Changes in heavy drinking following onset of health problems in a U.S. general population sample

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ABSTRACT

Heavy episodic drinking is a well-established risk factor for heart disease, diabetes, certain cancers, stroke, hypertension and injuries, however, little is known about whether health problems precipitate changes in subsequent drinking patterns. Retrospective cohort analyses of heavy drinking by decade were conducted using data from the 2010 U.S. National Alcohol Survey (n = 5240). Generalized estimating equations models were used to predict any, monthly, and weekly heavy (5+) drinking occasions across decades of life following a diagnosis of hypertension, heart problems, diabetes, stroke, cancer, or serious injury. Experiencing heart problems was associated with higher odds of reduced weekly heavy drinking (adjusted odds ratio (OR_{adj}) = 3.5; 95% confidence interval (CI); 1.7–7.4). The onset of diabetes was also associated with higher odds of reducing any heavy drinking over the decade (OR_{adj} = 1.7; 95% CI; 1.1–2.6). Cancer survivors were less likely to report no heavy drinking (OR_{adj} = 0.5; 95% CI; 0.3–0.8) or no weekly heavy drinking (OR_{adj} = 0.3; 95% CI; 0.2–0.7). Hypertension, stroke and injury were not found to have any significant associations. Reduced heavy drinking was more likely to be reported by Black drinkers following heart problems and Whites following a diabetes diagnosis. Increased heavy drinking following a cancer diagnosis was significant among women and Whites. Future studies on alcohol's heath and mortality risks should take into consideration effects of health problems on drinking patterns. Additionally, study results support increased prevention efforts targeting heavy drinking among cancer survivors, especially White women, and individuals with or being treated for hypertension.

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1. Introduction

The effects of health conditions on subsequent alcohol use patterns over the lifecourse have important implications for the design of studies aimed at estimating the reciprocal relationship of alcohol use on health and for optimizing treatment plans among those experiencing health conditions, particularly for alcohol-related health problems. First, the endogeneity of alcohol use patterns and health status over the lifecourse is among several important issues compromising the validity of most studies of alcohol's effects on health outcomes (Fillmore et al., 2006). The "sick quitter" effect (Shaper et al., 1988) suggests that some former drinkers quit in response to health problems, both alcohol-related and not, making use of former drinkers as controls problematic for analyses of alcohol's effects on health outcomes. Individuals' alcohol consumption patterns change from year to year (Kerr et al., 2002) and these changes have been linked to health outcomes (Fillmore et al., 2003). Furthermore, studies have identified relationships between life events such as divorce, financial problems, death of a relative, legal problems

and health problems with changes in drinking, and found health problems to be mostly associated with reduced drinking (Veenstra et al., 2006). These studies have not clearly differentiated responses in drinking patterns over the lifecourse to different types of health problems or differential responses across demographic groups.

More recently, studies have focused on identifying significant changes in lifestyle behaviors, including alcohol use, following diagnosis or treatment for specific health conditions. An English study focusing on cancer found that diagnosis did not change the prevalence of daily or near daily alcohol use (Williams et al., 2013). A Danish study also found no change in alcohol consumption after a cancer diagnosis compared to the rest of the sample (Bidstrup et al., 2013). Among adults ages 50 and over, findings from the U.S. Health and Retirement Study showed declines in excessive alcohol consumption after diagnosis of cancer, diabetes, and stroke (Newsom et al., 2012a). An analysis of a Canadian sample, including participants who were aged 50 and older, also found that the prevalence of excessive alcohol consumption decreased among those diagnosed with diabetes and that the average number of drinks declined for those diagnosed with stroke or cancer (Newsom et al., 2012b). These studies provide mixed evidence of changes in certain drinking measures following a health diagnosis that also varied by

health condition. In addition, none of these studies considered changes in the prevalence or the frequency of heavy drinking occasions following a diagnosis.

This study addresses the limitations of the prior literature by focusing on frequency of heavy drinking in relation to a specific set of prevalent health conditions assessed in the National Alcohol Survey, a cross-sectional adult sample of the U.S. population collected in 2009 and 2010. Heavy drinking over the lifecourse was assessed though retrospective questions on the frequency of heavy drinking days during the respondents teens, 20s, 30s and 40s (measured in "decades") in addition to past year drinking measures (Greenfield et al., 2014). This decades approach provides a unique perspective to capture changes in heavy drinking through specific life stages, and align them to a significant life event of a health diagnosis. Investigating both chronic and acute health problems, this study focused on hypertension, heart problems, diabetes, stroke, cancer and serious injury and the age at which these were first diagnosed or identified (Kerr et al., 2015). Furthermore, given the underlying subgroup differences in heavy drinking in relation to health conditions, analyses on the probability of heavy drinking in each decade following the date of first being diagnosed with each health issue were examined separately for men and women, and by racial/ethnic groups of non-Hispanic Whites, non-Hispanic Blacks, and Hispanics. We generally hypothesize that the onset of health problems will result in reduced heavy drinking prevalence and frequency but also anticipate that not all health problems will have the same effect and that not all sub-groups will be affected in the same way in response to each health condition.

2. Methods

2.1. Data

The 2010 U.S. National Alcohol Survey (2010 NAS) was a Computer Assisted Telephone Interview (CATI) household survey of the U.S. adult population aged 18 or older. Conducted for the Alcohol Research Group by ICF Macro between June 2009 and March 2010, the 2010 NAS utilized a sampling frame of all 50 states and the District of Columbia and included a base sample and racial/ethnic minority oversamples of Hispanic and African American populations. One adult in the surveyed household was randomly selected for interview. The average interview time was 55 min and the cooperation rate was 49.9%. This cooperation rate is consistent with those from other national household telephone surveys (Dutwin and Lavrakas, 2016). The study was approved by the Public Health Institute Institutional Review Board (IRB #I14-007).

2.2. Measures

Lifetime heavy drinking was assessed from a series of questions on the frequency of heavy drinking across respondents' lifetime beginning with the age of drinking onset through respondents' current age at interview. These questions were situated within each decade of life: teens, 20s, 30s, and 40s. For each decade, respondents were asked their frequency of drinking five or more (5+) drinks on one occasion using the following response options: "every day or nearly every day", "at least once a week", "at least once a month", "at least once a year", and "never" (Greenfield et al., 2014). For those aged 50 and older, we calculated 5+ frequency during the last 12 months prior to the interview date, utilizing graduated frequency series items on 12 or more, 8–11 and 5–7 drinks (Greenfield, 2000). Drinks were defined as the U.S. standard (14 g of ethanol) through examples of beer, wine and liquor pours. Given our hypothesized relationship that the onset of a health condition is associated with reduced heavy drinking, we reverse coded the outcome focusing on changes at three levels: no heavy drinking, no monthly heavy drinking, and no weekly heavy drinking.

Health condition onset was derived from a series of questions asking "have you ever been told by a doctor or other health professional that

you had [health condition]?" Those who answered yes were asked, "at what age were you first told." Age of onset for "hypertension or high blood pressure", "heart or coronary problem", "diabetes", "stroke", "cancer", and "injuries" from a serious accident was assessed and examined. For those between the ages of 40 and 69, we captured onset of disease up to two years prior to the interview age. We excluded respondents, ages 40–69, diagnosed less than two years prior to interview age to avoid overlap with the past year drinking measure.

Demographic and socioeconomic characteristics include gender, age at interview, race/ethnicity (White, Black, Hispanic, other), marital status (married, separated/divorced/widowed, never married), highest education level (less than high school, high school graduate, some college, and college graduate or more), household income (less than $20k, $20k–< 40k, $40k–<60k, $60k–<80k and more than $80k), employment status (full or part time employment, unemployed, retired, homemaker, and others). All variables served as control variables for the final models. Separate analyses were also performed by gender and race/ethnicity.

2.3. Statistical analysis

Of the total 6855 respondents in the sample, we restricted the analysis to respondents with no missing data on age and those younger than 70 years old for an analytic sample of 5240. Thus the analysis was focused on respondents ages 20 to 69 using their heavy drinking status in their 20s, 30s, 40s, and among those ages 50–69, current heavy drinking status. The analysis capitalized on the retrospective lifecourse drinking patterns by maximizing all available alcohol data. For example, heavy drinking in the 20s was examined for all respondents ages 20–69, while for those ages 30–69 and ages 40–69, heavy drinking in the 30s and 40s, respectively, were examined. Among those ages 50–69, the current interview's measure of heavy drinking that occurred in the past 12 months was used to capture heavy drinking in the 50s or 60s. Table 1 shows the valid sample size for each age group and the corresponding heavy drinking prevalence at each age period.

As our main research aim was to estimate the effect of health condition onset on heavy drinking, to address the problem of temporality, we aligned the outcome of heavy drinking status so that the behavior occurred in the decade after the age of onset of health condition. This ordering is illustrated in Table 1. For example, in the 20–69 age group column, we report the heavy drinking prevalence that occurred in the 20s and earlier for the corresponding health condition that was first diagnosed before age 20. Note that a person is coded as positive for health condition onset within a given period (i.e., ages 20–29) only when the

Table 1
Prevalence of lifetime heavy drinking frequency and health condition onset during the prior period for each lifetime decade group, U.S. 2010 National Alcohol Survey.

	Age group			
	20–69 (n = 5168)	30–69 (n = 4694)	40–69 (n = 3876)	50–69 (n = 2717)
Frequency of heavy drinking	20s	30s	40s	50s or 60s[a]
Never	40.4%	51.0%	61.7%	86.3%
Yearly	12.8%	18.3%	17.6%	7.4%
Monthly	18.5%	15.6%	10.9%	2.6%
Weekly	28.3%	15.1%	9.7%	3.8%
Health condition onset	<20	20–29	30–39	40–67[b]
Hypertension	1.6%	4.1%	7.1%	30.6%
Heart disease	1.6%	0.9%	1.4%	11.2%
Diabetes	0.8%	1.0%	2.6%	12.1%
Stroke	0.2%	0.1%	0.4%	3.5%
Cancer	0.0%	0.9%	1.2%	6.9%
Injury	5.6%	5.2%	4.4%	9.4%

[a] Heavy drinking in the 50s or 60s was measured from past 12-month status at the time of the interview.

[b] Health condition onset was required to be at least 2 years before respondents interview.