Detailing the Associations between Nondrinkers and Mortality

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September 23, 2011

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Abstract

People who abstain from alcohol completely are at an increased risk for death, and the reasons for this remain largely unexplained. We examine whether variation in the *reasons* for abstaining from drinking explain their increased mortality relative to light-to-moderate drinkers. We use a large nationally representative data set and multivariate analyses to focus on the extensive and diverse set of reasons individuals provide for abstaining from drinking and their associations with mortality. We find that some groups of abstainers, including ardent prosocial abstainers exhibit the same or lower risks of death than light drinkers. A more complete understanding of the relationship between alcohol consumption and mortality will contribute to better social policies to reduce or prevent alcohol abuse and to increase health and lengthen life.

Introduction

People who abstain from alcohol are at an increased risk for death, and the reasons for this remain largely unexplained. We examine whether variation in the *reasons* for abstaining from drinking explain the increased mortality among abstainers relative to moderate drinkers. This line of research addresses a substantial gap in the literature on alcohol and health. The health effects of alcohol nonuse have received far less attention than the health benefits of light-to-moderate alcohol use, and the negative health consequences of excessive and binge alcohol abuse. The much-debated 'sick-quitter' hypothesis argues that many people abstain from drinking because they were former alcoholics or currently grapple with problems of alcoholism. But even lifelong abstainers exhibit higher mortality risk than light drinkers. We extend the literature by testing whether individuals who abstain from drinking because they have had previous problems with alcohol, or because they have health conditions that limit their ability to drink, have elevated risks of death compared to those who abstain for more prosocial and healthy reasons.

Significance

This paper contributes to the alcohol literature through a more complete understanding of the diversity of abstainers, and through the direct testing of a prosocial or health abstainer effect; and to the mortality literature by underscoring the importance of alcohol consumption as a major preventable cause of death. Excess alcohol consumption not only increases the risk of death, but can also lead to work productivity losses, reduced immune function, and increased risk of chronic disease, injury, accidents, disability, strained social relationships, including marital and familial disruption. Alcohol contributes to large differences in mortality risk; affects multiple

organs; contributes to health disparities by age, sex, race/ethnicity, and socioeconomic status (SES); and contributes to international differences in mortality, as underscored in the recently completed *International Handbook of Adult Mortality* (Rogers and Crimmins 2010). Indeed, alcohol-related mortality is considered a central explanatory factor for life expectancy differences in Europe.

The Relationship between Alcohol Consumption and Mortality

Pearl (1926) was one of the first researchers to identify the U-shaped (or J-shaped) relationship between alcohol consumption and mortality, which has since been confirmed in numerous recent studies. The risk of death is lowest among light-to-moderate drinkers, slightly higher among abstainers and former drinkers, and much higher among heavy drinkers. Several studies find that the lowest mortality risk occurs among individuals who consume one drink or less per day.

The protective effect of light-to-moderate drinking on mortality results primarily from lower cardiovascular disease risk, the major cause of death in the United States, and persists even after adjusting for age, sex, body mass index (BMI), and cigarette consumption. Alcohol consumption may lower the risk of cardiovascular disease by increasing levels of HDL cholesterol, and decreasing LDL oxidation, inflammation, platelet aggregation, and blood clotting. It can also reduce stress and anxiety, and provide relaxation, pleasure, and enjoyment.

In contrast to light-to-moderate alcohol consumption, heavy alcohol consumption is associated with high risks of death for overall mortality, and from such specific causes as cirrhosis of the liver; chronic alcoholism; alcohol poisoning; accidents; suicides; homicides; cancers of the liver, mouth, esophagus, stomach, colon, and breast; and cardiovascular diseases, including arrhythmias, stroke, and cardiac arrest.

Aims

Our first aim is clarify the relationship between drinking abstention and the risk of death. The literature shows that individuals who abstain from drinking have higher mortality risk than those who are light-to-moderate drinkers. This relationship is most likely true for individuals who abstain because of responses that place them at higher risk of death (e.g., comorbidity, previous problems with alcohol, association with problem drinkers, and asocial behavior). But individuals who abstain for prosocial and healthy reasons may exhibit lower risks of death. We will examine the effects of drinking status on overall and cause-specific mortality. Another major advance of our work and a secondary aim will be to examine the role of key social factors and health behaviors in shaping the relationship between alcohol consumption and mortality. We expect that controlling for marital status, socioeconomic status, smoking status, and BMI will help inform the relationship between drinking status and mortality.

Data and Methods

Data

Our data come from the 1988 National Health Interview Survey Linked Mortality File (NHIS-LMF). The NHIS is based on a complex multistage sampling frame that provides nationally representative data on the non-institutionalized U.S. population. The 1988 NHIS features an Alcohol Supplement, which includes 43,809 adults aged 18 and over who responded to an extensive set of questions on past and current alcohol use, including abstention, and infrequent and former drinking. We limit the analyses to ages 21 and above to examine individuals who are of legal drinking age. In 2010, the National Center for Health Statistics linked the NHIS respondents to death certificates through the year 2006, or up to 19 years, to determine whether

individuals died within or survived the follow-up period. Over this period, 10,522 adults died. This data set is especially well-suited for our proposed project because it is large, nationally representative, includes a large number of deaths, boasts a detailed and extensive set of questions about alcohol consumption, and includes a large enough number of deaths to permit all-cause and cause-specific analyses.

Methods

We use latent class analysis to identify the most common subpopulations of abstainers, infrequent drinkers, and former drinkers—based on the any reason and most important reason variables.

We impute values for variables that initially have missing values to retain sample sizes.

We examine alcohol consumption and mortality through Cox proportional hazards models that use age at interview as the time variable (Allison 1984; Kom, Graubard, and Midthune1997). We follow individuals from the time of the interview until date of death or end of the follow-up period. And we adjust our descriptive and multivariate results for NHIS' sample weights and the complex sampling frame through the Stata 10.0 "svy" commands. We build statistical models by starting with the baseline model and progressively adding covariates for different sets of factors, including smoking, social characteristics, and health conditions.

Our cause-specific analyses separately examine heart disease (ICD10 I00-I78), malignant neoplasms [cancer] (ICD10 C00-C97), respiratory diseases (ICD10 J00-J06, J10-J18, J39-J79, A16-A19, and A37), external causes (ICD10 V01-X59; Y40-Y89; Y10-Y36), and all other causes, based on the most current classification of causes of death, the tenth revision of the *International Classification of Diseases*, or ICD-10 (WHO 2007). Because of the purported

benefits of light alcohol consumption on the cardiovascular system, we expect that individuals who abstain from drinking will exhibit higher mortality due to heart disease, similar risks for most causes, including respiratory diseases and external causes, but slightly lower mortality risk from cancer, since drinking is associated with several types of cancer. The cause-specific analyses right-censor individuals when they survive the follow-up period or die of other causes.

Conclusions

The commonly reported J- or U-shaped relationship between alcohol consumption and mortality is an oversimplification. Among drinkers, there is a strong gradient: increasing alcohol consumption leads to higher mortality risk, especially among heavy drinkers. But there is variation in mortality risk among abstainers. Ardent prosocial abstainers have similar mortality risks to current light drinkers.

The risk of mortality among abstainers is influenced in part by smoking status, social relationships, body mass, and SES. Because smoking and drinking are interrelated, it is crucial that studies that examine drinking control for smoking. Because risky behaviors often cluster, one advantage of abstaining from drinking is that it can encourage individuals to engage in other healthy behaviors. Both income and education have an attenuating effect on the relationship between abstaining from drinking and mortality.

High numbers of drinks consumed per day elevates mortality risk. Indeed, compared to light drinkers, those who drink 6 or more drinks per day have 57% higher risk of death over the follow-up period, net of other controls. Excessive drinking displays higher mortality risk than any other drinking status, but comes closest to the former problem drinkers, who have 41% higher risk of death than light drinkers (Table 3, Model 7). Problem drinkers contribute to

problems individually, at home, at work, and in the community. Indeed, the higher hazard ratios are attenuated with controls for marital status and socioeconomic status. Social policy should explore ways to better address problem drinkers. In some instances, the problem drinking is the result of other problems. Thus, it may make sense to address the root problem—which can be family problems, work problems, depression, or bereavement—before the problem drinking can be fully addressed.

The benefits of light alcohol consumption are often touted, but could easily vanish if consumption levels increase. Thus, the possible risk of missing slight potential benefits of drinking among abstainers must be offset with the definite higher risks of overall and cause-specific mortality among light drinkers if they increase their consumption levels.

A more complete understanding of the relationship between alcohol consumption and mortality will contribute to better social policies to reduce or prevent alcohol abuse. Our results indicate that social policies aimed at reducing mortality can champion the benefits related to abstaining from alcohol consumption. Furthermore, public policies could improve health and lengthen life by addressing some of the reasons that individuals don't drink, including: providing access to healthcare, raising individuals out of poverty, and reducing the prevalence of alcoholism by prevention and treatment efforts.

We have assembled substantial and diverse evidence to demonstrate that individuals who abstain from drinking have quite positive mortality prospects that are on par if not better than any other drinking status, including light alcohol consumption. Thus, we have ample evidence to underscore the health and longevity benefits of drinking abstention.