Substance misuse and violent crime: Swedish population study

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Many studies have reported strong associations between substance misuse and violent crime.[1] But the population impact of people diagnosed with substance use disorders on such crime is not known. Calculating the population impact and the relative importance of different classes of drugs is necessary to estimate the likely public health effect of any developments in services and treatment interventions in preventing violent crime.

To investigate the overall impact of substance misuse on violent crime, we estimated the population attributable risk using data from high quality national psychiatric and crime registers in Sweden from 1988 to 2000.

Participants, methods, and results

Swedish citizens have a unique identification number that can be used to link data across health and crime registers. The hospital discharge register contains diagnoses of all individuals who are admitted to any general, psychiatric, or secure hospital for assessment or treatment. All patients are given a clinical diagnosis on discharge according to ICD-9 (until 1996) and ICD-10 (from 1997) (international classification of diseases, 9th and 10th revisions). This register is valid and reliable for psychiatric diagnoses.[2]

The national crime register includes conviction data for people aged 15 (the age of criminal responsibility) and older. We extracted information on all individuals who had committed violent crimes—homicide, aggravated assault, common assault, robbery, threatening behaviour and harassment, arson, and any sexual offence. We included every violent crime committed by each convicted individual. Conviction data included those whose court ruling involved a mental health disposal; a non-custodial sentence, caution, or fine; a finding of legal insanity.

We identified individuals from the hospital discharge register with any principal or secondary diagnosis of alcohol misuse and alcohol induced psychoses (codes 291, 303, and F10), drug misuse and drug induced psychoses (292, 304, and F11-19) from 1 January 1988 to 31 December 2000 and linked them to the crime register. We calculated the population attributable risk (PAR; the absolute difference in the rate of violent crimes per 1000 inhabitants in the whole population and the rate in individuals that had not been patients with substance misuse), and the population attributable risk fraction (PAF; the proportion of violent crimes in the whole population that may be attributed to patients with substance misuse) with standard methods assuming Sweden's average population over age 15 during 1988-2000 was 6 724 503.[3]

During 1988-2000, 127 789 individuals (1.9% of the population) were discharged from hospital with diagnoses of substance misuse (mean age at first admission 49.1 (standard deviation 16.4) years; 28.4% female) and committed 80 215 violent crimes. The individual population attributable risk fractions for alcohol and substance misuse were 16.1% and 11.6% (table). The overall population attributable risk fraction for substance misuse was not calculated by adding these individuals' population attributable risk fractions, as some were admitted on repeated occasions, and a particular individual may have been diagnosed with alcohol or drug misuse on separate hospitalisations. The overall population attributable risk fraction for patients discharged with a principal diagnosis of

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Population attributable risk (PAR) and population attributable risk fraction (PAF) of patients with substance misuse to violent crime in Sweden 1988-2000

	No people admitted to hospital	No crimes committed by non-patients	No crimes committed by patients	r*	r_0*	r_1*	PAR	PAF (%)
Principal diagnosis:								
Misuse of any substance	127 789	244 168	80 215	48.2	37.0	627.7	11.2	23.3
Alcohol misuse	105 918	267 558	56 825	48.2	40.4	536.5	7.8	16.2
Drug misuse	38 228	265 565	58 818	48.2	42.6	1318.0	5.6	11.6
Drug misuse:								
Opiates	6 167	316 091	8 292	48.2	47.0	1344.6	1.2	2.5
Cannabis	3 118	318 679	5 704	48.2	47.4	1829.4	0.8	1.7
Sedatives	5 004	321 676	2 707	48.2	47.9	541.0	0.4	0.8
Cocaine	196	323 992	391	48.2	48.2	1994.9	0.1	0.1
Amphetamines	5 523	313 049	11 334	48.2	46.6	2052.1	1.6	3.4
Hallucinogens	293	323 921	462	48.2	48.2	1576.8	0.1	0.1
Solvents	368	323 791	592	48.2	48.2	1608.7	0.1	0.2
Poly-drug misuse	13 413	303 446	20 937	48.2	45.2	1560.9	3.0	6.3
Drug induced psychosis	4 146	315 984	8 399	48.2	47.0	2025.8	1.2	2.5

*r is the number of violent crimes per 1000 individuals in the whole population over the study period, r_0 is the number of violent crimes per 1000 among individuals not hospitalised for substance misuse, and r_1 is the number of violent crimes per 1000 hospitalised patients with substance misuse. Calculations accounted for all admissions. Individuals admitted on several occasions receiving different diagnoses were counted in relevant diagnostic categories. The population attributable risk PAR=r–r_0 and population attributable risk fraction PAF=PAR/r.

substance misuse was 23.3%. We redid the analyses including secondary diagnoses of alcohol and drug misuse, which increased the population attributable risk fraction slightly to 24.7% (data not shown).

Comment

We found that 16% of all violent crimes in Sweden during 1988-2000 were committed by people who had hospital discharge diagnoses of alcohol misuse, and more than a tenth of all violent crimes were committed by patients diagnosed as having misused drugs. Treatment services aimed at alcohol and drug misusers can potentially reduce violent offending.

The approach of population attributable risk is one way of exploring the relationship between substance misuse and violent crime. It assumes a causal relationship between the two and so estimates the maximum possible impact that any intervention might have. However, the co-occurrence of substance misuse and violent crime does not necessarily imply a simple causal relationship.

Integrating mental health and substance misuse services leads to improved outcomes.[4] This integration should be extended to the criminal justice system. The costs to the criminal justice system of drug related crime are enormous—for example, in the United Kingdom, a conservative estimate is £1bn ($1.8bn; €1.5bn) annually.[5] Interventions to reduce the risk of violence in patients who misuse alcohol and drugs could be highly cost effective.

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Regional differences in outcome from subarachnoid haemorrhage: comparative audit

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Subarachnoid haemorrhage affects 10 per 100 000 UK residents a year. More than half the cases are fatal, and serious disability is common among the survivors. Modern management has reduced death and disability by about 30% compared with 30 years ago.[1] We conducted a prospective collaborative audit. No other units were involved.

Participants, methods, and results

The Newcastle neurosurgery unit serves a population of 2.4 million[2] and has 78 adult beds. It is one of five units in the British Isles that are deemed by *Safe Neurosurgery 2000* to have enough beds for their populations.[2] The Nottingham unit serves a population of three million[2] and has 36 beds. It is one of the three most under-resourced units in the British Isles.

We audited all patients presenting with a subarachnoid haemorrhage confirmed on computed tomography or lumbar puncture between 1992 and 1998. Patients' demographic and presenting clinical data were recorded during their admission. Outcome was recorded at clinic follow up, by postal questionnaire, or telephone and was obtained for 1822 of the 1851 cases in the study. The shortest interval between presentation and follow up was 6 months, and the average 12 months; these were similar for both units.

Logistic regression of outcomes

Variable	Odds ratio of unfavourable outcome W (95% confidence limits)	P value
Unit:		
Newcastle	1.07 (0.82 to 1.41)	0.60
Nottingham	1	
WFNS grade*:		
1	1	
2	2.08 (1.51 to 2.85)	<0.0001
3	5.06 (2.96 to 8.63)	<0.0001
4	7.49 (5.16 to 10.89)	<0.0001
5	38.16 (25.05 to 58.14)	<0.0001
Patient age	1.04 (1.03 to 1.05) (per year)	<0.0001

*Grading according to the World Federation of Neurological Surgeons.[4]
Regression coefficients are given as a geometric model with constant = 0.0159 so that probability of unfavourable outcome = $0.0159*W*1.04^{age(years)}$.

Full time research assistants were employed in each unit to collect the data. After careful and in-depth work, important errors were found and corrected in a quarter of cases. Funding was not available after 1998.

Good recovery and moderate disability (according to the Glasgow outcome score[3]) were classed as favour-

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