Substance use and schizophrenia: effects on symptoms, social functioning and service use

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Background Studies examining the effects of substance use in patients with schizophrenia have produced conflicting results.

Aims To examine the effects of comorbid substance use on symptoms, social functioning and service use in patients with schizophrenia.

Method Patients (*n*=316) with and without substance use problems from three centres participating in the Scottish Comorbidity Study were compared, using research interviews and case note review, on measures of symptoms, social functioning and service use.

Results Patients with substance use problems were younger, more likely to be male and had shorter duration of illness. They had more police contact and increased self-reported needs, but otherwise showed few differences when compared with those without such problems.

Conclusions The presence of problem substance use had only modest impact on service use, symptoms or social functioning for this group of patients with schizophrenia. This has important implications for service development to meet the perceived needs of this group.

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Research in North America suggests that the co-occurrence of substance misuse and severe mental illness is common, and has a range of adverse effects on course of illness, service use and outcome (Drake *et al*, 1991). Similar evidence has emerged from studies in the UK in which patients with psychosis who had substance use problems spent more days in hospital compared with patients who did not (Menezes *et al*, 1996) and were more likely to report offending or hostile behaviour (Scott *et al*, 1998). Others report less-negative consequences, suggesting little adverse impact of substance use on symptoms, course of illness or service use (Zisook *et al*, 1992; Warner *et al*, 1994). Such conflicting results make it difficult to estimate the level of need of this group (who comprise at least a quarter to a third of patients with schizophrenia in most populations surveyed). The bulk of evidence comes from North America, where substance use patterns and service provision may differ. Many evaluations have involved only a few participants, and cohorts have frequently consisted of selected samples. To examine the consequences of substance use in a representative UK sample, we compared people with problem substance use with others taking part in a large study examining the prevalence, pattern and consequences of substance use among patients with schizophrenia in three areas of Scotland.

METHOD

Participants

Participants were drawn from three sites: Nithsdale, a rural area in south-west Scotland (population 57 000); west Glasgow, an inner-city area with high levels of deprivation (population 53 000); and a suburban area of Aberdeen (population 32 000). In Nithsdale and Glasgow participants were drawn from defined geographical areas; in Aberdeen, they were identified through five associated general practices (representative of suburban Aberdeen) which made up the catchment area of one community mental health team. Including three sites had the advantage of obtaining representative urban and rural populations. All patients with schizophrenia aged at least 16 years, who were known to primary or secondary care services, were included. Social services and voluntary services were also approached to complete identification. This 'key informant' method has been described by McCreadie (1982). Case notes were examined and only those with a consensus diagnosis of schizophrenia (after discussion with a senior investigator), based on the ICD–10 research diagnostic criteria (World Health Organization, 1993), were included. In addition, the Operational Checklist for Psychiatric Disorders (OPCRIT) (McGuffin *et al*, 1991) was completed and computer-generated research diagnoses obtained for all participants.

This study formed part of a wider investigation into the prevalence of substance misuse among patients with schizophrenia in three areas of Scotland when compared with locally recruited controls. Details of prevalence rates in comparison with controls may be found in the paper by McCreadie *et al* (2002). Ethical approval was obtained from the relevant local ethics committees and all participants gave informed, written consent before inclusion.

Assessment

All participants were interviewed by research nurses, who used sections 11 and 12 of the Schedules for Clinical Assessment in Neuropsychiatry (SCAN) (World Health Organization, 1994) to identify 'lifetime' (i.e. any time preceding the year up to interview) and 'past year' drug and alcohol use. The three research nurses were trained in the use of this instrument and reliability was checked by reviewing recorded interviews at several points throughout the study. Basic demographic details, including age, gender, ethnicity and social deprivation, were obtained. Social deprivation was determined from the participants' postcodes, using the Carstairs Deprivation Index (Carstairs & Morris, 1990). Service use was estimated by recording contacts with primary care staff, community mental health team members, out-patient services, depot clinics, general hospitals, accident

and emergency departments, police and other (e.g. voluntary) services within the past year. Number of psychiatric admissions, days spent in hospital and use of the Mental Health Act over the preceding 2 years were also recorded. Social functioning was assessed using the Global Assessment Scale (GAS; Endicott *et al*, 1976), in addition to information on marital status, living arrangements and employment. The Camberwell Assessment of Need (CAN; Slade *et al*, 1999) was used to gauge subjective and keyworker-reported needs (both met and unmet). In addition, all participants were interviewed by research psychiatrists, who administered the Positive and Negative Symptom Scale (PANSS; Kay *et al*, 1987) to assess current symptom severity. Regular reliability checks, by reviewing recorded assessments, were also carried out for this instrument throughout the study period.

For the purposes of this study, participants were identified as having problem use if they met ICD–10 research criteria for harmful use or dependence. Based on the SCAN interview, participants were further divided into those with problem use in the past year and those with lifetime use. Although it might be hypothesised that recent use is more likely to influence symptoms, social functioning and service use, lifetime use might also affect the course of illness and so is reported here as well.

To help corroborate the participants' reports of current use, every 20th patient was asked to give a urine sample (for cannabis measurement) and a hair sample (for measurement of opioids, sedatives, cocaine, stimulants, hallucinogens and volatile substances) to assess drug use in the previous 3 months (up to 30 days for cannabis). Substance use was also assessed by interview with keyworkers using a five-point rating scale (Drake *et al*, 1989). Laboratory analysis revealed no significant discrepancy with participants' own accounts of their drug-taking, but the accounts agreed relatively poorly with keyworker ratings (although in no consistent fashion). We thus relied on the extended research nurse interview (i.e. participant report) as providing the most reliable information on substance use.

Analysis

Chi-squared tests for categorical data and *t*-tests for continuous variables were used for univariate analyses. As there were multiple comparisons, only differences at the 1% level were regarded as significant.

RESULTS

Prevalence of problem substance use

Of the 446 patients who were identified, 130 (29%) either refused consent or were untraceable. Non-participants did not differ from the remainder in age, gender distribution, duration of illness, deprivation scores or OPCRIT diagnoses. Among the 316 participants, 22 (7%) reported problem drug use in the past year and 66 (21%) at some time before that.

Cannabis was the most commonly used drug, followed by opioids for current users and stimulants for lifetime users. Regarding alcohol, 49 (16%) reported problem use in the past year and 122 (39%) in the time before that. When combined, 64 (20%) had problem drug and/or alcohol use (hereafter referred to as problem substance use) in the past year and 141 (45%) at some time before that. Further details of substance use in this sample (including exact numbers with harmful use and with dependence) have been published separately (McCreadie *et al*, 2002).

Demographic findings

Comparisons of participants who were problem users and those who were not, in terms of gender, age, ethnicity, social deprivation and illness duration, are given in Tables 1 and 2. Younger age and male gender were associated with problem use (either current or past), as was shorter duration of illness. There was no difference in the age at onset between the two groups, but those who were problem drug users in the past year had an earlier age of onset of illness when examined separately (23.9 years *v*. 27.9 years, *P*=0.002). Those with problem alcohol use in the past year were also more likely to be in employment than their non-problem-using counterparts. Numbers were too small to detect any differences in ethnicity.

Table 1 Characteristics of participants reporting past-year problem substance use *v*. no problem substance use: gender, age, social deprivation, illness duration and age at onset

	Problem use (*n*=64)	No problem use (*n*=252)	Comparison statistics (99% CI)
Gender (*n*=316)			χ^2=12.2, d.f.=1, *P*<0.001, OR=3.2 (1.3 to 7.8)
Males (*n*)	52	145	
Females (*n*	12	107	
Age, years (*n*=316)			
Mean (s.d.)	38.2 (9.3)	47.1 (14.4)	*t*=4.7, d.f.=314, *P*<0.001 (−13.9 to −4.3)
Deprivation category (*n*=312)			χ^2=7.29, d.f.=2, *P*=0.028
Most affluent (*n*)	11	46	
Middle (*n*)	32	158	
Most deprived (*n*)	21	44	
Illness duration, years (*n*=296)			
Mean (s.d.)	11.5 (7.8)	19.7 (13.1)	*t*=−4.4, d.f.=294, *P*<0.001 (−12.9 to −3.3)
Age at onset, years (*n*=296)			
Mean (s.d.)	26.3 (7.4)	27.2 (9.3)	*t*=0.676, d.f.=294, *P*=0.499 (−4.4 to 2.6)

Table 2 Characteristics of participants reporting 'lifetime before' problem substance use *v.* no problem substance use: gender, age, social deprivation, illness duration and age at onset

	Problem use	No problem use	Comparison statistics (99% CI)
Gender (*n*=316)			χ^2=40.1, d.f.=1, *P*<0.001, OR=5.0 (2.5 to 9.9)
Male (*n*)	115	82	
Female (*n*)	26	93	
Age, years (*n*=316)			
Mean (s.d.)	39.6 (10.5)	49.9 (14.9)	*t*=−6.9, d.f.=314, *P*<0.001 (−14.1 to −6.4)
Deprivation category (*n*=312)			χ^2=8.3, d.f.=2, *P*=0.016
Most affluent (*n*)	21	36	
Middle (*n*)	79	111	
Most deprived (*n*)	139	26	
Illness duration, years (*n*=296)			
Mean (s.d.)	13.9 (9.3)	21.5 (13.9)	*t*=−5.3, d.f.=294, *P*<0.001 (−11.2 to −3.9)
Age at onset, years (*n*=296)			
Mean (s.d.)	25.7 (7.1)	28.2 (10.1)	*t*=−2.4, d.f.=294, *P*=0.019 (−5.2 to 0.23)

Table 3 Scores on the Positive and Negative Symptom Scale (PANSS) and the Global Assessment Scale (GAS): past-year problem substance use *v.* no problem substance use

	Problem use (*n*=63) Mean (s.d.)	No problem use (*n*=250)[1] Mean (s.d.)	Comparison			99% CI of the difference
			t	d.f.	*P*	
GAS score	49.6 (11.8)	51.1 (12.5)	−0.878	310	0.380	−6.1 to 3.0
PANSS score						
Positive symptoms	15.9 (5.9)	14.2 (5.9)	2.0	309	0.046	−0.49 to 3.8
Negative symptoms	17.1 (6.2)	16.7 (7.7)	−0.43	309	0.668	−2.1 to 2.9
General	32.6 (8.4)	29.3 (7.8)	2.9	309	0.004	0.35 to 6.2
Total	65.6 (16.4)	60.2 (17.2)	2.2	309	0.026	−0.85 to 11.6

1. Maximum.

Table 4 Scores on the Positive and Negative Symptom Scale (PANSS) and the Global Assessment Scale (GAS): 'lifetime before' problem substance use *v.* no problem use

	Problem use (*n*=138)[1] Mean (s.d.)	No problem use (*n*=174)[1] Mean (s.d.)	Comparison			99% CI of the difference
			t	d.f.	*P*	
GAS score	51.1 (12.0)	50.5 (12.6)	0.414	310	0.679	−3.1 to 4.2
PANSS score						
Positive symptoms	15.3 (6.0)	13.9 (5.8)	2.2	309	0.028	−0.26 to 3.2
Negative symptoms	16.8 (6.4)	16.8 (7.5)	0.03	309	0.978	−2.1 to 2.1
General	31.2 (7.9)	29.1 (8.0)	2.3	309	0.021	0.26 to 4.5
Total	63.3 (16.4)	59.7 (17.6)	1.84	309	0.067	−1.5 to 8.6

1. Maximum.

Symptoms and social functioning

Symptoms were measured using sub-scale (positive, negative and general) and total scores from the PANSS. Higher scores on the general sub-scale (which includes anxiety and depression ratings) reached significance for the group with problem substance use (past year) but this difference disappeared in the total scores (Tables 3 and 4). On measures of social functioning, GAS scores were not significantly different, nor was there any difference in living arrangements or marital status. Those reporting problem use (both past year and lifetime) did, however, have a greater

Table 5 Comparison of needs of those reporting past-year problem substance use or no problem substance use, based on the Camberwell Assessment of Need scores (n=316)

	Have needs?		Number of needs	Needs rating[1]
	Yes	No	mean (s.d.)	mean (s.d.)
Problem substance use?				
Yes	62	2	4.8 (2.9)	6.3 (4.4)
No	225	27	3.3 (2.4)	4.2 (3.4)
	χ^2=2.675, d.f.=1,		t=4.17, d.f.=313,	t=4.329, d.f.=313,
	P=0.102, OR=3.7		P<0.001	P<0.001
	99% CI 0.5–25.5		99% CI 0.6–2.4	99% CI 0.9–3.5

1. Needs rating calculated on scores of 1 for a partially met need or 2 for an unmet need.

Table 6 Comparison of needs of those reporting 'lifetime' problem substance use v. no problem substance use, based on the Camberwell Assessment of Need scores (n=316)

	Have needs?		Number of needs	Needs rating[1]
	Yes	No	mean (s.d.)	mean (s.d.)
Problem substance use?				
Yes	128	13	4.2 (2.9)	5.4 (2.9)
No	159	16	3.2 (2.3)	4.0 (3.2)
	χ^2=0.0, d.f.=1, P=1.0,		t=3.29, d.f.=313,	t=3.468, d.f.=313,
	OR=1.0		P<0.001	P<0.001
	99% CI 0.4–2.7		99% CI 0.2–1.7	99% CI 0.4–2.5

1. Needs rating calculated on scores of 1 for a partially met need, 2 for an unmet need.

self-reported number of needs and higher mean needs rating (combined scores for partially met or unmet need) (Tables 5 and 6).

Service use

With the exception of increased attendance at depot clinics (22.5% v. 11.2%, P=0.008; OR=2.3, 95% CI 1.0–5.2) for lifetime problem substance users, and increased contact with psychiatrists (95.3% v. 82.3%, P=0.01, OR=0.2, 95% CI 0.05–1.1) for past-year substance users, participants with problem drug or alcohol use were no more likely than those without substance use problems to have accessed primary care or to have had contact with other specific individuals in secondary care services (community psychiatric nursing, occupational therapy, psychology or social work) within the preceding year. Neither were they more likely to have attended general hospitals or accident and emergency departments. They did, however, have more police contact (past-year users 34.9% v. 14.9%, P<0.001, OR=3.1, 95% CI 1.3 to 7.0; lifetime users 29% v.

10.8%, P<0.001, OR=3.4, 95% CI 1.5 to 7.5). This reflected both greater reporting of crimes committed against the participants, and police contact for other reasons. Our method did not allow a further breakdown of these data. Numbers of admissions (past-year users 0.67 v. 0.89, P=0.259, 99% CI −0.6 to 0.16; lifetime users 0.85 v. 0.6, P=0.113, 99% CI −0.59 to 0.55), days admitted (past-year users 96.7 v. 61.8, P=0.211, 99% CI −19.9 to 89.8; lifetime users 78.3 v. 98.5, P=0.371, 99% CI −64.7 to 24.2) and detentions under the Mental Health Act (past-year users 0.2 v. 0.32, P=0.225, 99% CI −0.37 to 0.13; lifetime users 0.31 v. 0.16, P=0.066, 99% CI −0.58 to 0.34), all within the previous 2 years, also showed no significant difference.

DISCUSSION

An editorial in the *BMJ* (Weaver *et al*, 1999) has called for research to underpin policy and services for patients with comorbidity in the UK. Existing research points to a high prevalence of substance use among

patients with severe mental illness (Regier *et al*, 1990; Menezes *et al*, 1996) and there has been presumed to be a consequent adverse effect on symptoms and outcome. Although we did find some increased service use (police, psychiatrist and depot clinic contact), the increased police contact cannot necessarily be ascribed to more behavioural disturbance, and explanations for increased depot clinic attendance may include a different clinical approach to non-compliance. We also found a greater number of self-reported needs (either met or unmet) in people who were problem users. The most striking finding from this study, however, is the minimal effect of problem substance use on symptoms, service use or social functioning. This contrasts with the body of evidence from North America. Linszen *et al* (1994) found increased severity of symptoms and relapse. More-frequent hospital admission was reported by Drake *et al* (1989) and Swofford *et al* (1996). Other findings included greater use of emergency services, increased homelessness, and greater propensity for violent behaviour and suicidality. It has also been suggested that substance misuse comorbidity represents a significant cost to health services (Dickey & Azeni, 1996). One report from an inner-London catchment area, however, did not find an association between non-alcohol substance misuse and admission to hospital (Duke *et al*, 2001).

Methodological issues

One possible explanation for our finding is that those identified but not interviewed were more likely to be substance users. Although we cannot entirely rule this out, no difference emerged on any of the demographic and clinical factors that we were able to ascertain. Although the rates for problem drug use in the past year in our sample are a little lower than those reported in other UK studies (e.g. Menezes *et al*, 1996), the participants in the latter tended to be urban-based and younger. Underreporting could also have led to our finding of lack of difference. Our method of case finding was detailed and comprehensive, and corroborative hair and urine analyses in a subsample did not reveal recent use in those who denied it. When all other factors (such as age, geographical setting and diagnosis) are taken into account, the proportion of patients who were problem substance users is unlikely to differ

greatly in our sample from those in other recent UK studies (Menezes *et al*, 1996; Brown, 1998).

Reasons for the lack of difference

Are there other possible explanations for the lack of difference in this sample? Although most studies of chronically ill populations have found a detrimental effect of substance use, in many the participants were drawn from hospitalised, urban samples. Our patients were predominantly community-based, and came from a mix of urban and rural settings. Their level of problem substance use and any associated consequences may therefore more accurately reflect patterns throughout the UK. Similar lack of effect in a community sample was reported by Zisook *et al* (1992). Warner *et al* (1994), who also found little adverse consequences of substance use, suggest another explanation – that the finding of poorer outcome for patients with comorbid substance misuse might be mediated through non-compliance with treatment. They suggest that assertive community support might minimise this effect and thus any adverse consequences. We could not assess compliance, but all three areas in this study have well-developed community mental health teams and easy access to support for patients. Last, it has been suggested that patients with schizophrenia who are substance misusers might be a more able group at onset (Arndt *et al*, 1992) and that those with the most severe forms of illness are too disabled to engage in drug-seeking activity. Our study design could not test this hypothesis.

Relevance of our findings

These results should be interpreted with caution. They do not suggest that problem substance use in itself is of no consequence to this group. By definition, these people have suffered through this misuse. As has been previously noted, we cannot predict what level of functioning such patients might have had if they were not substance users (Zisook *et al*, 1992), and there remains an onus on general psychiatry and specialist addiction services to address their needs. What this paper does add is the interpretation that, in a sample that is older and more representative of urban and rural populations than samples in other UK studies, problem substance use may inflict less-severe damage than previously suspected.

CLINICAL IMPLICATIONS

■ The effects of substance use on symptoms, social functioning and service use in patients with schizophrenia may be less marked than previously reported.

■ Problem substance use in patients showed no effect on measures of admission to hospital, use of the Mental Health Act or contact with most other primary and secondary care services.

■ Problem substance use is more likely in patients who are male, of younger age, and (for drug users) have an earlier age of onset of psychosis.

LIMITATIONS

■ Nearly a third of the study sample did not respond.

■ Hair and urine analysis were limited to 1 in 20 of the participants.

■ The participants' own reports conflicted with keyworker ratings of problem substance use.

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