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Alcohol and depression: Evidence from the 2014 health survey for England

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A B S T R A C T

Background: A relatively large body of literature examines the association between depression and alcohol consumption, with evidence suggesting a bidirectional causal relationship. However, the endogeneity arising from this reverse causation has not been addressed in the literature.

Methods: Using data on 5828 respondents from the Health Survey for England (HSE), this study revisits the relationship between alcohol and depression and addresses the endogenous nature of this relationship. We use information on self-assessed depression, and control for endogeneity using the Lewbel two-staged least square (2SLS) estimation technique.

Results: We find that drinking alcohol promotes depression, and this is consistent across several measures of drinking behaviour including the amount of alcohol consumed, consumption intensity, alcohol dependence and risk of dependence.

Conclusion: While drinking may be generally accepted and in the case of England, part of the culture, this has costs in terms of both physical and mental health that ought not to be ignored. While public policy has predominantly focused on the physical aspects of excessive alcohol consumption it is possible that these policies will also have a direct positive spillover in terms of the mental health costs, through the impact of lower alcohol consumption on quality of life and wellbeing.

1. Introduction

According to the Royal College of Psychiatrists, Britain has experienced an increase in wealth over the last three decades and at the same time alcohol has become relatively cheaper. This has led to a surge in alcohol consumption levels although recent analysis of survey data in England suggests that more young people nowadays are delaying alcohol use onset, are drinking less than in previous generations or more likely to abstain (see, e.g., Meng et al., 2014). Further, social and moderate drinking does not cause many problems, and in English society, alcohol consumption is common, especially because most people in England feel comfortable with drinking alcohol being part of the British culture. However, several health problems (physical and mental health related) including depression have been associated with alcohol consumption and dependence. A recent review conducted by Rehm et al. (2017), for instance, shows that alcohol use is a major contributor to injuries and mortality. Following a comprehensive review which brings together findings from the existing literature, evidence presented Rehm et al. (2017) suggests that alcohol use is causally linked to over 40 major injury and disease categories based on the International Classification of Diseases (ICD).

In both clinical and population based studies, drinking behaviour has been found to be associated with depression (see, e.g., Brown et al., 1998; Davidson, 1995; Manninen et al., 2006; Merikangas and Gelernter, 1990; Regier et al., 1990). Particularly, depressed mood is often associated with increased consumption of alcohol, with evidence suggesting that symptoms of depression tend to disappear within weeks of withdrawal from alcohol (Schuckit, 1983). On the other hand, evidence shows that the odds of alcoholism (i.e., addiction) or increased levels of alcohol consumption is significantly higher among those displaying depressive symptoms compared to those without (Crum et al., 2001; Grant and Harford, 1995). The comorbid relationship between alcohol consumption and depression has been associated with issues of self-medication where victims of depression use alcohol to deal with depression symptoms (Crum et al., 2001). Other theories such as the tension-reduction theory (MacAndrew, 1982), which suggests that alcohol consumption is related to reduction in tension, could also explain the comorbid relationship between alcohol and depression.

A recent systematic review by Foulds et al. (2015) also provides insight into another strand of literature which focuses on how patients with alcohol use disorder respond differently to treatment if their diagnosed depression is either independent or substance-induced. Consistent with other strands of the literature focusing on alcohol and depression comorbidity, Foulds and his colleagues show that high levels of

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depressive symptoms are characteristic of patients entering treatments for alcohol use disorder. However, this review focuses on the distinction between independent depression and substance-induced depression supporting the idea of reverse causality discussed above. On the one hand, the idea of substance-induced depression suggests that alcohol abuse or dependence could induce depression. On the other hand, entering treatment for an alcohol use disorder with independent depression suggests that the alcohol abuse could have been a result of the depression. The likely reverse causality hinted in this review has also been collectively acknowledged in several studies captured by Boden and Fergusson (2011) in their review. Findings from Boden and Fergusson suggest that the presence of either alcohol use disorder doubled the risks of getting a major depression and vice versa. Beyond reverse causality, findings from this study also suggest that omitted variable bias may be an issue given that the common factors often controlled for cannot fully account for the association between alcohol use and depression.

Overall, the existing literature on alcohol and depression presents two major conclusions: 1) attempts to cope with the feelings and symptoms of depression may lead some individuals to abuse alcohol to excess, and 2) alcohol consumption can lead to depression given the various psychological effects of alcohol and impacts on mental health (Adams et al., 2006; Bell and Britton, 2014; Huang et al., 2016; Lange et al., 2016). Additionally, excessive alcohol consumption can lead to disruptions in jobs and relationships, which could lead to depression (Schuckit, 1983; Schutte et al., 1995). Despite the well-established literature in this area, which suggests reverse causation between depression and alcohol, the endogenous relationship between drinking behaviour and depression has not received much attention in the literature. Specifically, existing studies that examine the impact of drinking behaviour on depression fail to account for the potential endogeneity. For instance, recent studies on the relationship (see, e.g., McBride et al., 2016) fail to account for reverse causality and the associated endogeneity. On the other hand, flagship papers recently published on the subject such as Fergusson et al. (2009) as well as Mushquash et al. (2013) that attempt to address issues of reverse causality adopt structural equation modelling, which has been argued in the methodological literature as limited in addressing endogeneity (see, e.g., Kelloway, 1995). More importantly, the findings from these two studies seem to contradict each other, and the scope of Mushquash et al. (2013) seems to be limited with a narrow focus on 200 women.

The primary objective of this paper, then, is to broaden our knowledge of the effects of alcohol on depression using new data from the Health Survey for England (HSE) while controlling for endogeneity. Failure to address the bi-directional causal nature of the relationship between depression and alcohol can give rise to bias results and erroneous inference, which could affect policy. In this current study, we contribute to the existing literature by providing new evidence on the relationship between depression and alcohol based on a rigours statistical methodology which addresses the endogenous nature of this relationship. We also examine how the impact of alcohol on depression differs by gender. Further, we adopt a wider range of measures to capture drinking behaviour and dependence than previous studies in this area. The existing literature has tended to concentrate on clinical definitions through the use of diagnosis based instruments for major depression and alcohol addiction (predominantly DSM based instruments). However, our purpose is to study the relationship between depression and alcohol within the population (not just clinical patients) and to also understand sub-clinical behaviours. We therefore utilise broader measures of depression and alcohol related behaviours. This allows us to examine the robustness of our results from different constructs of drinking behaviour.

The remainder of the paper is structured as follows. The next section presents an overview of the methods and data used in this study. Section 3 presents the results. Section 4 presents and a brief discussion and concludes.

2. Methods

2.1. Data: health survey for England 2014

Our study involves a secondary analysis of the 2014 Health Survey for England (HSE) data. The 2014 dataset of the HSE is the latest release of a high quality annual survey designed to provide a representative sample of households in England in terms of gender, age, geographic location and socio-economic circumstances among others. The survey uses a multistage stratified design and provides information about the lifestyle and health status of people living in England. Full details on the data can be found online (https://data.gov.uk/dataset/health_survey_for_england). It should be noted that while the survey is annual, it is repeated cross-sectional data not longitudinal data and thus themes and questions vary each year. For this reason, we employ the latest data available, which captures alcohol related behaviour, at the time of writing for our study. Since 1991, data from the HSE has produced several publications (see, e.g., Colhoun et al., 1998; Jarvis and Feyerabend, 2015; Mindell et al., 2012; Oyebode and Mindell, 2013; Primatesta et al., 2001 among others), and is considered reliable given the methodological rigour associated with the data collection.

2.1.1. Dependent variable: depression

The dependent variable used in this study is depression, a well-established measure of subjective wellbeing in the literature (see, e.g., Newmann, 1989; Pinquart and Sörensen, 2000). In the data, the variable *Depression* is assessed by asking respondents "have you recently been feeling unhappy and depressed?" Responses are coded such that 1 means "not at all", 2 means "no more than usual", 3 means "rather more than usual", and 4 means "much more than usual". The distribution of responses has a mean value of 1.78 with a standard deviation of 0.77. It is important to note that this measure is subjective and not clinically defined. Thus, it will capture a broader set of symptoms than those defined in standard depression scales employed as survey instruments, and include individuals with subclinical levels of depression as well as clinical levels as respondents reporting experiencing depression. While this is a single item measure of depression, it is taken from the General Health Questionnaire (GHQ-12) (Goldberg, 1978) scale contained within the survey. It is not specific in terms of the timeframe, asking respondents to rank current/recent feelings in reference to usual feelings. This allows us to benchmark the question according to the individual's norm rather than a collective norm and allows us to minimise current mood bias. Single item questions also reduce respondent fatigue, are less cognitively challenging and less monotonous than multi item scales. Further, single item measures are not susceptible to spurious correlations due to a common response format rather than being due to a true response to the question content (common method variance).

2.1.2. Independent variables

Our main explanatory variables are a rich and comprehensive set of measures of alcohol behaviours including: consumption status, consumption frequency, consumption intensity, dependence risk and experience of alcohol dependency/addiction. The motivation for using different measures relating to different aspect of behaviour is to identify the best option for intervention either through policy or treatment. Moreover, there is no single behavioural profile of alcohol consumption, some people drink small amounts often and some drink large amounts infrequently and all combinations in-between are observed on society. Frequency measures capture the habitual nature of consumption whereas intensity measures capture the volume of alcohol consumed. Historical measures capture path dependency and stocks of addiction (Becker and Murphy, 1998). The 2014 HSE is a rich dataset which presents information on all these dimensions of drinking. First, consumption status in the HSE data, named *Drinker*, is recorded in the form of a dichotomous variable which equals 1 if respondent drinks