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Research paper

Age at first use of alcohol predicts the risk of heavy alcohol use in early adulthood: A longitudinal study in the United States

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ABSTRACT

Background: Two ecological cross-sectional studies which relied on national survey data (U.S. and Australia) have shown that starting drinking at a younger age increases the frequency of heavy drinking in the general population, including those with good mental and physical health status. This study further investigates the hypothesis that age at first use of alcohol increases the risk of heavy alcohol use by applying data from a longitudinal study.

Method: This study used public-use data collected from Wave I, Wave III and Wave IV of the National Longitudinal Study of Adolescent Health in the United States. The association between age at first use of alcohol and heavy alcohol use (5+ drinks per occasion) was examined with two different multivariate analysis approaches with data from 2316 participants: ordered logistic regression models and Poisson regression models with longitudinal data settings. In addition, the newly developed proxy outcome approach was further used to estimate and adjust for unmeasured/unobserved confounding factors.

Results: Age at first use of alcohol before 18 years was associated significantly higher risk of heavy alcohol use at follow-up.

Conclusion: After adjusting for known and residual confounders, younger age at first use of alcohol was associated with significantly higher risk of heavy alcohol use, moreover, we posit that the association observed from this longitudinal study is probably causal. Abstinence from alcohol until the age of 18 years will likely reduce individual risk of alcohol-related problems in adulthood. In the longer term, delayed onset of exposure with widespread abstinence among this age group is also likely to reduce the overall prevalence of alcohol-related problems in the general population.

Introduction

The association between age at first use of alcohol and risk of alcohol use disorders has been investigated in a number of studies. Observational studies suggest that alcohol use at an early age may increase the risk of alcohol use disorders during adulthood (Agrawal et al., 2009; Bonomo, Bowes, Coffey, Carlin, & Patton, 2004; Dawson, Goldstein, Chou, Ruan, & Grant, 2008; DeWit, Adlaf, Offord, & Ogborne, 2000; Hingson, Heeren, & Winter, 2006; von Diemen, Bassani, Fuchs, Szobot, & Pechansky, 2008). While it has been hypothesised that onset of heavy alcohol use is the intermediate step involved in the association between age at first use of alcohol and risk of alcohol use disorder (Liang & Chikritzhs, 2012), heavy alcohol use is also the cause for most (if not all) alcohol caused diseases and many mental disorders. Thus, if age at first use of alcohol influences frequency of heavy alcohol use, beginning alcohol use at a young age is a shared risk factor for alcohol caused morbidity. Recent analysis of data from the Australian National Drug Strategy Household (NDSH) survey and the U.S. National Survey on Drug Use and Health (NSDUH) showed significant positive associations between age at first use of alcohol and frequency of heavy drinking which were not affected by level of psychological distress or health status (Liang & Chikritzhs, 2012, 2013a, 2013b). However, evidence from prospective studies is required to support these cross-sectional findings (McCambridge, McAlaney, & Rowe, 2011). This study aims to test the hypothesis that age at first use of alcohol increases the risk of heavy alcohol use (5+ drinks per occasion) in later life by applying data from a longitudinal study with a representative U.S. sample. In addition, a newly developed analytical approach (Liang & Chikritzhs, 2013a, 2013b; Liang, Zhao, & Lee, 2014; Tchetgen Tchetgen, 2014) was used to control for unmeasured confounding effects.

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Method

This study used data collected from the National Longitudinal Study of Adolescent Health (Add Health), which was conducted in the United States. Details of the Add Health study have been described in detail previously (Harris, 2011). Briefly, a representative sample of adolescents in between grade 7 (age 11/12) and grade 12 (age 17/18), mean age: 16, were initially recruited in 1994–1995 (Wave I), they were then followed up in 1996 (Wave II), in 2001–2002 (Wave III), and in 2007–2008 (Wave IV) (mean age, 29). A combination of self-administered questionnaires and interviews were employed to collect social, psychological and health information, including demographics, risk behaviours, health status and family composition. In addition, Wave I survey also included a face-to-face interview with one parent (preferably the mother) of each participant to provide further information including parental alcohol use. This study used public-use data collected from Wave I, Wave III and Wave IV of the Add Health study. In the Wave I survey, participants were asked whether they had consumed a drink of beer, wine, or liquor—not just a sip for more than 2 or 3 times in their life. If the answer was yes, participants were then asked about their age at the first time they had a drink in the absence of their parents (Harris & Udry, 2013). This information was used to define age at first use of alcohol. For participants who had never consumed alcohol in the absence of their parents at Wave I, the information on age at first use of alcohol collected at Wave IV was used. Information on heavy alcohol use during young adulthood was collected in survey Waves III and IV. In these two survey waves, participants were asked to recall how many days they drank five or more drinks in a row during the 12 months before the interview.

Data analysis

The aim of the analysis was to investigate the association between age at first use of alcohol and heavy alcohol use (5+ drinks per occasion) during early adulthood and consisted of two different multivariate analysis approaches: (a) Multivariate ordered logistic regression models predict frequency of heavy alcohol use in the past 12 months in Wave III and Wave IV separately using age at first use, while controlling for potential confounders including the age at baseline. This is because there is considerable physical and psychological development throughout the adolescent phrase (age 12–19) (Hales, Yudofsky, & Gabbard, 2010). In these models heavy alcohol use was treated as an ordered categorical outcome variable as follows: (1) none, (2) 1 or 2 days in past 12 months, (3) once per month, (4) 2–3 days per month, (5) 3–5 days per week (6) almost every day or every day. Information on a number of potential confounding factors was obtained from Waves I and III and controlled for in the analysis including: age at baseline (Wave I), gender, race, frequency of alcohol use of parents at baseline (frequency of the more frequently drinking parent was used) (Wave I), had ever smoked at baseline (Wave I), median income of residence location at baseline (Wave I), whether had an academic degree or diploma (Wave III), general health status at baseline (Wave I) as well as at follow-up (Waves

Table 1
The effect of age at first use of alcohol on the frequency of heavy alcohol use: estimates from multivariate ordered logistic regression models.

	Odds ratio	95% Confidence interval		Odds ratio	95% Confidence interval	
	Wave III			Wave IV		
Age first use of alcohol						
<15 years	1.65	1.28	2.11	1.77	1.38	2.29
15–17 years	1.66	1.32	2.10	1.38	1.09	1.75
18–20 years	1.00			1.00		
21 years or older	0.26	0.17	0.39	0.54	0.38	0.78
Age at Wave I						
1st strata (<14.25 years)	1.00			1.00		
2nd strata (14.25–15.49 years)	1.09	0.84	1.40	0.84	0.66	1.07
3rd strata (15.50–16.74 years)	1.02	0.79	1.31	0.66	0.51	0.84
4th strata (16.75–17.99 years)	1.01	0.79	1.29	0.69	0.54	0.88
Gender						
Male	1.00			1.00		
Female	0.38	0.32	0.45	0.48	0.40	0.57
Race						
White	1.00			1.00		
Black	0.33	0.24	0.46	0.64	0.48	0.84
Other	0.65	0.44	0.96	1.08	0.66	1.78
Frequency of parental alcohol use (Wave I)						
Never	1.00			1.00		
<1 per month or less	1.29	1.02	1.65	1.23	0.97	1.56
2–3 per month	1.47	1.07	2.02	1.49	1.09	2.02
1–2 per week	1.83	1.37	2.44	2.00	1.52	2.62
3 or more per week	1.74	1.29	2.34	1.65	1.23	2.21
Median household income of residential area by quartiles (Wave I)						
1st strata (lowest)	1.00			1.00		
2nd strata	0.88	0.65	1.18	1.10	0.83	1.46
3rd strata	1.03	0.78	1.37	1.06	0.81	1.40
4th strata	1.20	0.90	1.61	1.43	1.08	1.90
Diploma or degree (Wave III)						
No	1.00			1.00		
Yes	1.54	1.04	2.27	1.27	0.87	1.84
Health status (Wave I)						
Excellent	1.00			1.00		
Very good	0.85	0.70	1.05	0.95	0.78	1.15
Good	0.76	0.59	0.96	0.85	0.66	1.10
Fair or poor	0.71	0.49	1.04	0.85	0.53	1.35
Ever smoked (Wave I)						
No	1.00			1.00		
Yes	1.29	1.06	1.58	1.18	0.97	1.43

[a] Heavy alcohol use in Waves III and IV were analysed separately. The outcome is an ordered categorical variable with the following categories: (1) none, (2) 1 or 2 days in past 12 months, (3) once per month, (4) 2–3 days per month, (5) 3–5 days per week (6) almost every day or every day.