



Testing different thresholds for risky episodic drinking—What's so special about five drinks?



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ARTICLE INFO

Article history:

Received 19 February 2013

Received in revised form 3 April 2013

Accepted 19 April 2013

Available online 30 May 2013

Keywords:

Alcohol

Drinking guidelines

Risky drinking

Episodic drinking

Drinking thresholds

ABSTRACT

Background: Studies of episodic drinking typically use a measure based on the frequency of drinking five or more standard drinks (a definition which itself varies based on the standard units being used). While this threshold clearly defines drinking behaviour with a range of risks and negative consequences, there has been limited research outside of US college-based studies to determine the appropriateness of this definition. This study examines fifteen different risky-drinking thresholds to assess which definitions of risky drinking best predict negative outcomes.

Methods: This paper presents an analysis of a national survey sample of 19,757 drinkers. The appropriateness of each threshold is assessed using basic risk-curves, specificity and sensitivity analyses and the performance of each threshold definition in multivariate logistic regression models. Risky drinking was defined in fifteen ways (based on frequency and volume) and tested against a series of self-reported negative outcomes and risky behaviours.

Results: The study finds that the most appropriate risky drinking threshold for these data varies based on the mode of analysis and on the type of outcome being considered. Across all approaches used, risky drinking thresholds of seven or fewer drinks performed better than higher thresholds.

Conclusions: While individual level risks peak at higher levels of consumption, these findings support the continuing use of relatively low thresholds for defining risky-drinking, as risk across the total population is highest at these levels.

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1. Introduction

Alcohol consumption contributes to a substantial public health burden in Australia, with the most recent estimates available attributing 3.2% of the burden of disease to risky drinking (Begg et al., 2007). Given this burden, there is significant research interest in examining the characteristics, behaviours and negative consequences experienced by people who drink at 'risky' levels. Typically, the definition of 'risky drinking' in Australian research has been based on guidelines produced by the National Health and Medical Research Council (NHMRC), which specify thresholds for both episodic consumption and longer-term drinking. In other words, the NHMRC guidelines conceptualise risky drinking of two types, based on drinking patterns and total volume of consumption. There is increasing evidence that drinking pattern (i.e., risky episodes of

drinking) is a key driver of negative health and social consequences from alcohol consumption (Bobak et al., 2004; Gmel et al., 2007; Rehm et al., 2001). Similarly, the focus of much media and policy attention in the alcohol field is on 'binge' or episodic heavy drinking (Gartrell and Veness, 2008; Stark, 2007).

Given this focus, developing a robust definition of episodic risky drinking is a key requirement. Under the Australian 2009 NHMRC guidelines, short-term risky drinking is defined as an episode of drinking where five or more standard drinks (an Australian standard drink is 10 g of alcohol, while US standard drinks are ~14 g) are consumed. This threshold was derived from meta-analyses of data from emergency department studies examining the role of alcohol consumption in injury morbidity and mortality. The authors of the guidelines picked an absolute risk threshold of 1 in 100, which was met by drinkers who consumed 5 or more drinks twice-weekly. While there was some evidence that mortality risk increased more rapidly above the 5+ threshold, the use of the 1 in 100 risk level was arbitrary, and based on acceptable risks in other settings (National Health and Medical Research Council, 2009). This definition is widely used in alcohol research in Australia to define 'risky drinkers' (AIHW, 2011). There has been some

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criticism of this threshold as being overly inclusive. For example, using this threshold, 45% of Australians aged 18 and over are classified as short-term risky drinkers (AIHW, 2011). Further, this threshold does not capture extremely heavy drinking, which may be increasing in Australia. For example, a recent Victorian study found that more than 40% of 16–24-year olds reported drinking episodes of more than 20 standard drinks, up from 26% in 2002 (Victorian Drug and Alcohol Prevention Council, 2010).

In US studies of risky drinking, a threshold equivalent to seven Australian standard drinks (5 US drinks) is more widely used (e.g., Wechsler et al., 1995; Weitzman et al., 2003). Again, this threshold has been criticised as being too low, particularly for college populations (White et al., 2006). In response to these criticisms, a series of studies have been undertaken to assess the validity of the US threshold. Using survey data, both Wechsler et al. and Weitzman et al. find no evidence that a higher threshold for defining episodic risky drinking is more valid, with increases in the threshold resulting in more accurate prediction of harm rates amongst the ‘risky drinking’ group, but also higher rates of false negatives (i.e., non-risky drinkers who report harm; Wechsler and Nelson, 2006; Weitzman and Nelson, 2004). Framing their results in terms of the prevention paradox, Weitzman et al. argue that the use of a lower risky-drinking threshold is the most likely to reduce alcohol-related harms as, while prevalence of harm is higher among the heaviest drinking young people, the number of lower-level drinkers is so much higher that they account for the majority of harms experienced (Weitzman and Nelson, 2004). Other studies have broadly supported the use of risky-drinking thresholds at or below 7 Australian drinks. Using event-based data, Jackson et al. found little evidence that higher thresholds had better predictive value (Jackson, 2008), while Dawson et al. (2012), examined a range of potential drinking guidelines, finding that a risky-drinking threshold of 4 US drinks (~6 Australian standard drinks) performed the best. Outside of the US, analyses of Finnish drinkers examined the contribution of drinking occasions across a range of quantities and frequencies, finding that individual-level risk peaked at high levels of consumption (above thirteen drinks; Finnish standard drinks, which include 12g of pure alcohol) but that the highest levels of risk at the population level occurred at much lower levels (between five and seven drinks; Mäkelä and Mustonen, 2007).

Thus, there is a reasonable evidence base from US studies of college populations that using episodic risky drinking thresholds higher than 5–7 drinks provides little additional benefit. In addition, there is evidence from Finland that, while individual level risk is highest for people who drink at very high levels, population level risk is highest at much lower levels. Aside from this Finnish study, there has been little attempt to validate these findings either on broader populations (i.e., non-college samples) or in a non-US context. This study uses Australian survey data to examine the predictive utility of different definitions of short-term risky drinking on a range of alcohol-related harms.

It is worth highlighting the broad and disparate approaches that make up the research literature in this field: researchers have used a wide variety of harm measures, have studied differing sets of potential thresholds (both in terms of volumes and frequencies) and have not used consistent timeframes for analysis. Further, there has been little theoretical discussion of the balancing between sensitivity and specificity required for risky drinking measures. This will depend on the purpose of the measure, and with broad-based population approaches like those discussed here, there is no obvious argument to favour sensitivity over specificity (or vice versa). This study takes a broad approach, aiming to assess the validity of as broad a range of potential thresholds as possible, over a range of different harm measures, while balancing sensitivity and specificity.

Table 1

Proportion of current drinkers drinking at various quantity and frequency thresholds, 2010 National Drug and Alcohol Strategy Household Survey.

Quantity	Frequency		
	1+ occasions (yearly)	12+ occasions (monthly)	52+ occasions (weekly)
3 or more standard drinks	69.4%	60.4%	35.5%
5 or more standard drinks	51.8%	42.4%	19.2%
7 or more standard drinks	37.2%	27.3%	9.4%
11 or more standard drinks	22.5%	15.8%	3.9%
20 or more standard drinks	13.9%	5.5%	1.5%

2. Methods

2.1. Data

This study uses data from the 2010 National Drug Strategy Household Survey (NDSHS). The NDSHS is a national survey of the Australian population aged 12 and over. The data were collected using a drop and collect approach and a clustered stratified random sample with regions sampled randomly within 15 strata (capital city and rest of state for each state and territory of Australia, except the Australian Capital Territory, which was a single strata), households selected randomly within regions and respondents randomly selected within households. Data were collected from a final sample of 26,648 respondents (based on a participation rate of 50.6%). The survey collects a wide range of data on alcohol, tobacco and other drug use, along with items on consequences of and attitudes to alcohol and drug use, health-related items and a suite of socio-demographic measures. Full details of the methods, the questionnaire and the broad findings of the 2010 NDSHS are available in the main survey report (AIHW, 2011).

The analyses presented here were based only on respondents who had consumed at least one alcohol drink in the last 12 months and who had provided complete answers to the detailed graduated frequency items relating to alcohol consumption at varying levels. This led to the exclusion of 5099 (19.1%) respondents who had not consumed alcohol in the last 12 months and 1752 respondents (6.7%) who provided insufficiently detailed or inconsistent consumption data, leaving a final sample of 19,757 (74.1% of the original sample). All analyses are based on unweighted data for this group of respondents.

The main aim of this study was to compare the utility of a range of different threshold measures for episodic risky drinking. Thus, a series of thresholds were set based on frequency and quantities of consumption, derived from the standard graduated quantity-frequency questions used in the survey (Greenfield, 2000). The quantity thresholds (linked to the specific quantities asked about in the survey) were 3, 5, 7, 11 and 20 Australian standard drinks (10g alcohol), with three frequencies examined for each (at least once in the last year, at least 12 times in the last year and at least 52 times in the last year). Table 1 provides the prevalence of drinking at these various thresholds in this sample (i.e., among drinkers).

These thresholds will be presented in the rest of this paper as ‘quantity/frequency’. For example, the threshold based on drinking 7 or more drinks on 12 or more occasions will be presented as ‘7+/monthly’, while 5 or more on 52 or more occasions will be presented as ‘5+/weekly’.

Using each of these thresholds, respondents were classified as either risky-drinkers or non-risky drinkers based on their answers to the graduated quantity-frequency questions (Gmel et al., 2006) in the NDSHS. Thus, for example, a respondent who reported drinking fifteen drinking occasions in the last year and consumed six drinks on each of these occasions would be classified as a risky-drinker using the 3+/yearly, 3+/monthly, 5+/yearly

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