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Sudden death in psychiatric patients

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Background The present study investigated histories of prior psychiatric treatment in cases of sudden death reported to the coroner.

Methods A matching survey linked the register of deaths reported to the coroner with a comprehensive statewide psychiatric case register covering both in-patient and community-based services.

Results Sudden death was five times higher in people with histories of psychiatric contact. Suicide accounted for part of this excess mortality but deaths from natural causes and accidents were also elevated. Schizophrenic and affective disorders had similar suicide rates. Comorbid substance misuse doubled the risk of sudden death in affective and schizophrenic disorders.

Conclusions The rates of sudden death are sufficiently elevated to raise questions about current priorities in mental health care. There is a need both for greater attention to suicide risk, most notably among young people with schizophrenia, to the early detection of cardiovascular disorders and to the vigorous management of comorbid substance misuse.

Death rates among those who have been patients of mental health services are reported to be higher than for the general population (Farr, 1841; Ødegard, 1952; Gausset *et al*, 1992; Berren *et al*, 1994; Rossler *et al*, 1995; Hansen *et al*, 1997). Though suicide rates are raised across a wide range of mental disorders (Harris & Barraclough, 1997) this only accounts for part of the increased mortality. Premature death may also result from accident proneness, coexisting substance misuse (including smoking), financial and social deprivation, the side-effects of various medications and a greater incidence of concurrent physical illness (Sims, 1989; Corten *et al*, 1991; Mehtonen *et al*, 1991; Lereya *et al*, 1995; Holding & Barraclough, 1975).

Objective measures of the quality of psychiatric care have proved elusive. Suicide rates have been proposed as one such indicator but the use of wider notions of sudden, or premature, death have received less attention than they perhaps deserve. The present study set out to examine the relationship between sudden death and having previously received psychiatric care as the first stage in establishing the patterns of such mortality and their change with changing patterns of care delivery.

METHOD

A matching survey was conducted that manually linked the register of deaths reported to the State Coroner of Victoria (total population 4.5 million with 3.6 million over the age of 15 years) between January and December 1995, and the database of all patients who had received care from public sector mental health services in Victoria.

The coroner has a statutory responsibility to investigate all deaths in which the death was unexpected, unnatural, violent or resulted from accident or injury. Other deaths reportable to the coroner include deaths under anaesthesia, where the body is not identified, where the cause of death is not known and where the person died in custody. In total, 3831 cases were reported to the coroner in 1995, of which 176 cases under the age of 15 years were excluded from the investigation, together with another 23 cases in which the body was not identified. This left 3632 individuals who were than matched by full name and date of birth with the records contained in the psychiatric case register. The Victorian Psychiatric Case Register (VPCR) which was established in 1961 has been described as one of the largest databases in the world for psychiatric research (Eaton *et al*, 1992), though it has been little exploited until recently. The contemporary register lists 135 992 individuals over the age of 15 years and contains data on all contacts with over 95% of public out-patient, community and in-patient services (Burgess *et al*, 1992). In 1995, 31 000 (8.1 per 100 000) individuals were recorded as having had contact with the public psychiatric services, in over 70% of whom their care was entirely in the community. The register details contacts with services as well as the diagnosis or diagnoses (coded using ICD–9; World Health Organization, 1978) given by the attending psychiatrist, systematic reclassification of which has revealed good diagnostic reliability for schizophrenia though a less favourable result for non-psychotic disorders (Krupinski *et al*, 1982). The register is employed to monitor levels of service activity with potential funding implications which provides a stimulus for maintaining full and prompt returns. The private sector, which does not report to the register, accounts for 6% of in-patient beds and provides out-patient services to a significant number of individuals, though predominantly with non-psychotic disorders.

The schizophrenia group, for the purposes of this paper, includes all ICD–9 codes 295 plus paranoid states (297). The affective disorders grouping incorporates ICD–9 codes 296, plus other codes for depressive disorders. The personality disorders category comprises all 301 codes. The alcohol and drug misuse categories include dependence and misuse as well as 291 and 292. Organic disorders incorporates 290, 293, 294 and in addition codes outside of the mental disorders section including 331. The other disorders incorporates all residual mental disorder categories. A no final diagnosis group is included constituting the 17% of cases on

the current register for whom there is no recorded diagnosis, virtually all of whom were out-patient and community contacts, the majority having only a single recorded contact. Patients with multiple treatment episodes can have varying primary diagnoses. In this analysis a single primary diagnosis was assigned through a diagnostic hierarchy with organic disorders taking precedence, then in descending order schizophrenic disorders, affective disorders, other neurotic disorders, personality disorders and substance misuse. The manual linkage was checked on 100 cases by an independent rater and with a specially developed computer algorithm with better than 95% agreement between the three evaluations.

The two databases allow determination of the frequency with which those with prior treatment for particular mental disorders appear in the various categories of sudden death, and this in turn allows comparison to the expected frequency with which individuals recorded in the register should appear, given their representations in the total population. This relationship was expressed in terms of a relative risk which was tested for significance using a modified χ^2 test (Armitage & Berry, 1987). Standard mortality ratios were also calculated which express the excess mortality from sudden death reported to the coroner among those on the register compared with that expected in the general population. The age at death was also established for each diagnostic group and the lapse of time between their most recent in-patient care (if any) and death. To calculate a relative risk of dying as an in-patient or within a year of discharge a comparison was made with the average number of people that had been receiving in-patient care in the previous 12 months calculated at three-month intervals through 1995.

The coding system employed on the VPCR allows the clinician to record comorbid conditions, including alcohol and drug misuse. A coding for substance misuse has been added on at least one occasion in 17.5% of the schizophrenic and 11% of the affective disorders groupings. This allowed an analysis of the differences in sudden death for those with and without comorbid substance misuse, though numbers were not sufficient to differentiate between alcohol and drug misuse.

The study was approved by the Ethics Committee of the Department of Human Services.

RESULTS

There were 636 matches established with the psychiatric case register among the 3632 coroner's cases. In 36 cases (1%) no classification of the type of death involved was recorded, and the case file itself could not be located within the State Coroner's Office. Identification details were nevertheless present, and so the cases were retained for overall representation of diagnostic groupings, but excluded from the analysis of type of death classifications.

In Table 1 the overall frequencies with which coronial cases had had prior psychiatric treatment in the public mental health services are presented together with those for each of the major diagnostic groups. The relative risk of individuals recorded on the psychiatric case register dying in circumstances that are reported to the coroner was over five times higher than expected with all the reported diagnostic groups showing an increase (see Table 1). In those people who had received in-patient care in the year prior to their death the relative risk of death increases to at least six times that of the general population with organic disorders, drug misuse, schizophrenic disorders and affective disorders all showing marked increases.

The coroner's cases identified in the psychiatric case register are on average 11 years younger than those with no record of prior psychiatric contact and with the exception of the organic disorders, which includes people suffering from dementia, the mean age of each diagnostic group is significantly lower ($P<0.001$). Those who were recorded on the psychiatric case register had a median age of death of 45 with over 70% of deaths occurring before the age of 55 and 40% of deaths occurring before 35. The cases of sudden death not on the psychiatric register had a median age of death of 57, with 40% of deaths occurring before 55 and 18% of deaths before 35. People who misused drugs had the lowest mean age at death with 70% dying prior to the age of 35. In those with schizophrenic disorders there also occurred a preponderance of deaths at a younger age with 70% dying before the age of 55 and 45% prior to 35. This tendency is also present in affective disorders with 31% dying before reaching 35.

Suicide

The coroner's findings indicated suicide in 569 people. This group contained 188 people who were recorded on the case register, which is 12 times higher than expected. With the exception of those suffering from organic disorders, all diagnostic populations have an overall relative risk of suicide at least four times that of the general population, with the highest relative risks being in those suffering from affective and schizophrenic disorders (see Table 2). The relative risk of suicide for the people who had been recently hospitalised rose in comparison to the overall relative risk (see Table 2). Seventy-seven of the people who took their own life in 1995 did so while hospitalised or within a year of

Table 1 Sudden death in psychiatric patients

Diagnosis	Population size	Number in coroner's records	Mean age	Standard morbidity ratio (95% CI)	Relative risk – all cases (95% CI)	Relative risk for in-patients in previous year (95% CI)
General population	3 561 211	2996	56.9	–	–	
Total register population	135 992	636	45.0	4.2 (3.9–4.6)	5.4* (4.9–5.8)	6.3* (5.6–7.2)
Organic disorders	14 600	72	63.8	2.1 (1.6–2.6)	4.9* (3.9–6.2)	18.1** (13.8–23.7)
Schizophrenia	25 202	123	43.2	4.8 (4.0–5.7)	4.9* (4.1–5.9)	6.7* (5.4–8.3)
Affective disorders	25 365	100	45.4	6.6 (2.9–4.3)	4.0* (3.2–4.8)	6.0* (4.7–7.7)
Other disorders	25 044	45	39.4	2.8 (2.0–3.7)	1.8** (1.3–2.4)	2.2** (1.4–3.4)
Personality disorders	3382	14	46.4	4.7 (2.2–7.2)	4.1* (2.4–6.9)	2.3** (1.0–6.0)
Drug misuse	8160	60	31.8	9.4 (7.0–1.8)	7.4* (5.7–9.5)	13.9* (8.4–23.2)
Alcohol misuse	11 306	40	43.2	2.9 (2.0–3.8)	3.5* (2.6–4.8)	6.1* (2.3–6.4)
No final diagnosis	22 933	182	44.4	7.6 (6.5–8.7)	8.2* (7.1–9.5)	4.0* (2.7–5.9)

*$P<0.001$. **$P<0.05$.
The general population is for those 15 years and over.

Table 2 Suicide and psychiatric disorder

Diagnosis	Number	Mean age	Proportion male	Relative risk – all cases (95% CI)	Relative risk – in-patiets in previous year (95% CI)
General population	381	41.6	76%	–	–
Total register population	188	37.2	72%	12.4* (10.5–14.7)	17.9* (14.5–22.0)
Organic disorders	8	55.6	75%	3.5* (1.8–7.0)	14.7* (7.0–31.0)
Schizophrenia	50	32.3	66%	13.5* (10.1–18.1)	19.4* (14.0–27.0)
Affective disorders	49	40.0	69%	13.1* (9.8–17.6)	22.8* (16.4–31.8)
Other disorders	18	35.7	78%	4.6* (2.9–7.4)	7.4* (4.0–13.9)
Personality disorders	3	34.7	67%	5.6* (1.8–17.4)	3.2 (NS) (0.4–22.6)
Drug misuse	13	36.3	77%	10.2* (5.9–17.4)	5.8 (NS) (0.8–41.6)
Alcohol misuse	10	31.5	100%	5.6* (3.0–10.5)	9.7** (1.4–69.4)
No final diagnosis	37	43.5	70%	10.7* (7.7–15.0)	11.9* (6.7–21.1)

*$P<0.001$. **$P<0.05$.

discharge from a psychiatric unit, a rate of death over 17 times that of the general population. The age at suicide for the general population (mean 42 years, 75% prior to the age of 55, and 43% prior to 35) is significantly higher than for individuals on the register (mean age 37 years, 89% died before 55 and 52% before 35). Those people with a history of affective disorders who committed suicide do not differ significantly in age distribution from the general population, but those with histories of schizophrenic disorders are significantly younger (mean 32 years, 96% prior to 55 and 70% prior to 35).

Accidents

There were 711 deaths by accident, mainly due to motor vehicle accidents, drug overdoses and drowning. Of these, 126 were matches with psychiatric case records (see Table 3). Drug misusers were at greatest risk but affective disorders were also over-represented, though not schizophrenic disorders.

Homicide

There were 53 findings of homicide, 11 of the victims had had prior psychiatric treatment (relative risk (RR) 4.8, 95% CI 2.5–9.3, $P<0.001$). The numbers are too small to allow a meaningful analysis by diagnostic groupings though it is worth noting four had received treatment for schizophrenic disorders.

Open findings

In the situations where the coroner found ambiguity as to whether the death was accidental or suicide an open finding was recorded. The psychiatric case register population is over 19 times more likely to appear in this grouping with alcohol misuse and drug misuse being the most dramatically over-represented followed by schizophrenic disorders and affective disorders (see Table 3).

Table 3 Accidential deaths and open findings

	Accidental deaths		Open findings	
	Relative risk (95% CI)	Involving drug overdose	Relative risk (95% CI)	Involving drug overdose
Total case register population	5.4* (4.5–6.5)	38%	16.7** (12.4–22.6)	51%
Schizophrenia	1.8 (NS) (0.9–3.5)	14%	8.0** (3.9–16.3)	100%
Affective disorders	3.4** (2.1–5.5)	9%	5.9** (2.6–13.3)	88%
Other diagnoses	2.0* (1.1–3.8)	58%	2.9 (NS) (0.9–9.2)	44%
Drug misuse	17.3** (11.8–25.4)	61%	49.2** (28.9–83.7)	38%
Alcohol misuse	1.8 (NS) (0.6–4.8)	15%	13.3** (2.9–30.0)	63%

*$P<0.05$. **$P<0.001$.

Unexpected death due to natural causes

Deaths due to natural causes constitute the largest proportion of classifications in the State Coroner's Office Register. This classification involves unexpected deaths which, upon examination of the deceased's body, prior medical history, and circumstances of death, are deemed to be due to natural causes. Of these 2041 deaths, 216 were located on the psychiatric case register (RR 3.0, 95% CI 2.6–4.3, $P<0.001$) with an over-representation noted for people who misused alcohol (RR 2.6, 95% CI 1.6–4.2, $P<0.001$), those with schizophrenic disorders (RR 2.9, 95% CI 2.1–3.9, $P<0.001$) and organic disorders (RR 6.0, 95% CI 4.6–8.0, $P<0.001$). The over-representation among schizophrenic disorders was accounted for by an excess of deaths due to cardiovascular disease.

In the population dying of natural causes not found on the psychiatric case register the median age at death was 68 with 23% dying before 55, whereas the median age at death in the psychiatric patient population was 63 with 35% dying prior to 55.

Autopsy negative results

In some of the cases investigated by the coroner in 1995, the cause of death could not be established, and thus the classification of the death was not possible. This occurred 40 times in 1995, and 22 of these cases involved individuals matched on the psychiatric case register (RR 30.8, 95% CI 18.3–46.5, $P<0.001$). Those with schizophrenic disorders were the most dramatically over-represented (RR 29.7, 95% CI 13.3–66.5, $P<0.001$), but people who misused alcohol (RR 25.5, 95% CI 7.9–82.3) and affective disorders (RR 15.5, 95% CI 5.5–43.3) were also significantly increased in this population.

Undetermined deaths are made up of a mixture of cases where the body is too deteriorated, burnt or otherwise traumatised to allow the cause of death to be established (30 cases), and a group where the cause of death could not be established despite a full autopsy and subsequent analysis of autopsy material (10 cases). Five of the deaths in this latter group

involved individuals matched on the psychiatric register (RR 25.2, 95% CI 8.6–73.7, $P<0.001$). Individuals suffering schizophrenic disorders constituted three of these cases (RR 60.1, 95% CI 16.6–218.5, $P<0.001$).

Interaction between substance misuse and psychiatric disorders

There were sufficient numbers for an analysis to be carried out for the schizophrenic and affective disorders comparing those with a recorded comorbid diagnosis of substance misuse with those who had never been so ascertained. Those with schizophrenic disorders who had also received a diagnosis of substance misuse were twice as likely to appear among the coroner's cases (RR 8.8, 95% CI 5.8–11.8 *v.* 4.1, 95% CI 3.3–5.0, $P<0.01$). In the affective disorders group there was an even greater marked excess among coroners cases as a whole in those also recorded as substance misusers (RR 9.4, 95% CI 5.5–13.2 *v.* 3.1, 95% CI 2.4–3.7, $P<0.001$) which was also significant for suicide (RR 23.4, 95% CI 12.5–43.8 *v.* 11.5, 95% CI 8.3–15.9, $P<0.05$).

DISCUSSION

This study documents an elevated rate of sudden death in those who have previously received psychiatric treatment. This accords with the majority of previous reports, many of which have examined deaths from all causes including sudden deaths reported to the coroner or their equivalent (Gausset *et al*, 1992; Berren *et al*, 1994; Hansen *et al*, 1997), though not with a recent study concentrating on first admissions to hospital which claimed to show no increased mortality and no elevated suicide risk (Naik *et al*, 1997). The nearly five-fold increase in schizophrenic disorders among coroners' cases is somewhat higher than that reported by Allebeck (1989) in his study of schizophrenia, but our results are similar to his for suicide and undetermined cause of death. The elevated rates of sudden death and the younger age at death are contributed to, but not wholly accounted for, by suicide and accidental death. There remains over and above this a doubling of sudden death due to natural causes and an increased presence of autopsy negative cases, the latter almost exclusively involving those who have previously received treatment for schizophrenic disorders.

Study bias and limitations

There are a number of biases inherent in this study. The referring of cases of sudden death to the coroner, though in theory strictly rule governed, in practice reflects a range of social and interpersonal influences. A person dying unexpectedly in the bosom of their family may be less likely to finish up being referred to the coroner than a mentally ill individual who dies in a similar manner, but in a shelter for the homeless. Such influences could artificially inflate the number of deaths of socially disorganised individuals being reported to the coroner, and with it particularly those with schizophrenia and severe problems with substance misuse. There are, however, a number of systematic biases which will decrease the likelihood of one of the coroner's cases being identified as having had prior psychiatric treatment. Any substantial errors in data recording, either in the coroner's records or the case register, will prevent a match being made and thus miss recognising that the deceased had had prior psychiatric treatment. The case register does not record patients who have been treated exclusively in the private system, or the far larger population treated entirely by general practitioners for their mental health problems. These factors skew the data, particularly with regard to affective disorders which unless severe or accompanied by social problems may not have contact with the public psychiatric system. These caveats do not apply to those with schizophrenic disorders, 25 202 of whom are listed in the case register which represents 0.7% of the state's population aged 15 years and over, a figure close to the expected period prevalence of schizophrenia in this community. Thus though the cases on the register with affective disorders and substance misuse are almost certainly biased toward the severe end of the spectrum, and over-represent the socially disorganised and indigent, the registration of those with schizophrenia is likely to be broadly representative of those in the community.

The diagnosis recorded on the register represents the treating clinician's attribution. This is a study of individuals who have been diagnosed and treated for particular disorders in a state wide mental health service, it is not a study of cases ascertained by standardised instruments. This is both an obvious limitation and for clinicians a potential benefit given that it examines an aspect of actual practice.

Death from natural causes

Higher rates of concurrent physical illness and of sudden death from natural causes have previously been reported among psychiatric patients and have been hypothesised to reflect a general neglect of health, an increased rate of damaging behaviours such as smoking, poor diet and decreased access to health services (Corten *et al*, 1991; Berren *et al*, 1994; Vieweg & Levenson, 1995). The possibility of psychotropic medication either exacerbating pre-existing disorders or masking symptoms until too late for remedial action has also been suggested (Gausset *et al*, 1992). In this study the excess of sudden death from natural causes among those with prior contact with the mental health services was due predominantly to ischaemic heart disease, which is plausibly relatable to damaging habits and poor health care. The finding of a marked increase in patients with schizophrenic disorders dying for no discernible cause is particularly troubling as it raises the spectre of some aspect of their pharmacological treatment playing a role (Hollister & Kosek, 1965; Whyman, 1976; Mehtonen *et al*, 1991; Lereya *et al*, 1995). In three of the five autopsy negative deaths among psychiatric patients toxicological analysis found no trace of oral antipsychotics though when these analyses were carried out detection of depot antipsychotics were not included. There was no evidence for drug levels outside of the therapeutic range which makes an immediate toxic effect of medication unlikely but leaves open the question of more long-term damage.

Deaths from suicide and homicide

Suicide rates were clearly elevated for the whole VPCR population and for each of the diagnostic groupings studied. This reflects predominantly suicide occurring in the community though the highest risk of most groups was during admission and in the year subsequent to discharge. Though males predominate among suicides this is least marked in schizophrenic disorders. The age distribution for suicide in schizophrenic disorders is also notable with over 70% occurring before the age of 35 and within 10 years of first diagnosis, which contrasts with affective disorders where suicide is more evenly spread over the decades. The frequency of the overall association between suicide and mental disorder is underestimated in this study as

only those who have had contact with public services are included. This failure of ascertainment is likely to be greatest among those with affective disorders and alcohol misuse. The preponderance of more severely ill cases, particularly among affective and alcohol misuse cases, could however lead to an overestimation of all forms of mortality including suicide, as the relative risks are calculated on the basis of cases in the register.

The relative risk of being classified as a case of suicide did not differ significantly between affective disorders and the schizophrenic disorders which appears to run counter to numerous previous studies which have suggested a far greater contribution from affective disorders to suicide (Harris & Barraclough, 1997). This contradiction may be more apparent than real since affective disorders are far more common in the community than schizophrenia and even if they were associated with the same relative risk of suicide affective disorders would generate five to 10 times as many suicides. In public psychiatric services, in contrast, schizophrenic disorders are becoming at least as common as affective disorders and from such populations it may well be that those with schizophrenic disorders are at a similar risk of suicide. Combining the categories of suicide, accident and open findings, however, produced a significantly higher overall rate of these forms of sudden death for affective disorders compared to schizophrenic. This may reflect the privately acknowledged predisposition of coroners to avoid findings pointing strongly to suicide in those with obviously close and concerned family members urging a verdict of accident; a situation perhaps more likely in affective disorder. The selective nature of our sample of affective disorders limits how far interpretations of these findings can be advanced, particularly when they appear at variance with the weight of existing evidence.

Those individuals who were recorded as having had contact with the services but received no diagnostic classification had among the highest risks of sudden death and suicide. A review of a selection of such cases suggests they are drawn predominantly from socially and personality disordered individuals who present in crisis. Like those with a primary diagnosis of a personality disorder this population represents a group with a high mortality who are often difficult to engage in treatment and who on occasion may not be seen as constituting legitimate patients. As a consequence such individuals may not receive the therapeutic attention they require.

There was a nearly five-fold increase in patients on the VPCR among homicide victims, four of whom had schizophrenic disorders. In the same year three patients with schizophrenic disorders previously recorded on the VPCR were convicted, or found not guilty by virtue of insanity, on homicide charges though the relative risk for register population as a whole committing a homicide appears higher than that of being a victim. The numbers in this study are insufficient for effective comparisons but we are examining a larger sample of homicides to ascertain the levels of victimisation among psychiatric patients.

Role of substance misuse

People with a primary diagnosis of substance misuse, and in particular those with drug problems, had markedly elevated risks of sudden death. Those on the VPCR with a primary diagnosis of substance misuse tend to be drawn from the most severely addicted and socially disorganised which limits how far these findings may properly be generalised to the far wider spectrum of substance misusers. Similarly those with a comorbid diagnosis of substance misuse are likely to be the more obviously impaired misusers among the psychiatrically disordered and do not reflect the full range of alcohol and drug misuse in this population. This may exaggerate the apparent impact of substance misuse, but nevertheless, there are clear indicators from this data of an association between those with schizophrenic or affective disorders who misuse drugs or alcohol and a doubling of the risk of sudden death. It is tempting to attribute this increased mortality directly to the substance misuse but epidemiological studies of this type cannot establish causal links, merely raise the possibilities of such connections. The association could, for example, be in part accounted for by the more socially and psychologically disorganised among the psychiatric population being both more prone to substance misuse, and more likely to make such misuse obvious to those caring for them. The linkage to substance misuse could therefore merely be an indirect indicator of the severity of the psychiatric disorder and its depredations. Whether or not the association with an increased frequency of sudden death reflects a causal influence, it does reinforce the clinical impression that patients with comorbid substance misuse are at particularly high risk and should attract commensurate therapeutic concern and resources.

CLINICAL RELEVANCE

The findings in this study with regard to schizophrenic disorders are probably the most generalisable and have the most obvious clinical relevance. The data adds to the growing evidence that schizophrenic disorders are still in these days of community care associated with premature death from a variety of causes. The emphasis in clinical practice on depressive disorders being the harbingers of suicidal behaviour needs to be combined with a heightened sensitivity to the risk of suicide in those with schizophrenic disorders, particularly in the young recently discharged population. The increased rate of sudden death from cardiovascular causes in schizophrenic disorders, again particularly in younger age groups, deserves further study. This could reflect dietary and substance usage problems or even some sensitising influence of treatment agents. Whatever its origin, increased alertness to symptoms referrable to possible cardiovascular problems with regular monitoring of the blood pressure and, if clinically indicated, electrocardiographic study, seem advisable in this population.

The final messages from this study are the familiar triad of closer monitoring of suicide risk, the encouragement of healthier lifestyle, including stopping smoking, and better monitoring of health status, particularly with regard to potential disorders of the cardiovascular system. Added to this is the need to vigorously manage comorbid substance misuse. In the background lurks a question over whether current treatment approaches, particularly in schizophrenia, may be contributing to sudden death, a question we are intending to investigate with a more detailed study of autopsy negative and sudden deaths from natural causes where toxicology has been performed post-mortem, and through a study of the changing patterns of mortality in this condition over the past 30 years. The elevated rates of sudden death cannot but raise questions about whether sufficient clinical attention is being directed to the risk factors in the mentally disordered population and to some high-risk groups

such as those with personality disorders and those with substance use problems.

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CLINICAL IMPLICATIONS

- Among the patients of a public mental heath service schizophrenic disorders are associated with a risk of suicide comparable to that of affective disorders and these deaths tend to be concentrated among those under 35 years of age.
- The elevated rates of sudden and premature death from cardiovascular causes, particularly in schizophrenia, indicates an urgent need for greater encouragement of healthier life styles and more active monitoring of cardiovascular status.
- The presence of comorbid substance misuse substantially increases the risks of sudden death in those with affective and schizophrenic disorders.

LIMITATIONS

- Associations found are dependent on the completeness of the data in the coroner's records and core register used.
- The case register employed records only contacts with public services, omitting private and general practice contacts.
- The case register though representative of those with schizophrenia in the community records a selective sample of affective disorders and substance misusers skewed towards the more severely effected and socially disrupted.

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