Risk of suicide in relation to income level in people admitted to hospital with mental illness: nested case-control study

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People at higher risk of suicide, such as those who are socially and economically disadvantaged, are also at high risk of being admitted to hospital with a mental illness.[1,2] In some cases it seems that mental illness is a factor on the causal pathway between social position and suicide.[2,3] However, Mortensen and colleagues showed that the importance of socioeconomic variables as risk factors for suicide was reduced after adjustment was made for a history of mental illness.[3] We present findings on 811 cases of suicide and 80 787 matched control subjects in a population based study which aimed to gain further insight into the association between social position and mental disorder.

Subjects, methods, and results

We used the Danish medical registers on vital statistics to establish a random, 5%, population based sample of 811 people who had committed suicide between 1982 and 1994. Up to 1983, suicide was defined as ICD-8 codes E950-959; for 1994, ICD-10 codes X60-X84 were applied. Each person who had committed suicide was matched with approximately 100 people of the same sex and year of birth who were alive on the date of the suicide. Information on dates of hospital admission and discharge and details of diagnoses was drawn from the Danish psychiatric central register, which has monitored all psychiatric inpatient facilities since 1969. Socioeconomic data on case and control subjects from two years before the suicide were added from the longitudinal labour market register. Detailed description of the registers can be found in Mortensen et al.[3]

The main variables included were annual gross income (wages, pensions, unemployment and social security benefits, and interest), grouped into fourths, and hospital admission status in relation to mental illness. Hospital admission status was categorised as follows: never admitted, currently admitted or first discharge within the present or preceding year, and first discharge before the preceding year. Trend variables were defined as variables taking the values 0, 1, 2, and 3 in the four income groups.

We also included socioeconomic and marital status in our analysis. Socioeconomic status was categorised as: fully employed, unemployed for 1%-20% of the year, unemployed for 21%-100% of the year, old age pensioner, disability pensioner, student, or recipient of social assistance, and there were three categories for marital status: cohabiting, single with children, and single without children. The psychiatric information gathered included the diagnosis (schizophrenia (ICD-8, 295), manic depressive psychosis (ICD-8, 296), reactive psychosis (ICD-8, 298)), and an indicator for more than one previous admission to hospital for mental illness. Data were analysed by conditional logistic regression.

In contrast to findings in the general population, the suicide risk for patients admitted to hospital with a mental illness fell significantly with decreasing income ($P = 0.0001$). The table shows that, in comparison with the group with the highest income, the suicide risks for people recently discharged from hospital fell from 0.50 (95% confidence interval 0.25 to 0.97) in the second highest group, to 0.37 (0.18 to 0.77) in the third group, and 0.35 (0.17 to 0.69) in the lowest group. The table also shows that risk ratios for people whose first admission to hospital had occurred before the previous year showed a similar pattern. The unadjusted risk ratios in the general population fell gradually with income (table). Analogous risks, calculated by using the trend, were 2.30 (1.32^3), 1.32 ($=1.32^2$), 1.74 ($=1.32^1$), and 1 ($=1.32^0$), respectively. No significant interactions were found between trends and the different diagnoses. In the adjusted analyses, a similar but less pronounced pattern was found in people who had never been admitted to hospital with a psychiatric disorder. The impacts of socioeconomic and marital status were as expected—that is, there were excess risks in single and unemployed people. Furthermore, an unadjusted analysis omitting these factors strengthened the results.

Risk ratios (95% confidence intervals) for suicide in relation to gross income and time since first discharge from hospital for a psychiatric disorder in 811 people who committed suicide and 80 787 control subjects

		Hospital admission status (adjusted risk ratio)†		
Gross income	Crude risk ratio*	Never admitted	Currently in hospital or discharged in past year‡	Discharged >1 year ago
Highest fourth	1	1	1	1
Third	1.34 (1.09 to 1.65)	1.14 (0.86 to 1.51)	0.50 (0.25 to 0.97)	0.71 (0.47 to 1.07)
Second	1.78 (1.43 to 2.21)	1.26 (0.94 to 1.71)	0.37 (0.18 to 0.77)	0.55 (0.37 to 0.83)
Lowest fourth	2.27 (1.82 to 2.83)	1.35 (0.97 to 1.91)	0.35 (0.17 to 0.69)	0.45 (0.29 to 0.68)
Test of trend‡	P<0.0001	P=0.08	P=0.002	P<0.0001
Risk ratio for trend	1.32 (1.22 to 1.42)	1.10 (0.99 to 1.24)	0.70 (0.56 to 0.88)	0.77 (0.67 to 0.88)

*Adjusted for age, time period, and sex by matching.
†Adjusted for socioeconomic and marital status; schizophrenia, manic depressive psychosis, and reactive psychosis; and an indicator for more than one previous admission by regression and for age, sex, and time period by matching.
‡The three trends in the adjusted model were significantly different (P<0.0001).

Comment

People with a history of mental illness and a high income are at greater risk of committing suicide than their lower income counterparts. Richer people with a mental disorder may be more suicidal before they are admitted to hospital or they may feel more stigmatised,[4] vulnerable, and shameful[5] about having a mental illness. In Denmark there are no private psychiatric hospitals or clinics. Perhaps treatment focuses on people from lower social classes as most patients are

from this background, and perhaps patients from higher income groups are less likely to be admitted.

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Commentary: Suicide and income—is the risk greater in rich people who develop serious mental illness?

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There is clear evidence from person based and ecological studies that relative poverty is associated with an increased risk of suicide.[1 2] For example, between 1991 and 1993 in Britain, the standardised mortality ratio for suicide was four times higher in men aged 20-64 from social class V than in men aged 20-64 from social class I (215 *v* 55).[1] Explanations for the observed associations are complex and include the direct effects on mental health of material deprivation, higher levels of unemployment, and job insecurity in people of lower socioeconomic position, differences in social support in relation to social class, and downward social migration in people who develop mental illness.

The findings of Agerbo et al in relation to suicide risk in former psychiatric inpatients are therefore at odds with the general pattern of suicide risk associated with poverty. Low income and increased suicide risk were strongly associated in the general population (risk ratio in the lowest income group compared with the highest, 2.27 (95% confidence interval 1.82 to 2.83)), but the opposite was seen in people who had previously been admitted to a psychiatric hospital for treatment. Patients from the high income group who had recently been discharged from hospital seemed to be at two to three times greater risk of committing suicide than patients from the low income group. The risk ratio in the lowest income group compared with the highest group was 0.35 (0.17 to 0.69).

Agerbo et al say that this association could be the result of the greater stigma associated with mental illness among rich people or, less plausibly, because this group is undertreated. Confounding by severity of illness may also explain the observed patterns of risk. The greater resources available to richer patients may enable them to avoid admission to hospital, and so they may hold out against admission for longer at any level of severity of psychiatric ill health. Equally, less severe illness in high income groups may be treated in private clinics. Thus, patients from high income groups who are admitted to public hospitals may have more severe mental illness than patients from lower income groups. The authors have tried to control for this possible effect by including in their multivariable models terms for diagnosis and previous admission. However, it is uncertain whether these factors are able to capture subtle elements of illness severity. Furthermore, as relative risks before and after controlling for these variables are not presented, the extent of any possible residual confounding is impossible to assess.

Is there any support for these findings from other research in this area? In an American study of mortality in former psychiatric outpatients, the most educated group (and, by implication, those with higher incomes) had the greatest increased risk of unnatural death, and the largest category of unnatural deaths was suicide.[3] However, this was a small study with only eight cases of suicide and undetermined cause of death in a total of 43 deaths. Two case-control studies in Britain have recently assessed suicide risk factors in current and former psychiatric inpatients.[4 5] While neither study presented information on income, both assessed unemployment as a possible risk factor. Unemployment is a recognised risk factor for suicide and may act as a proxy measure for income, but in neither of these studies did it predict risk. In fact, unemployment was associated with a non-significant, 30% reduction in risk in one study.[4] These studies suggest that for unemployment, as with income in the analysis of Agerbo et al, risks may differ in psychiatric patients and the general population. In none of these studies, however, was the severity of the psychiatric illness comprehensively controlled for in relation to associations between either education or unemployment and suicide.

Further studies in which illness severity is adequately controlled for are needed to determine whether any increased risk of suicide in high income psychiatric inpatients is due to the greater severity of illness or the stigmatising effects of admission to hospital in this group.

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