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Avoidable mortality of psychiatric patients in an area with a community-based system of mental health care

Amaddeo F, Barbui C, Perini G, Biggeri A, Tansella M. Avoidable mortality of psychiatric patients in an area with a community-based system of mental health care.

Objective: To ascertain the existence of an excess of avoidable mortality among psychiatric patients in an area with a *community-based* system of care, to identify predictors of higher risk of avoidable mortality and to provide some possible indication to reduce avoidable mortality in modern psychiatric services.

Method: All patients with an ICD-10 psychiatric diagnosis, living in a catchment area of about 75 000 inhabitants, seeking care in 1982–2001 were included ($n = 6956$). Mortality and causes of death were ascertained using linkage procedures with other local health databases. Standardized mortality ratios (SMRs) were calculated for each avoidable cause of death.

Results: The observed number of deaths for those causes considered avoidable by the European Community was four times greater than the expected ($P < 0.01$). SMR was higher for deaths preventable with adequate health promotion policies than for those preventable with appropriate health care. Males, alcohol/drug addicted and young patients have the highest avoidable SMRs.

Conclusion: These findings urgently call for the implementation of health promotion and preventive programs targeted to psychiatric patients. Moreover, mental health services should improve the capacity to manage medical health problems of their patients.

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Key words: avoidable mortality; mental health services; standardized mortality ratio; community-based mental health care

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Significant outcomes

- Mortality for avoidable causes of death is four times greater among psychiatric patients than among general population.
- The risk of death among mentally ill patients is high for causes considered avoidable with adequate health promotion policies.
- Health promotion programs targeted to psychiatric patients should be considered as key features in modern psychiatric services.

Limitations

- Low severity of our cohort, as compared with the population of previous hospital based studies.
- Standardized mortality ratios were calculated using as reference population the general population in the Veneto region as local data were not available.
- As data were drawn from a psychiatric case register, the interpretation of diagnostic assessment should be cautious.

Introduction

Mortality among psychiatric patients has been found to be higher than the general population, not only in those long-term residents in old-fashioned psychiatric hospitals or attending *hospital-based* psychiatric services (1), but also in those treated in modern *community-based* systems of care (2).

The hypotheses about why people with psychiatric disorders are more likely to die than the rest of the population are many, different and often supported by contradictory data.

Psychiatric patients are at higher risk of suicide (3, 4), accidental or violent death in general (5–8), and this association is quite obvious and well known. Less clear is the association that links psychiatric morbidity to a higher mortality for natural causes. A correlation between organic diseases and mental disorders is evident (9–15), but a comprehensive explanation of the excess morbidity and mortality of these populations is still lacking. A possible explanation could be the unhealthy lifestyle of people with psychiatric disorders (smoking, alcohol abuse, dietary habits, etc.), especially those with severe mental illnesses (16, 17). Other data suggest that medical assistance could be less adequate for psychiatric patients than for people without psychiatric disorders (18, 19). Furthermore, the limited ability of people with mental disorders to recognize and communicate their symptoms of organic diseases could be another possible explanation (10, 14, 20–22). Finally, the use of psychotropic drugs has been associated with an excess of cardiac deaths (23, 24).

In 1976, Rutstein et al. (25) proposed, as an indicator of the quality of the health care provided for a population, the proportion of deaths considered 'avoidable'. A more specific definition of 'avoidable mortality' has been provided by Charlton et al. (26): 'Conditions for which effective therapeutic or preventive measures exist and are likely to delay death events at an older age'. This concept has been further developed by other researchers, who categorized the different causes of avoidable death in 'medically avoidable', i.e. preventable with appropriate health care and 'behaviorally avoidable', i.e. preventable with adequate health promotion policies (27).

These negative quality indicators have been rarely applied to psychiatric populations (16, 28–31) with several methodological aspects that make complicate the comparison of the results.

Aims of the study

The aims of our study are to ascertain the existence of an excess of avoidable mortality among patients followed-up over a 20-year period by a *community-based* system of mental health care, to identify predictors of avoidable mortality and to provide indications oriented to reduce avoidable mortality in modern psychiatric services.

Material and methods

The catchment area and the South Verona Psychiatric Case Register

The study was conducted in South Verona (Italy), an area of about 75 000 inhabitants, and was approved by the local Ethical Committee. The main agency providing psychiatric care is the South Verona Community Mental Health Service (CMHS), run by the Section of Psychiatry and Clinical Psychology of the University of Verona. The service, set up in 1978 and monitored ever since by the South Verona Psychiatric Case Register (PCR), provides a wide range of well-integrated hospital and community services, ensures continuity of care through the different phases of treatment and across its various components, and targets the severely mentally ill. According to the Italian Psychiatric Reform, since 1978, in-patient care can only be provided in general hospital psychiatric wards or private psychiatric clinics. The Italian NHS provides medical and psychiatric care, including admissions to some private clinics, free of charge. More information on the research setting can be found elsewhere (32).

Study design and statistical analyzes

All patients with an ICD-10 diagnosis seeking care in 1982–2001 were included in this study. Data were drawn from the South Verona PCR. For the purposes of the present study, ICD diagnoses were collapsed into seven diagnostic groups: schizophrenia and related disorders (ICD-10 codes F20 through F29; F84), severe affective disorders (ICD-10 codes F30; F31; F32.3; F33.3; F38.00; F38.8; F39), mild affective disorders (F32.0, 32.1, 32.2, 32.8, 32.9; F33.0, 33.1, 33.2, 33.8, 33.9; F34.1, 34.8, 34.9; F38.10; F41.2; F43.20, 43.21, 43.22), alcohol and drug addiction (F10.1, 10.2, 10.3; F11–19.1, 19.2, 19.3; F55), neurotic, stress related and somatoform disorders (F40; F41.0, 41.1, 41.3, 41.8, 41.9; F42; F44; F45; F48; F54), disorders of personality and behavior of the adult

(F34.0, F52, F60–F69) and other diagnoses (including organic psychoses, eating disorders, mental retardation, dementia, etc.).

Mortality and causes of death were ascertained using linkage procedures with Municipality and Forensic Medicine Registers, and with the database of the Local Health Trust. Patients who moved outside the area were truncated from the date of migration.

The standardized mortality ratio (SMR) compares the observed number of deaths with the expected number for each cause included in a list of avoidable deaths. Person-years were calculated for each patient and were divided in five calendar-year periods of 4 years each. The expected number of deaths were obtained applying to the corresponding sex and age structure (person-years), for each of the five periods considered, the age-, gender-, cause-specific- and period-specific-mortality rates of the general population in the Veneto Region. These specific mortality rates have been obtained by the Italian National Institute of Health. For motor vehicle accidents SMRs, we estimate expected deaths using mortality rates of the whole Country (Italian Institute of Statistics), since data about the population of Veneto Region were not available. Avoidable deaths were defined according to Rutstein's list (25) and according to the official list of causes of death considered avoidable, set up in the 1980s, by a European Community research group chaired by Holland (27). For each cause, a specific age range is given within which death is considered avoidable. A high SMR for a disease on this list suggests substandard care. Causes were divided into two groups: indicators of (i) quality of health care, and of (ii) quality of health policies. SMRs were calculated together with the 95% confidence intervals (CI).

Results

In this study, 6956 patients (3135 males and 3821 females) for a total of 59 148 person-years (26 941 males and 32 207 females) were included. About 8% of the patients had a diagnosis of schizophrenia, 4% had severe affective disorders, 25% mild affective disorders, 14% drug or alcohol addiction, 22% neurotic and somatoform disorders, 6% personality disorders and 21% other diagnoses (including organic psychoses, eating disorders, mental retardation, dementia, etc.). Of the whole sample, 938 (527 males and 411 females) died during the study period. Only 64 of 938 deaths were due to causes considered avoidable by the European Community research group.

The observed number of deaths (Table 1) for those causes was four times greater than the expected ($P < 0.01$). Data show that the expected number of avoidable deaths is higher for women compared with men (8.09 vs 6.68). This is due to the relatively higher number of female person-years in our sample (32 207 vs. 26 941). The total avoidable SMR was higher for male (6.13; 4.58–8.33; $P < 0.01$) than for female (2.84; 1.89–4.28; $P < 0.01$). Patients with a diagnosis of drug and alcohol addiction had the highest SMR (18.84; 12.40–28.61; $P < 0.01$). Another predictor of higher risk of avoidable death was the young age (SMR = 41.86 for the age group 25–44), whereas there was no significant difference between patients followed for <10 years and patients followed for longer.

For several causes (Table 2), SMRs were not calculable when the number of expected deaths was too close to zero and the number of observed deaths was equivalent to zero.

No differences emerged between the general population and mentally ill patients regarding deaths due to circulatory disturbances of the brain, diabetes, tuberculosis, malignant neoplasm of cervix uteri and uterus, chronic rheumatic heart disease, abdominal hernia and cholelithiasis. Data about motor vehicle accidents showed SMRs lower than one (all ages: seven events observed vs. 8.49 expected, SMR = 0.82; in the age group 15–24: 1 event observed vs. 1.96 expected, SMR = 0.51).

Table 1. Mortality for 'avoidable causes' in psychiatric patients

| | Person years | O | E | SMR | 95% CI | P-value |
|-------------------------------------|--------------|----|-------|-------|-------------|---------|
| All patients | 59 148 | 64 | 14.87 | 4.31 | 3.37–5.50 | ** |
| Gender | | | | | | |
| Males | 26 941 | 41 | 6.68 | 6.13 | 4.58–8.33 | ** |
| Females | 32 207 | 23 | 8.09 | 2.84 | 1.89–4.28 | ** |
| Diagnosis | | | | | | |
| Schizophrenia and related disorders | 4612 | 5 | 1.03 | 4.83 | 2.01–11.61 | ** |
| Severe affective disorders | 2223 | 4 | 0.86 | 4.66 | 1.75–12.42 | ** |
| Mild affective disorders | 14 951 | 13 | 5.40 | 2.41 | 1.40–4.15 | ** |
| Alcohol/drug addiction | 8278 | 22 | 1.17 | 18.84 | 12.40–28.61 | ** |
| Neurosis and somatoform disorders | 12 950 | 7 | 2.82 | 2.48 | 1.18–5.21 | * |
| Personality disorders | 3627 | 1 | 0.33 | 3.03 | 0.43–21.48 | * |
| Other diagnoses | 12 520 | 12 | 3.32 | 3.61 | 2.05–6.36 | ** |
| Age | | | | | | |
| 14–24 | 7331 | 1 | 0.04 | 22.50 | 3.17–159.73 | * |
| 25–44 | 23 745 | 13 | 0.31 | 41.86 | 24.31–72.09 | ** |
| 45–64 | 18 768 | 42 | 2.28 | 18.43 | 13.62–24.94 | ** |
| ≥65 | 9304 | 8 | 12.14 | 0.66 | 0.33–1.32 | |
| Follow-up | | | | | | |
| <10 years | 45 281 | 46 | 10.97 | 4.19 | 3.14–5.60 | ** |
| > 10 years | 13 855 | 18 | 3.67 | 4.90 | 3.09–7.79 | ** |

O, observed; E, expected; SMR, standardized mortality ratio; CI, confidence interval.

* $P < 0.05$; ** $P < 0.01$.

Table 2. Mortality by 'avoidable causes' in psychiatric patients

| Causes of death (age) | O | E | SMR | 95% CI | P-value |
|---|----|-------|-------|-------------|---------|
| Indicators of health care quality | 16 | 9.32 | 1.72 | 1.05–2.80 | * |
| Circulatory disturbances of the brain (35–64) | 8 | 4.43 | 1.81 | 0.90–3.61 | |
| Diabetes (5–64) | 3 | 1.36 | 2.21 | 0.71–6.85 | |
| Tuberculosis (5–64) | 0 | 0.09 | 0 | – | |
| Malignant neoplasm of cervix uteri and uterus (15–64) | 1 | 0.36 | 2.80 | 0.40–19.90 | |
| Hodgkin's disease (5–64) | 2 | 0.08 | 25.68 | 6.42–102.68 | ** |
| Chronic rheumatic heart disease (5–44) | 0 | 0.15 | 0 | – | |
| Hypertensive disease (35–64) | 2 | 0.47 | 4.22 | 1.06–16.88 | * |
| Appendicitis (5–64)† | 0 | – | – | – | |
| Abdominal hernia (5–64)† | 0 | 0.05 | 0 | – | |
| Cholelithiasis (5–64)† | 0 | 0.05 | 0 | – | |
| Maternal mortality (10–44)† | 0 | 0 | – | – | |
| Typhoid (5–64)† | 0 | 0 | – | – | |
| Tetanus (0–64)† | 0 | 0 | – | – | |
| Osteomyelitis (1–64)† | 0 | 0 | – | – | |
| Asthma (5–44)† | 0 | 0 | – | – | |
| Indicators of health policies quality | 48 | 5.39 | 8.91 | 6.72–11.83 | ** |
| Chronic liver disease and cirrhosis (15–74) | 34 | 1.33 | 25.65 | 18.33–35.90 | ** |
| Malignant neoplasm of trachea, bronchus and lung (5–64) | 14 | 4.09 | 3.43 | 2.03–5.79 | ** |
| All avoidable causes | 64 | 14.87 | 4.31 | 3.37–5.50 | ** |

†Expected number close or equal to zero, used only to assess the presence of Sentinel Health Events.
* $P < 0.05$; ** $P < 0.01$.

Our sample shows a higher SMR for indicators of quality of health policies (8.91; 6.72–11.83; $P < 0.01$), than for causes selected as preventable with an appropriate health care (1.72; 1.05–2.80; $P < 0.05$). Significant SMRs were found for Hodgkin's disease and hypertensive disease (among the indicators of quality of medical care) and for chronic liver disease and cirrhosis and for malignant neoplasm of trachea, bronchus and lung (among the indicators of quality of health policies).

Discussion

In community psychiatry, the risk of death for causes considered avoidable by the European Community is four times higher than for the general population. Males have a SMR around six and females have a SMR around three.

The comparison with other studies about avoidable mortality among psychiatric patients is difficult because of the differences in populations studied, in the lists of causes of death considered avoidable and in the statistical analyzes (16, 28–31).

Danish studies by Mortensen and Juel (28, 29), the Swedish one by Ringback Weitoft et al. (30) and the study by Rasanen et al. (31) in Finland analyzed mortality rates of inpatients only, whereas our sample includes patients treated by a modern, *community-based* psychiatric service. In addition to that, the Danish studies take into consideration only patients with a diagnosis of schizophrenia, as well as the study by Brown et al. (16) of the University of Southampton. Both the

studies by Mortensen and Juel (28, 29) and the research by Ringback Weitoft et al. (30) refer to the avoidable death list created by Rutstein et al. (25) from which the European Community list has been derived (27), but they modified it 'in order to make it applicable to data'. Brown et al. (16) did not refer to the European Community list, but to the list approved by the British Chief Medical Officer's annual report.

Taking into account these differences, the comparison of our results with the avoidable SMR in the study by Brown et al. (16) for schizophrenic patients shows almost no differences (4.83; CI 95% 2.01–11.61 vs. 4.68; CI 95% 1.72–10.20). The comparison with the findings of the Swedish study demonstrates that the excess avoidable mortality in our psychiatric population is similar to that in Stockholm population (SRR = 4.7 for males and 3.8 for females) (30). Data showed by Ringback Weitoft et al. are reliable, though they are not SMRs, but standardized rate ratios (SRRs), therefore not easily comparable with ours. For the Swedish research group, the higher avoidable mortality risk group was 'psychiatric diagnoses related to drug addiction', in line with our findings, followed by the groups 'schizophrenia', 'other diagnoses' and 'affective psychosis'. Avoidable SMRs in the first Danish paper (28) were low and not significant (1.30; CI 95% 0.92–1.78 for males and 1.50; CI 95% 0.98–1.85 for females). Values in the second Danish study (26) were significant only for males (2.19; CI 95% 1.20–3.68 for males and 0.80; CI 95% 0.29–1.74 for females).

The Finnish study, conducted on an inpatient sample, showed slightly lower avoidable SMRs. Interestingly, the avoidable death risk found by Rasanen et al. (31) was higher for females (3.24) than for males (1.88), in opposition to our findings. The Finnish data revealed a non-significant difference between the death risk for the causes considered as health policy indicators among male patients and the risk of the general population (SMR = 0.48; CI 95% 0.07–3.40). The same difference for female patients was significant, but with a large confidence interval (SMR = 6.52; CI 95% 1.63–26.07). This dramatic difference with our data finds a possible explanation in the fact that, unlike psychiatric patients followed by a community-based service, hospitalized patients are protected against alcohol abuse. This relative protection of long-stay inpatient is responsible of the strong reduction of mortality for liver cirrhosis, which is one of the main health policy indicators, according to the European Community list of avoidable causes of death.

This is a possible effect of the process of deinstitutionalization that has been promoted in psychiatry in the past few decades throughout the world: the reduction of the number of beds is associated to an increase in death rates for causes considered 'behaviorally avoidable', for cardiovascular and unnatural causes for both genders (33) and for suicide (29, 34). Yet, some authors found no significant correlation between mortality rates and reduction of psychiatric beds (35).

On the other hand, the absence of deaths for several avoidable causes (tuberculosis, chronic rheumatic heart disease, appendicitis, abdominal hernia, cholelithiasis, maternal mortality, typhoid, tetanus, osteomyelitis and asthma) can be considered as a significant result, indicating that in 20 years there were no dramatic 'weaknesses' in the health care of psychiatric patients. These weaknesses (that have been referred to as Sentinel Health Events by Rutstein et al.), would have been sufficient to merit a follow-up study to ascertain the flaws of the medical care.

Some limitations of our study should be also considered. First, a low severity of our cohort, when compared with the population of previous hospital based studies, that includes some patients who had only one contact (single-consulters who contacted outpatient departments) who might be considered to be mild cases. In South Verona, 30% of new episodes of care were once-only contacts with the service (36). A second limitation is that data on all those patients ($n = 1324$) who migrated outside Verona were truncated at the date of migration. As we used person-years to calculate

SMRs and as in our area there is no evidence of selective migration, we can exclude that this limitation biased our results. Moreover, SMRs were calculated using as reference population the general population in the Veneto region (about 4.5 million inhabitants in 2001). It is known that mortality is slightly different in different provinces of our region. Finally, another limitation was that the interpretation of diagnostic assessment should be cautious when data are drawn from psychiatric case registers. As demonstrated by Byrne et al. (37) and also discussed by Parker (38), there is a lack of studies about accuracy and validity of information contained within psychiatric databases.

In a modern psychiatric service, medical assistance should remain of high quality, even though patients live outside the hospital in the community. The need for a thorough medical examination at admission in psychiatric wards has been stressed by several authors (35, 39, 40). Deficits in quality of medical care seemed to explain a substantial portion of the excess mortality experienced by patients with mental disorders, as showed by Druss et al. (17) in those patients who experienced myocardial infarction. Sundquist and Li (41) showed that hospitalization because of affective or psychotic disorders predicts coronary heart diseases and these associations are partly mediated by alcohol abuse. Even if these evidences suggest that a thorough medical examination should be offered to all new patients who seek care from a community mental health service along with an improvement in the relationship between psychiatric patients and their general practitioners (42), our findings show that the effects on avoidable mortality of this procedure would be marginal.

On the contrary, it seems that a more promising way to decrease the avoidable mortality among psychiatric patients is improving health policies quality, especially prevention of drinking and smoking to avoid liver diseases and neoplasms of the lung. Health promotion programs targeted to the psychiatric populations (43) need to be considered as key-features of modern mental health systems of care.

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