account possible confounders such as school and family factors. More specifically, we hypothesise that young people who engage in excessive drinking (binge or compulsive drinking) will be at greater risk of engaging in risky sex, independent of their level of connectedness to and performance at school, and the quality of their family environment.

## Methods and data

### Data

The data for this paper are taken from the International Youth Development Study (IYDS). The IYDS is a school-based longitudinal study of young people conducted in two states – Victoria, Australia, and Washington State, US. The study collects a wide range of data about young people's behaviour and social development in domains such as the community, family, school, peer group and in individual attitudes. Initial recruitment of students in Grade 5, and Years 7 and 9, using a two-stage cluster sampling design, was undertaken in 2002. At the first stage, stratified by school sector (Government, Catholic and Independent), schools were randomly selected proportional to size and a single complete class at the specified Year level selected randomly at the second stage. Students in the target classrooms were required to provide signed parental consent and 74% participated. Participating students were followed longitudinally over time. In this paper, data from the Year 11 follow-up survey in 2008 of the Grade 5 cohort from the state and independent school sectors of Victoria are analysed. The 2008

survey included an extended range of questions on sexual behaviour. Students attending Catholic schools did not complete this section of the survey. The Victorian arm of the study and this specific research has been approved by the Human Research Ethics Committee at The University of Melbourne and La Trobe University's Human Ethics Committee (FHEC10/235). The research was also approved by the Department of Education and Training and school principals at participating schools.

### Measures

*Sexual behaviour.* Experience of sex, number of sexual partners and experience of regretted sex due to alcohol consumption in the past year were used to measure sexual behaviour.

For sexual experience, students were asked to respond yes or no to the question "In the past year, have you had sex?". To determine their number of recent sexual partners, sexually active students were asked "In the past year, how many males and/or females have you had sex with?" Students' responses to this question were re-coded into 'less than three' or 'three or more sexual partners' for analyses, enabling us to compare our results with prevalence estimates from the SSASH study.<sup>8</sup> To determine whether students had experienced sex that was adversely influenced by alcohol consumption, students were asked "Over the last year, how often has your use of alcohol caused you to have sex with someone which you later regretted?" Students responded using an 8-point scale ranging from 'never' to '40+ times', with answers to this question re-coded into a binary measure classifying students as either having regretted sex in the past year or not.

*Pregnancy.* Both male and female students were asked about pregnancy. Young men were asked "In the past year, how many times have you gotten someone pregnant?" and young women, "In the past year, how many times have you been pregnant?" Students could respond 'never', 'one time', 'two or more times' or 'not sure'. Students were re-classified as either experiencing at least one pregnancy or not in the past year with students reporting uncertainty around pregnancy (n=2) excluded from analyses.

*Condom use.* Student condom use at the last sexual encounter was measured dichotomously. Students were asked, "The last time you had sex, did you or your partner use a condom or another latex barrier?" This variable was re-coded so that the outcome was condom non-use.

*Excessive alcohol use.* Students' excessive alcohol consumption was measured by two questions; the first asked about *binge drinking* in the past two weeks and the second asked about *compulsive drinking* over the past year. The binge drinking question asked students, "Think back over the last 2 weeks, how many times have you had five or more drinks in a row?", rated on a 6-point scale from none to 10 or more times. For analysis, students were re-classified into those who drank five or more drinks in a row in the past two weeks on at least one occasion and those who did not. For compulsive drinking, students were asked, "When drinking alcohol over the past year have you ever found that you were not able to stop drinking once you had started?" Students responded using an 8-point scale ranging from 'never' to '40+ times', with those

reporting one or more episodes of compulsive drinking compared to those reporting never. Both measures of excessive alcohol use included those who reported not drinking alcohol in the past year.

**School and family factors.** Students' level of bonding with school and family environments were measured by a series of uni-dimensional scales. For school bonding, students' self-rated *school commitment* (9 items, e.g. 'How interesting are most of your school subjects to you?' and 'How important do you think the things you are learning in school are going to be for your later in life') and *academic performance* (2 items, 'Putting them all together, what were your grades/marks like last year?' and 'Are your school grades better than the grades/marks of most students in your class?') were measured. The level of attachment to and quality of a student's family life was assessed across four areas: *family management* (9 items, e.g. 'My parents want me to call if I am going to be late getting home' and 'My parents ask if I've gotten my homework done'), *family conflict* (3 items, e.g. 'We all argue about the same things in my family over and over' and 'People in my family have serious arguments'), *parental attitude towards their children's drug and alcohol use* (4 items, e.g. 'How wrong do your parents feel it would be for you to drink beer or wine regularly?' and 'How wrong do your parents feel it would be for you to use marijuana (pot, weed, grass?) and *family attachment* (4 items, e.g. 'Do you share your thoughts and feelings with your mother?' and 'Do you feel very close to your father?'). Each scale showed acceptable internal consistency (see Table 3 footnote). For each of these measures, student responses to questions were averaged. To provide more meaningful measures in analyses, scale variables were trichotomised with the distribution of student scores on these measures used to classify respondents as having either low, medium or high scores on each of the factors. The decision to adopt a multidimensional approach in modelling school and family bonding factors was undertaken in order to strengthen the content validity of our measurement of these factors.

### Socio-demographic factors

**Family socioeconomic status.** Students' family socioeconomic (FSES) status consisted of a composite metric measure comprising parental education and parental income, collected as part of a separate parent survey.<sup>23</sup> Parental education was scored: 1 'less than secondary', 2 'completed secondary' and 3 'completed post-secondary education'. Parental income was reported as the combined household income of all household participants.

**Geographic area/urbanicity.** Students' geographical area was measured using the location of their enrolled school. Students were classified as attending schools in urban, regional or rural settings with the classifications of schools based on both the population size and density of surrounding areas.<sup>24</sup>

### Analysis

Correlations between drinking, school and family factors were examined to check the likelihood of modelling being affected by multi-collinearity. Correlations ranged from low to moderate, and were well below the often recommended cut-off of 0.70<sup>25</sup> for identifying associated factors that may manifest as collinear in

regression modelling. Contingency table analyses were undertaken for bivariate analyses, with each of the sexual behaviour and alcohol outcomes cross-tabulated by each independent factor. Binary logistic regression models were developed in exploring the multivariate relationship between alcohol consumption and each sexual behaviour outcome, with the exception of unintended pregnancy where insufficient cases precluded multivariate modelling. Student age, family socioeconomic status and students' school geographic area and each of the school and family factors were treated as covariates and multivariate models adjusted for these covariates.

Analyses were originally stratified by gender given the variation in sexual behaviour for young men and women. However, as there were no statistically significant gender differences found in the associations between alcohol use and sexual behaviour, non-stratified analyses are presented with gender introduced as a covariate. To adjust variance estimates in analyses for the two-stage cluster design of the study, the primary sample unit (PSU) of analysis was set to the school in all analyses. Stata version 10 was used in all statistical analyses.<sup>26</sup>

## Results

Overall, 790 students were surveyed in wave 6 of the IYDS study – 85% of the original 927 students participating in 2002. Of these students, 508 government and independent school students answered the question regarding sexual experience in the past year with 58 cases (11%) excluded from analyses due to listwise missing data across measures. Analysis of these cases showed no differences between excluded cases and those providing complete data on the sexual behaviour outcomes. The demographic profile of the final sample included in the analyses (n=450) is shown in Table 1.

Table 2 shows prevalence estimates for sexual behaviour outcomes and drinking behaviour. Under half the sample (44%, n=197) reported that they had experienced sex in the year prior to being surveyed and although young women reported higher rates of sex in the sample than young men, this difference was not statistically significant ( $F(1,150)=3.56, p=0.06$ ). Although most sexually active students (58%) had sex with only one person in the year prior to being surveyed, considerable proportions reported either two (23%) or three or more (19%) sexual partners. At their last sexual encounter, one-third reported not using a condom, with young women more likely than young men to report not using a condom the last time they had sex ( $F(1,96)=5.86, p=0.02$ ). Under one-third of sexually active students reported having sex that they later regretted due to alcohol in the past year. Although male students reported regretted sex due to alcohol more commonly than young women, this difference was not statistically significant ( $F(1,93)=0.87, p=0.35$ ). Finally, approximately 5% (n=10) of sexually active students in the study sample reported having sex that resulted in a pregnancy.

Approximately half the students reported drinking five or more alcoholic drinks in a row in the two weeks prior to being surveyed and just over a quarter said they had experienced an episode of

compulsive drinking in the past year. Young men showed higher rates of binge drinking than young women ( $F(1,150)=2.8, p=0.10$ ) but compulsive drinking was more prevalent among young women ( $F(1,150)=2.9, p=0.09$ ). These differences were not statistically significant.

Students' use of alcohol was associated with higher rates of sexual behaviour. For the bivariate associations, students who reported binge drinking in the past two weeks and compulsive drinking in the past year were more likely to have, in the past year, experienced sex (binge drinking: 59% vs. 29%,  $F(1,150)=29.4, p<0.001$ ; compulsive drinking: 65% vs. 37%,  $F(1,150)=24.4, p<0.001$ ), had three or more sexual partners (binge drinking: 24% vs. 9%,  $F(1,94)=4.1, p=0.05$ ; compulsive drinking: 27% vs. 14%,  $F(1,94)=6.4, p=0.02$ ) and experienced an episode of sex they later regretted due to alcohol (binge drinking: 33% vs. 18%,  $F(1,93)=3.18, p=0.08$ ; compulsive drinking: 47% vs. 17%,  $F(1,93)=20.9, p<0.001$ ). There were no statistically significant associations between alcohol consumption and condom non-use at the last sexual encounter (binge drinking: 32% vs. 37%,  $F(1,96)=0.56, p=0.45$ ; compulsive drinking 34% vs. 33%,  $F(1,96)=0.03, p=0.87$ ) and unintended pregnancy (binge drinking: 6% vs. 3%,  $F(1,95)=0.79, p=0.38$ ; compulsive drinking 8% vs. 3%,  $F(1,95)=1.7, p=0.19$ ).

When models were adjusted for sociodemographic, school and family bonding factors, we found that the associations between excessive alcohol consumption and experience of sex and – for those who were sexually active – three or more sexual partners in the past year and regretted sex due to alcohol consumption were maintained (Table 3).

Compared to students who had not drunk excessive amounts of alcohol in the past year, those who engaged in a binge drinking episode ( $OR = 2.44, p<0.01$ ) or reported an episode of compulsive

**Table 1: Sample demographic characteristics n (%).<sup>a</sup>**

Variable	Total (n=450)
Gender	
Male	198 (44)
Female	252 (56)
Age, mean (95%CI)	17.0 (16.9,17.0)
<b>Family SES factors</b>	
Mothers education <sup>b</sup>	
Below secondary	164 (37.1)
Completed secondary	146 (33.0)
Post secondary	132 (29.9)
Fathers education <sup>b</sup>	
Below secondary	107 (29.0)
Completed secondary	160 (43.5)
Post secondary	101 (27.5)
Family income <sup>b</sup>	
< \$50,000	164 (45.3)
\$50,000 – \$100,000	149 (41.2)
> \$100,000	49 (13.5)
School area	
Urban	233 (51.8)
Regional	56 (12.4)
Rural	161 (35.8)
School sector	
Government	339 (75.3)
Independent	111 (24.7)

Notes:

*a Unless otherwise indicated, data are reported as counts and (percent)*

*b family SES variables – category n's for these factors do not sum to the total sample n as they are shown before missing data imputation and aggregation.*

**Table 2: Student sexual and drinking behaviour by gender: rates (%) and 95% confidence intervals (95%CI).**

Variable	Males % (95%CI)	Females % (95%CI)	Total % (95%CI)
<b>Sexual behaviour</b>			
Sex in the past 12 months (n=450)	38.4 (31.8-45.4)	48.0 (40.4-55.7)	43.8 (38.5-49.2)
Three or more sexual partners in the past 12 months (n=195)	18.9 (11.4-29.8)	19.0 (12.6-27.6)	19.0 (13.7-25.6)
Had sex they later regretted due to alcohol in the past 12 months (n=194)	32.0 (23.2-42.3)	26.1 (19.3-34.2)	28.4 (23.1-34.2)
Did not use a condom at the last sexual encounter (n=197)	23.4 (15.0-34.6)	40.0 (31.6-49.0)	33.5* (27.0-40.7)
Sex that resulted in a pregnancy in the past 12 months (n=196)	5.3 (2.0-13.5)	5.0 (2.2-10.7)	5.1 (2.6-9.7)
<b>Drinking</b>			
Binge drinking in past 2 weeks (5 or more drinks)	54.5 (45.9-62.9)	46.0 (38.7-53.5)	49.7 (43.5-56.0)
Compulsive drinking in past year	21.7 (16.4-28.2)	29.0 (23.5-35.2)	25.8 (21.9-30.1)

Notes:

\*  $p<0.05$

drinking (OR=2.15,  $p < .01$ ) were more likely to have experienced sex in the previous 12 months. Students who considered their parents to espouse either moderate (OR=1.86,  $p=0.03$ ) or favourable (OR=2.38,  $p=0.01$ ) attitudes towards their children's drug and alcohol use were more likely to have experienced sex in the past year compared to those who thought their parents held unfavourable attitudes to their drug and alcohol use.

Sexually active students who reported at least one binge drinking episode in the previous two weeks were more than three times more likely to have had three or more sexual partners in the past 12 months (OR=3.37,  $p=0.03$ ). Furthermore, compared to students with high self-rated academic performance, those with medium self-rated academic performance levels were more likely to report three or more sexual partners in the past year (OR=3.22,  $p=0.02$ ).

Unsurprisingly, students who drank large amounts of alcohol were more likely to report having sex that they later regretted due to alcohol. Those who reported at least one episode of compulsive drinking in the past year were more than four times as likely to have sex they later regretted due to alcohol, than students who had not drunk compulsively (OR=4.43,  $p < 0.01$ ). Students who reported a binge drinking episode in the past two weeks also reported higher rates of regretted sex due to alcohol than those who did not binge drink, however the differences here were not statistically significant (OR=2.23,  $p=0.10$ ). Students who reported low family attachment were less likely than students with high levels of attachment to have sex they regretted due to alcohol (OR=0.35,  $p=0.04$ ).

Despite the positive association between excessive drinking and risky sexual behaviour, condom use remained relatively stable across heavy and non-heavy drinking student populations. As Table 3 shows, on both binge drinking and compulsive drinking measures, students who drank excessively had comparable rates of condom non-use at the last sexual encounter to those who did not drink to excess (binge drinking, OR=0.99,  $p=0.99$ ; compulsive drinking: OR=0.80,  $p=0.56$ ). Students whose parents held favourable attitudes towards their children's drug and alcohol use were less likely to report not using a condom at the last sexual encounter compared to those with parents who held unfavourable attitudes (OR=0.29,  $p=0.04$ ). Compared to students with high levels of family attachment, students with only moderate attachment were more likely not to use a condom when they last had sex (OR=3.17,  $p=0.03$ ).

## Discussion

In line with the hypotheses, the study found excessive alcohol use continued to show statistically significant associations with sexual behaviour and indicators of risky sex, after controlling for demographic, school and family factors. The results reveal that of Victorian Year 11 students, under half had experienced sex in the past year. The study also showed that in Victoria, significant numbers of students consumed excessive amounts of alcohol and at times lost control of the ability to stop drinking.

Significant minorities of sexually active young people engaged in risky sexual behaviour. Of those who were sexually active, approximately one in five students reported sex with three or more

people in the past 12 months and one-third did not use a condom when they last had sex. One in 20 students reported sex that resulted in pregnancy, although as both young men and young women were asked about pregnancy this figure may overestimate pregnancy rates. Not surprisingly, given the rates of sexual behaviour and excessive drinking, over one-third of students had engaged in sex which they later regretted because of alcohol use. This finding is concerning as a regretted sexual encounter may indicate circumstances where the level of perceived control of the sexual experience may have been compromised or diminished. For example, regretted sex may indicate a sexual encounter contextualised by sexual coercion, poor communication about expectations of the encounter or sexual inexperience and unpreparedness for sex. These are not only poor outcomes intrinsically (from mental and, potentially, physical health perspectives), but may also have longer term sexual health implications for the young person as they form subsequent sexual partnerships.

The high rates of risky sexual behaviour and excessive drinking of young Australians reported in this research are comparable to those reported by other studies collecting similar data. This increases confidence in the methodological robustness of the present study by establishing the validity of estimates from this analysis across different studies from similar populations. The rate of sexual experience reported by students in this study (44%) is lower than the 56% (This figure is for Year 12 students but with a similar mean age to that of the sample used in this analysis) reported by Smith et al.<sup>9</sup> but the difference might be partially explained by the SSASH study asking students about *lifetime* sexual experience rather than the past year only. The rates of condom use at the last sexual encounter were similar across the two studies (66% vs. 61%), however, the estimate of the rate of multiple sex partners over a year (using three or more sexual partners as a comparison) was lower in the current study (19%) than the 30% reported in the SSASH study. In terms of student binge drinking, the rate reported in our research (50%) was slightly higher than the figure reported in the Australian Secondary Students Alcohol and Drug (ASSAD) survey (45%), although the higher number of alcoholic drinks used to define a binge drinking episode in the ASSAD study (7+ drinks for young men, 5+ drinks for young women) will likely account for this lower estimate.

We found that excessive alcohol use was associated with a range of risky sexual behaviours, independent of school and family bonding factors. This finding is important as it suggests that the adverse effects of excessive alcohol consumption on youth sexual health behaviour are not explained by confounding due to common factors relating to school and family environments.

Although binge drinking and compulsive drinking increased the likelihood that students would be sexually active, these drinking behaviours were not associated with condom use at the last sexual encounter for sexually active young people. In some respects, this is an encouraging finding as it suggests that condom use behaviour of sexually active adolescents is to some degree impervious to excessive alcohol use. This may be because using a condom during sex has been reinforced in targeted public health campaigns to the extent that it has become accepted practice, even among adolescents

**Table 3: Student sexual behaviour outcomes by alcohol use, adjusted for school and family factors<sup>a</sup>: rates (%)<sup>b</sup>, adjusted odds ratios (OR) and 95% confidence intervals (95%CI).**

Factor	Sexual experience in past year (n=450)			Three or more sexual partners in past year (n=195) <sup>c</sup>			Regretted sex due to alcohol in past year (n=194) <sup>d</sup>			Condom non-use at last sexual encounter (n=197) <sup>e</sup>		
	%	OR	95%CI	%	OR	95%CI	%	OR	95%CI	%	OR	95%CI
<b>Drinking</b>												
Binge drinking												
No (ref.)	28.8	-	-	9.2	-	-	17.7	-	-	37.3	-	-
Yes	58.9	2.44**	1.44-4.12	23.9	3.37*	1.11-10.26	33.3	2.23	0.85-5.88	31.5	0.99	0.43-1.93
Compulsive drinking												
No (ref.)	36.5	-	-	14.2	-	-	16.8	-	-	33.1	-	-
Yes	64.7	2.15**	1.29-3.60	26.7	1.95	0.91-4.17	46.7	4.43***	2.10-9.31	34.2	0.80	0.38-1.69
<b>School context</b>												
Self-rated school commitment												
High (ref.)	41.0	-	-	17.7	-	-	18.0	-	-	27.8	-	-
Medium	45.7	0.84	0.55-1.28	20.0	1.18	0.45-3.12	34.7	2.22	0.91-5.44	36.3	1.39	0.68-2.86
Low	46.9	0.64	0.32-1.28	20.0	0.97	0.20-4.71	40.0	2.25	0.49-10.27	43.8	1.73	0.41-7.42
Self-rated academic performance												
High (ref.)	40.1	-	-	12.1	-	-	23.3	-	-	29.0	-	-
Medium	48.4	1.27	0.83-1.92	25.8	3.22*	1.18-8.82	33.7	1.14	0.46-2.85	34.4	1.14	0.52-2.53
Low	44.1	1.13	0.55-2.33	20.0	2.59	0.57-12.04	26.7	0.96	0.21-4.44	57.1	3.45	0.77-15.53
<b>Family context</b>												
Family management <sup>e</sup>												
Good (ref.)	39.0	-	-	19.3	-	-	17.9	-	-	31.6	-	-
Moderate	36.3	0.69	0.39-1.22	18.0	0.92	0.35-2.37	22.6	1.33	0.43-4.18	36.5	1.28	0.50-3.25
Poor	58.7	1.52	0.84-2.78	19.5	0.82	0.27-2.50	40.8	3.16	0.97-10.28	32.5	1.33	0.47-3.77
Family conflict <sup>f</sup>												
Low (ref.)	39.0	-	-	20.0	-	-	24.1	-	-	30.0	-	-
Moderate	39.3	0.79	0.42-1.49	17.3	0.55	0.17-1.80	22.2	0.82	0.24-2.86	30.5	1.08	0.39-3.00
High	51.8	1.23	0.65-2.34	20.2	0.64	0.18-2.26	35.7	1.38	0.42-4.49	37.7	1.05	0.32-3.51
Parental attitudes towards child's drug/alcohol use <sup>g</sup>												
Not favourable (ref.)	26.9	-	-	17.2	-	-	32.1	-	-	45.2	-	-
Moderate	44.0	1.86*	1.06-3.25	21.7	1.35	0.39-4.66	23.5	0.66	0.18-2.38	35.7	0.68	0.25-1.87
Favourable	59.0	2.38*	1.21-4.69	15.9	0.60	0.15-2.46	33.8	0.60	0.15-2.39	25.0	0.29*	0.09-0.91
Family attachment <sup>h</sup>												
High (ref.)	43.7	-	-	21.7	-	-	29.4	-	-	24.6	-	-
Moderate	38.9	0.72	0.41-1.28	14.3	0.59	0.19-1.89	26.0	0.37	0.13-1.00	48.0	3.16*	1.15-8.70
Low	47.8	1.06	0.62-1.80	19.5	0.84	0.30-2.31	29.0	0.35*	0.13-0.98	32.1	1.24	0.43-3.60

Notes:

\*  $p < 0.05$ ; \*\*  $p < 0.01$ ; \*\*\*  $p < 0.001$

<sup>a</sup> Models also adjusted for gender, family SES, age and school area; <sup>b</sup> Rates (%) are from bivariate analyses; <sup>c</sup> Sexually active students only; <sup>d</sup> Sexually active students and those who drank alcohol in the past year only;

<sup>e</sup>  $\alpha = 0.83$ ; <sup>f</sup>  $\alpha = 0.84$ ; <sup>g</sup>  $\alpha = 0.77$ ; <sup>h</sup>  $\alpha = 0.70$

drinking excessively. Nonetheless, as the present study and other research has found, a sizable proportion of young people do not use condoms consistently despite increases in rates of STIs over the past decade in Australia.

There are several limitations that may have affected the findings of this research. First, given the cross-sectional design of this study it is not possible to infer causal directions. The temporal nature of the association between excessive alcohol use and sexual behaviour is difficult to establish, although there is limited theoretical ground to argue that early sexual behaviour leads to excessive alcohol use and the current findings suggest the association is not explained by confounders. Second, the missing data from Catholic schools and the small numbers of cases included in some analyses, particularly those relating to the sexually active group of students, should be taken into consideration when interpreting the external validity of results from this study. Comparison with the included sample suggested relatively minor differences and the estimates of sexual behaviour and alcohol use were similar to other surveys.

In conclusion, the findings of this study suggest that for young people, drinking excessive amounts of alcohol increases the odds of engaging in sexual practices that may carry potential health risks for the individual. Encouragingly, among those who were sexually active, students' use of condoms to prevent both transmission of STIs and unplanned pregnancy did not appear adversely affected by excessive alcohol use. Nonetheless, given the increases in sexual behaviour and prevalence of STIs in Australia and the static rates of condom use in younger populations, the high numbers of young people who continue to engage in unprotected sex is concerning from a public health perspective. Given our findings we recommend that future research investigate the effect on youth sexual behaviour of interventions that reduce rates of binge or compulsive drinking.

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