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Research report

Alcohol-related deaths and social factors in depression mortality: a register-based follow-up of depressed in-patients and antidepressant users in Finland

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ABSTRACT

Background: Excess mortality of depression is established for various causes of death, but evidence is scarce on alcohol-related causes. It also remains unclear whether the magnitude of the excess varies by social factors. This study aimed to quantify the contribution of alcohol-related causes of death and to assess modifying effects of socioeconomic position, employment status, and living arrangements in the excess mortality of depression.

Methods: A 14% sample of community-dwelling Finns aged 40–64 at the end of 1997 was assessed for depression, using register data on psychiatric hospital care and antidepressant use in 1996–1997. Depressed in-patients (n=897), out-patients using antidepressants (n=13,658), and non-depressed individuals (n=217,140) were followed up for cause-specific mortality in 1998–2007, distinguishing between alcohol- and non-alcohol-related deaths, and testing for variation in the excess mortality according to baseline social factors.

Results: Depressed in- and out-patients had significant excess mortality for suicide (age-adjusted rate ratios RR=3.77 for men and RR=6.35 for women), all accidental and violent causes (RR=3.47 and RR=4.43), and diseases (RR=1.67 and RR=1.41). Of the excess, alcohol-related causes accounted for 50% among depressed men and 30% among women. Excess mortality varied little by social factors, particularly in non-alcohol-related causes. Where variation was significant, the relative excess was larger among those with higher socioeconomic position and the employed. Absolute excess was, however, larger among those with lower socioeconomic position, the unemployed, and the unpartnered.

Limitations: Depression was measured indirectly by hospital and antidepressant use.

Conclusions: The results highlight the major role of alcohol in depression mortality.

1. Introduction

People with depression have higher mortality than the general population. Their all-cause mortality is around 1.2- to 2.7-fold (Cuijpers and Smit, 2002; Harris and Barraclough, 1998; Schulz et al., 2002; Wulsin et al., 1999) and the excess mortality is particularly pronounced for accidental and violent causes of death, ranging from 1.5 (Mykletun et al., 2007) to 10-fold (Ösby et al., 2001). Some studies have also found elevated disease mortality from causes such as cardiovascular disease and cancer (Pinquart and Duberstein, 2010; Schulz et al., 2002; Wulsin et al., 1999).

One major cause of the excess may relate to alcohol use. In Finland, as well as in the United States, around 15% of depressed individuals have a co-morbid alcohol use disorder (Pirkola et al., 2005; Sullivan et al., 2005). A review on depression mortality concluded that alcohol use is a major mediating factor and should be controlled for in analyses of the depression-mortality association (Wulsin et al., 1999). Self-reported alcohol use has been statistically controlled for in some studies (Wulsin et al., 1999). However, to the best of our knowledge, no prior studies on depression have specifically assessed mortality due to alcohol-related causes of death, a measure that captures the contribution of alcohol-related deaths more reliably than self-reported alcohol use.

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Mortality, alcohol-related mortality in particular, has been shown to vary strongly according to social factors such as socioeconomic position, employment status, and living arrangements (Herttua et al., 2007; Koskinen et al., 2007; Tarkiainen et al., 2012). However, very little is known about the variation of depression mortality according to social factors. The effect of depression on mortality may be modified by social factors in at least two ways. Firstly, the excess mortality of depression may be smaller among those with higher socioeconomic position, the employed, and those living with a partner, because economic and family resources, such as ability to purchase care, social support, and social control, may buffer the detrimental effect of depression (Fuhrer et al., 1999). Secondly, the excess mortality of depression may be larger among those with more favorable social positions, as they may have more to lose following depression, and they may find it more challenging to fulfill the family and labor-market-related expectations when depressed (Agerbo, 2007).

Although many studies on depression mortality have *controlled* for various social characteristics (Wulsin et al., 1999), few prior studies have assessed the *modifying* effects of socioeconomic position, employment status, or living arrangements. An exception is made by studies focusing on social predictors of suicide. These studies have shown that being employed and being un-partnered predict suicidality among out- and in-patients with major depressive disorder (Sinclair et al., 2005; Sokero et al., 2005). Few studies have assessed social differentials in mortality from causes other than suicide. One study assessed the modifying effect of social relations on the depression–mortality association in a community sample of older adults, but found no buffering of excess all-cause mortality among depressed individuals with more social relations (Fuhrer et al., 1999). Another study found no significant differentials in the excess external or internal cause mortality according to marital status or education among discharged in-patients with unipolar depression (Schneider et al., 2001). However, due to their relatively small sample of 354 discharged in-patients, they may have lacked statistical power to observe differentials.

1.1. Aims

In this study we aim to elaborate the excess mortality of depression by studying it according to cause of death as well as various indicators of socioeconomic position, employment status, and living arrangements. We use large population-based longitudinal register data of 897 depressed in-patients and 13,658 depressed out-patients compared with 215,140 non-depressed individuals. Our measures of depression are based on psychiatric hospital care with a diagnosis of unipolar depression and registered purchases of antidepressants. The specific aims are:

(1) To quantify the excess mortality due to different causes of death among depressed in- and out-patients in a register-based population sample.
(2) To assess the contribution of alcohol-related causes of death in the excess mortality.
(3) To assess the modifying effects of socioeconomic position, employment status and living arrangements on the excess mortality for alcohol-related and non-alcohol-related causes.

2. Data and methods

2.1. Sample and mortality follow-up

The data consisted of a 14% random sample of the Finnish population aged 40–64 years, living in private households at the end of 1997 ($n=237,469$). The data were drawn from population registers at Statistics Finland and included detailed socio-demographic information and mortality follow-up until the end of 2007. These data were linked with information on all purchases of prescription medication, and on the right for reimbursement of drug costs for diagnosed chronic disorders, provided by the Social Insurance Institution, as well as with information on all hospitalizations provided by the National Institute for Health and Welfare. Statistics Finland performed the data linkage via personal identification codes.

Psychiatric and somatic morbidity of all individuals was assessed using data on hospital care, prescription medication purchases and right for drug cost reimbursement in the two-year period prior to baseline from 1 January 1996 to 31 December 1997. In order to focus on unipolar depression, we excluded those who, in 1996–1997, had hospital care for schizophrenia, manic, bipolar, or non-affective psychotic disorders—International Classification of Diseases 10th revision (ICD10) codes F20-29, F30.1, F30.2-F30.9, F31, F53.1—irrespective of comorbid unipolar depression ($n=5360$). We further excluded those who had no hospital diagnosis of depression in 1996–1997 but did have the right for reimbursement of drug costs for diagnosed psychosis (Finnish codes 112 and 188) or psychiatric hospital care for disorders other than depression or substance use disorder (SUD) ($n=289$). Also those with any missing data were excluded ($n=125$). Those with SUD at baseline ($n=2920$) were not excluded because comorbidity with depression is common and depressed individuals without SUD would be an unrepresentative group (Fig. 1).

The data included a ten-year (1998–2007) mortality follow-up. We performed separate analyses for *suicide* (ICD10 codes X60–X84, Y87.0), *all accidental and violent deaths* including suicide (V01–X44, X46–Y89), and *all disease deaths* (A00–T98, X45). All deaths were further classified according to whether alcohol was marked on the death certificate as the underlying or contributory cause of death. Alcohol-related deaths included fatal alcohol poisoning (X45) and diseases caused by alcohol: mental and behavioral disorders due to alcohol use (F10), degeneration of nervous system due to alcohol (G312), epileptic seizures related to alcohol (G4051), alcoholic polyneuropathy, myopathy, cardiomyopathy, gastritis and liver disease (G621, G721, I426, K292, K70), alcoholic diseases of the pancreas (K852, K860) and fetal consequences of maternal alcohol use (O354, P043). In accidental and violent causes, including suicides, the death was considered alcohol-related if alcohol intoxication was marked on the death certificate as one of the contributory causes. The accuracy and

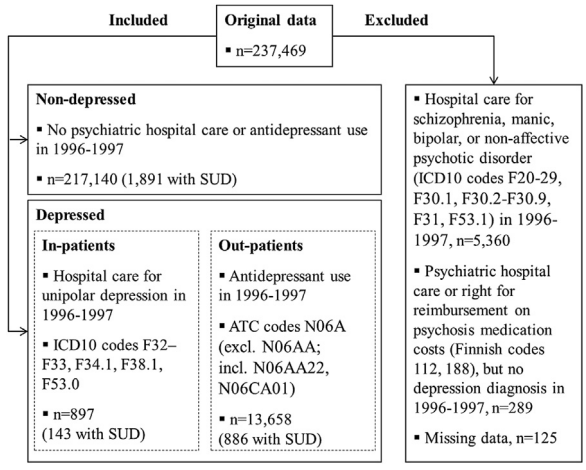

Fig. 1. Flow chart on the formation and exclusion criteria of the data.