

Suicide and Other Causes of Death in the Psychiatric Patients of a Mental Health Service over a 5-year Period

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Authors' contributions

This work was carried out in collaboration between all authors. Authors RDL and FF designed the study and wrote the protocol. Author SM performed the statistical analysis, author ES managed the literature search, and all together wrote the first draft of the manuscript with assistance from author MR. All authors read and approved the final manuscript.

Research Article

Received 10th May 2013
Accepted 6th July 2013
Published 16th July 2013

ABSTRACT

Aims: 1) To compare mortality rate and causes of death between psychiatric patients of a Mental Health Department (MHD) and local population of Modena.

2) To appraise the impact of selected demographic and clinical variables on suicide.

Study Design: Retrospective analysis.

Place and Duration of Study: MHD of Modena between March 2009 and September 2009.

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Methodology: Our psychiatric sample was composed by all psychiatric patients followed by the MHD of Modena, who died from 1-1-2004 to 31-12-2008 (n=168). We compared the standardized mortality rate and causes of death of our sample to those of the local population (n=250,000), who died during the same period of time, according to data provided by the registry of the Clinical Epidemiology Service of Modena. From computerized registration system and medical records of MHD and death certificates, we collected: demographic data, psychiatric diagnosis, death causes, time elapsed from the first consultation in MHD to death, time elapsed from the last discharge from psychiatric ward or from the last consultation in MHD to death. Our sample of psychiatric patients was further divided into two groups: the first one was composed of those who committed suicide (n=25) and the second one those that died from other causes (n=143), and all variables of each group were statistically compared to highlight the demographic and clinical features of the two groups.

Results: Neoplastic and cardiovascular diseases were the two most frequent causes of death in both psychiatric and local populations and suicide represented the third leading cause of death in the psychiatric sample. Psychiatric patients who committed suicide were statistically significantly younger in comparison to others and killed themselves after 12 days (median) from the last psychiatric consultation or hospital discharge.

Conclusion: Our patients presented the same high vulnerability to organic disorders and their fatal consequences as local population with higher risk of suicide which remains a fatal outcome of psychiatric diseases.

Keywords: Mortality rate and causes; suicide; psychiatric patients.

1. INTRODUCTION

In past centuries, the causes of death in psychiatric hospitals were represented by infective illness (especially tuberculosis), starvation or malnutrition (pellagra reached epidemic proportions in Northern Italy as in the southern U.S. in the late 19th century) [1,2]. At present, in western countries, neoplastic and cardiovascular diseases are the most frequent causes of death in the general population as in psychiatric patients [3], who according to many studies, could be more vulnerable to diseases due to a reduced therapeutic compliance or an unhealthy life style [4].

Life expectancy is reduced by 20% in schizophrenia patients in comparison with the general population [5]. Ösby et al. observed that, among natural causes, cardiovascular diseases were responsible for this excess of mortality [6]. Schizophrenic patients are often obese (40-60%), smokers (75-92%) and/or carriers of diabetes mellitus (10.8-14.9%) [7]. All these conditions are associated with antipsychotic drug treatment and can lead to early onset of metabolic syndrome [8,9], which affects 40-60% of psychiatric patients [7]. Other authors suggested the hypothesis of a possible direct biological contribution to cardiovascular mortality by the mental illness itself [3]. According to a large epidemiological study conducted in France from 1993 to 2003, the mortality rate for lung cancer in men and breast cancer in women was higher in schizophrenic patients than in the general population, probably because of unruly lifestyle and scarce compliance to medical interventions [10]. A study which compared two epidemiologically complete cohorts, 1875-1924 and 1994-2010, of schizophrenic patients, highlighted that in the contemporary cohort deaths from cardiovascular causes arise in the elderly and deaths from suicide in the young patients [2].

People with schizophrenia or bipolar disorder had higher mortality rates than the general population, both as a result of natural and unnatural causes. Most of this excess mortality was the result of deaths from natural causes, especially deaths from circulatory and respiratory diseases, as evidenced by an epidemiological study conducted among English people discharged from inpatient care with a diagnosis of schizophrenia or bipolar disorder between 1996 and 2006 [11].

Depression could act on the pathogenesis of cardiovascular disease, causing the higher risk of mortality, through hyperactivity of the orthosympathetic system, which alters lipid metabolism and platelet aggregation [12]. The relationship between depression and myocardial infarction may represent a form of vicious circle in that depressed patients with heart disease have a 2 times greater risk of death and patients with myocardial infarction who subsequently developed a depressive episode have a risk of death increased by 3-4 times [12]. It has also been suggested that depressive disorders could biologically contribute to cancer mortality, whose rate is increased to 39% in depressed patients [13,14].

The analysis of psychiatric patient mortality rate shows that natural deaths are 60%, whereas unnatural (suicide, accidents) deaths represent 40% [3]. Among the unnatural causes of deaths, suicide is the most tragic complication of psychiatric disorders: 90-93% of patients who commit suicide meet criteria for an Axis I psychiatric disorder at the time of the act and about 50% of them were in psychiatric care [15]. According to most studies, mental illness can be considered a primary risk factor for suicide [16]: over 90% of people who commit suicide have a psychiatric illness at the time and over 50% are under active psychiatric or mental health care [15].

Schizophrenia has a lifetime suicide risk of 10% and the risk is greater for young males with past suicide attempts, frequent relapses and poor adherence to treatment [17,18]. The lifetime risk of suicide in patients with depression amounts to 15%: suicidal thoughts and plans are often symptoms of major depression and its treatment should lead to suicidal ideation remission [19]. In Bipolar Disorders, the risk of suicide increases during the course of illness with a rate of 10-19%, which is higher in male patients who experienced mixed or depressive phase associated with psychotic symptoms [20].

According to other authors, a history of alcohol abuse and deterioration in function predicts suicide in bipolar disorder [21].

Patients with pathological use of substances have an incidence of suicide 20 times higher than the general population but similar to that of patients affected by Bipolar Disorders [22].

Alcohol abuse is present in the history of many suicides with a percentage ranged from 25 to 50% and its contribution to the increased suicide rate is second only to mood disorders [23]. Suicide in alcohol dependence can be an event that occurs later and is often related to social isolation and rejection, whereas in affective disorders it can represent an early event related to the severity of disease [24,25]. Some personality traits, such as aggressiveness and impulsiveness, can represent important predictors of suicidal behaviour [26]. In antisocial and borderline personality disorders, suicide is estimated at 9%, whereas self-injurious behaviour was assessed about 90% [27,28,29]. The prominent role of cyclothymic temperament in the development of suicidal behaviour has been supported by studies, which highlighted that rapid mood variability was associated with increased likelihood of suicidal ideation or attempt [30,31]. Moreover, some authors hypothesized that genetic factors contribute to the dysthymic temperament and this relationship is at least partially mediated

by development of deep white matter hyper-intensity at brain magnetic resonance imaging, which might be useful biological marker of suicide risk in patients with affective disorders [32].

According to Beck, the lack of expectations for future (helplessness) and the presence of feelings of despair (hopelessness) can predict 91% of suicides [33]. Hopelessness indicates a pessimistic cognitive structure for the future and has been identified as a robust and independent predictor of suicidal behaviour [34].

Three major aspects of hopelessness assessed by means of the 20-item Beck Hopelessness Scale (BHS) [35], are represented by negative feelings about the future, loss of motivation and expectations. Patients with higher hopelessness scores on BHS frequently present moderate to severe depression, higher suicidal risk as assessed by means of Mini International Neuropsychiatric Interview (MINI) [36] and multiple lifetime suicidal attempts. A complex relationship between affective temperaments, hopelessness and such predictors of suicidal behaviour as previous suicide attempts and positive suicidal risk evaluated by means of MINI, has been highlighted by some authors [37]. Atypical symptoms such as irritability, anger and alcohol use, assessed by means of the Gotland Scale of Male Depression (GSMD), would represent the "suicidality-related" symptoms of depression in both male and female patients and GSMD might be considered a valid instrument for the prediction of suicidal risk [38].

A previous suicide attempt is considered a primary risk factor of suicide [39]. After a self-injurious behaviour, the risk of suicide increase by 32 % in the following year.

A family history of suicide is also viewed as a primary risk factor [40,41]. Secondary risk factors to committing suicide include severe negative life events and any co-morbid organic disease [42]. Male gender, adolescence, seasonality, environmental conditions (easy availability of potentially lethal instruments, diffuse information about suicide, etc.) represent tertiary risk factors of suicide [42]. About suicide and the health care system, recent literature has pointed out the following observations: 38% of psychiatric emergency consultations were required for suicidal behaviour [43], 45% of patients who committed suicide had contacted their general practitioner 30 days before death [44]; 5-6% of suicides occurred during hospitalization [45]; 24% of patients, previously admitted due to self-injurious behaviour, committed suicide in a period (from 1 week to 3 months) shortly following discharge [46].

2. AIMS

- A. To compare mortality rate and causes of death between psychiatric patients of a Mental Health Department and local population, in the same period of time.
- B. To appraise the impact of selected demographic and clinical variables on suicide.

3. METHOD

This research, approved by local Institutional Review Board, was conducted in the Mental Health Department (MHD) of Modena (catchment area of 250,000 inhabitants), which includes the 3 outpatient care districts, Mental Health Service (MHS), and 1 psychiatric ward (15 beds), Servizio Psichiatrico di Diagnosi e Cura (SPDC), which is the public ward located in a general hospital (Nuovo Ospedale

CivileS.Agostino Estense), where patients are admitted in compulsory or voluntary state, according to Italian 180 Law [47].

The sample (n=168) included all psychiatric patients followed by the Mental Health Department (MHD) who died during the observation period (from 1-1-2004 to 31-12-2008). They represent 1.02% (168/16,392) of all psychiatric patients followed by MHD during the same period.

We calculated the (5-year band) age-adjusted rates for most frequent causes of death (cardiovascular diseases, neoplastic diseases, lung diseases, gastrointestinal disorders, dementias, suicide) in the sample of deceased psychiatric patients. The standardized mortality rates of our sample were compared to similarly standardized mortality rates of the local population observed during the same period of time [48]. These data were provided by the registry of the Clinical Epidemiology Service of Modena.

From computerized registration system, medical records of MHD and death certificates the following variables were collected: demographic data, psychiatric diagnosis (according to ICD-9-CM) [49], causes of death (suicide and natural causes), time elapsed from the first consultation in Mental Health Service (MHS) to death, time elapsed from the last discharge from psychiatric ward (SPDC) or from the last consultation in Mental Health Service (MHS) to the death. In Table 1, the demographic and clinical characteristic of our sample (n=168) are shown.

Table 1. Demographic and clinical characteristic of our sample (n=168)

PSYCHIATRIC DIAGNOSIS (according to ICD-9-CM)	N. male	N. female	Median age of death (years)	Nationality	Total
Dementias	20	19	80	39 Italians	39
Organic brain disorders	7	1	67	7 Italians 2 extra-Europeans	9
Addiction to alcohol or substances	6	7	51	13 Italians	13
Major depressive episode and dysthymia	12	13	62	24 Italians 1 extra-European	25
Bipolar disorders	3	4	49	7 Italians	7
Anxiety disorders	3	6	76	9 Italians	9
Personality disorders	6	5	55	11 Italians	11
Schizophrenia and other psychotic disorders	17	7	63.5	24 Italians	24
Adjustment disorders	18	13	65.5	31 Italians	31
Total	93	75	71	165 Italians 3 extra-Europeans	168

The deceased patients of each diagnostic category group were divided, according to the mean age (71 years) of the whole sample, into two groups, the first one deceased at < 71

years old and the second one at ≥ 71 years old, in order to detect if the mean age of death varied in accordance with the psychiatric diagnosis (chi square test) [50].

The whole sample of deceased psychiatric patients was further divided into two groups, suicide patients (n=25) and the others who died from natural causes (n=143), and the demographic and clinical features of the two groups were compared (t-test, Wilcoxon test, chi-square test) [50,51]. The data was analyzed by the SAS Program (version 9.1.3).

4. RESULTS

The two leading causes of mortality, cardiovascular disease and cancer, were similar in both our sample and the general population of the same geographical area in a time frame consistent with that of our study. Otherwise, suicide was the third leading cause of death for the psychiatric patient group (15%) compared to the general population, with a frequency of 4% (Fig. 1). In our sample, lung, gastrointestinal disease and dementia were more represented than in the general population (Fig. 1).

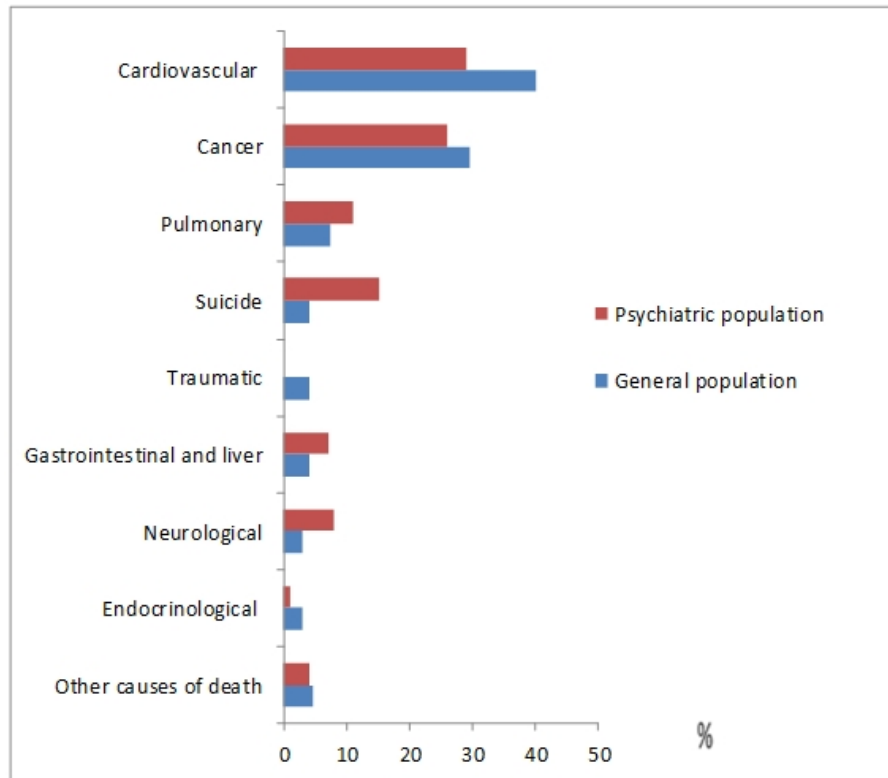


Fig. 1. Frequency of causes of death in general population (n=250,000) and psychiatric population (n=16,392) of Modena (2004-2008)

The standardized mortality rates for cardiovascular, lung, gastrointestinal and liver diseases and dementias progressively increased during the latter period of observation in our psychiatric sample in comparison to the general population, as evidenced in Table 2. On the contrary, suicide standardized mortality rate of psychiatric patients that was initially higher became similar in both the populations at the end of the 5-year period (Fig. 2, Table 2).

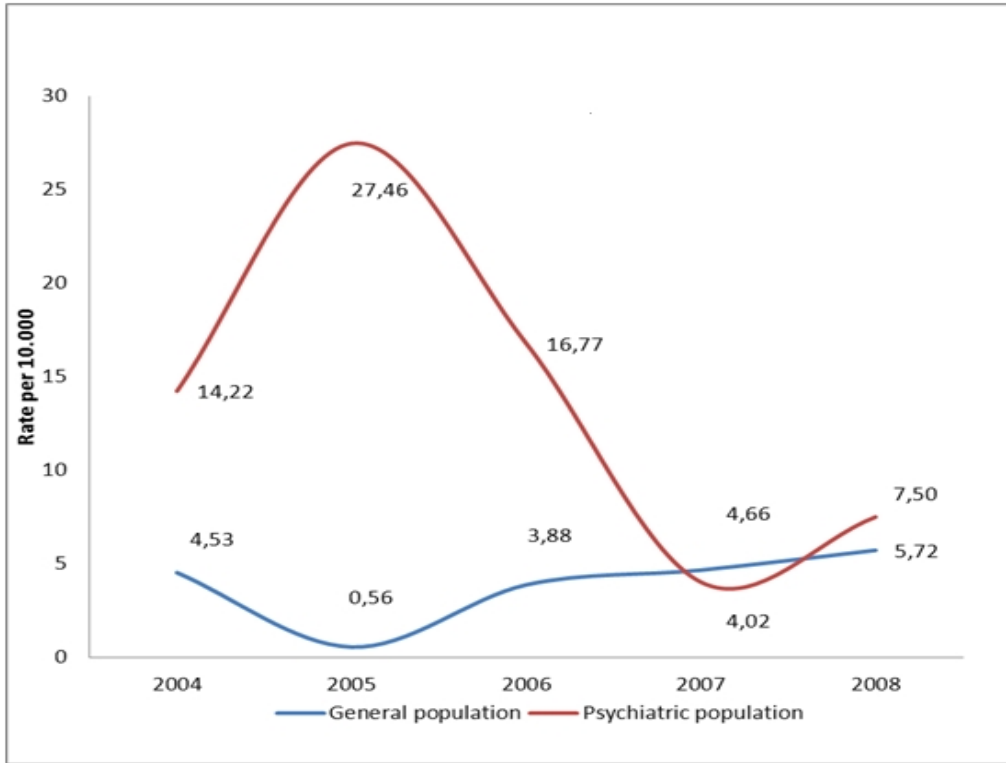


Fig. 2. Standardized suicide rates of general population (n=250,000) and psychiatric population (n=16,392) of Modena (2004-2008)

Table 2. Mortality rate (95% confidence intervals) among general and psychiatric populations of Modena from 1-1-2004 to 31-12-2008

General population of Modena					
Causes of death	2004	2005	2006	2007	2008
Cardiovascular disorders	35.7 (32.9- 38.5)	36.6 (33.9 – 39.3)	34.5 (31.8 – 37.2)	36.2 (33.4 – 39)	36.1 (33.4 – 38.8)
Neoplastic diseases	30.6 (28.1 – 33.2)	30.9 (28.3 – 33.5)	31.1 (28.6 – 33.7)	31.8 (29.2 – 34.4)	28.7 (26.3 – 31.1)
Suicides	4.5 (3.5 – 5.5)	0.6 (0.3 – 0.9)	3.9 (3.0 – 4.0)	4.7 (3.7 – 5.7)	5.7 (4.6 – 6.8)
Lung diseases	4.6 (3.6 – 5.6)	7.2 (6.0 – 8.4)	5.9 (4.8 – 7.0)	7.9 (6.6 – 9.2)	7.6 (6.3 – 8.9)
Gastrointestinal and liver diseases	3.6 (2.7 – 4.5)	4.1 (3.1 – 5.1)	3.8 (3.9 – 4.7)	4.4 (3.4 – 5.4)	3.8 (2.9 – 4.7)
Dementias	5.1 (4.0 – 6.2)	5.3 (4.3 – 6.3)	6.3 (5.1 – 7.5)	6.9 (5.7 – 8.2)	7.1 (5.8 – 8.4)
Psychiatric patients of Modena Mental Health Department					
Causes of death	2004	2005	2006	2007	2008
Cardiovascular disorders	4.7 (0.0 – 11.7)	32.0 (13.9 – 50.1)	29.4 (12.1 – 46.7)	28.2 (11.2 – 45.2)	45.0 (23.5 – 66.5)
Neoplastic diseases	23.7 (8.1 – 39.4)	41.2 (20.6 – 61.8)	16.8 (3.6 – 30.0)	36.2 (16.9 – 55.5)	30.0 (12.4 – 47.6)
Suicides	14.2 (2.1 – 26.3)	27.5 (10.7 – 44.2)	16.8 (3.7 – 29.9)	4.0 (0.0 – 10.5)	7.5 (0.0 – 16.3)
Lung diseases	0.0	4.6 (0.0 – 11.4)	8.4 (0.0 – 17.7)	12.1 (1.0 – 23.2)	33.8 (15.1 – 52.5)
Gastrointestinal and liver diseases	0.0	13.7 (1.8 – 25.6)	4.2 (0.0 – 10.8)	8.0 (0.0 – 17.2)	15.0 (2.6 – 27.4)
Dementias	0.0	4.6 (0.0 – 11.4)	0.0	0.0	18.8 (4.9 – 32.7)

The overall mean age of death in our sample was 71 years (68 for men and 74 for women) and was lower than that expected for the general population (78.3 years for males and 83.9 for females on average from 2004 to 2008) [52]. The patients of our sample affected by "Schizophrenia and other psychotic disorders" ($P<0.05$), "Personality disorders" ($P<0.05$), "Addiction to alcohol and substances" ($P<0.05$), "Major depressive episode and dysthymia" ($P<0.05$) presented a lower mean age of death than that expected for the general population, whereas our patients affected by "Dementias" ($P<0.0001$) presented a superior mean age of death (chi square test).

In our psychiatric sample, we found 25 suicide patients: 16 males with a median age of 42 years and 9 females with a median age of 50 years. The psychiatric patients of our sample committed suicide in the following dramatic manners: 8 patients by means of defenestration, 7 hanging, 4 poisoning, 3 voluntary train accidents, 2 cutting, 1 drowning.

Among causes of death, only suicide was statistically significantly related to psychiatric diagnosis: "Schizophrenia and other psychotic disorders" and "Major depressive episode and dysthymia" ($P<0.005$; chi square test) were the prevalent psychiatric diagnosis of suicides. Gender and age of suicidal patients divided by 10 year bands are shown in Fig. 3.

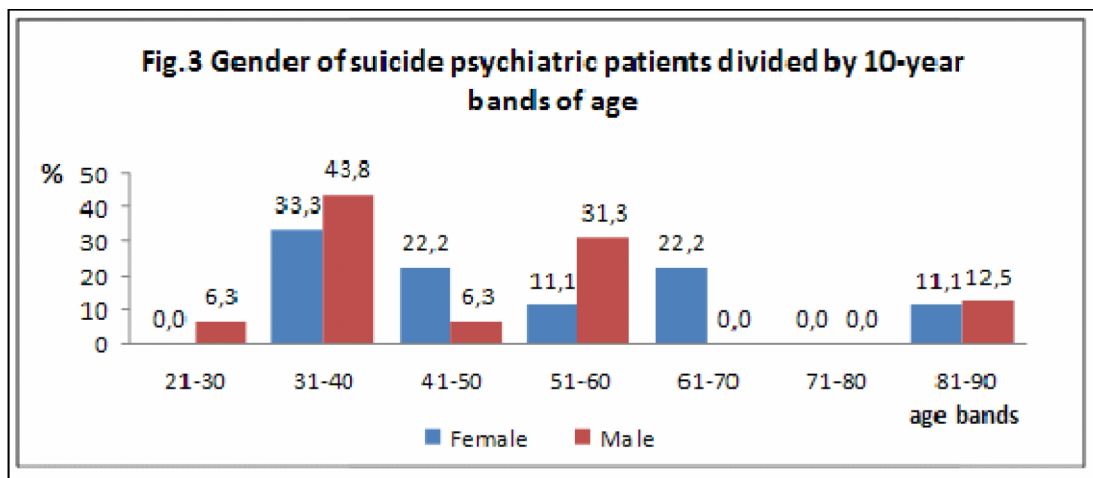


Fig. 3. Gender of suicide psychiatric patients divided by 10-year bands of age

The comparison of clinical and demographic variables between patients deceased by natural causes and suicide showed the following outcomes:

- the male/female ratio was 1.8 for suicidal patients and 1.13 for others;
- the mean (50.1 ± 17.01 years) and the median age (49 years) of suicide patients was statistically significantly younger in comparison to the mean (71.0 ± 14.55 years) and the median age (75 years) of other deceased patients in our sample ($P<0.0001$, t-test);
- the mean age of death among suicide patients affected by "Adjustment disorders" ($P<0.01$) and "Schizophrenia and other psychotic disorders" ($P<0.005$) was statistically significantly less than the age of death of naturally deceased patients affected by the same psychiatric diseases (Wilcoxon test) (Table 3).

The comparison of the modalities of out-patient and in-patient care between patients deceased by natural causes and suicide evidenced the following differences:

- suicides were followed for a longer period (521 days on average, 21-10,908 value range) by our psychiatric service in comparison to naturally deceased patients (440 days on average, 1-5,874 value range), but the difference was not statistically significant (Wilcoxon test);
- 64% of suicides and 50% of naturally deceased patients were previously hospitalized in the psychiatric ward during the observation period (no statistically significant difference, chi square test);
- 10% (16/25) of suicides were more frequently admitted in comparison to natural death patients (42%, 71/143) during the 5-year observation period ($P<0.05$, chi square test);
- suicidal patients killed themselves after 12 days on average whereas the other patients of our sample died by natural causes after 67 days on average from the last psychiatric consultation or hospital discharge ($P<0.05$, Wilcoxon test).

Table 3. Demographic data of suicides and natural deaths in our sample divided by psychiatric diagnosis

PSYCHIATRIC DIAGNOSIS (according to ICD9-CM)	SUICIDES (N=25)			NATURAL DEATHS (N=143)		
	Number Males (M) Females (F)	%	median age (years)	Number Males (M) Females (F)	%	median age (years)
Dementias + Organic brain disorders	M=1 -	4%	80	M=27 F=20	32.87%	73
Addiction to alcohol or substances	M=0 F=1	4%	56	M=6 F=6	8.39%	50.5
Major depressive episode and dysthymia	M=4 F=4	32%	56.5	M=8 F=9	11.89%	66
Bipolar disorders	M=1 F=0	4%	49	M=2 F=4	4.20%	73.5
Anxiety disorders	M=1 F=0	4%	26	M=2 F=6	5.59%	77.5
Personality disorders	M=2 F=1	12%	37	M=4 F=4	5.59%	62
Schizophrenia and other psychotic disorders	M=6 F=1	28%	38	M=11 F=6	11.89%	69*
Adjustment disorders	M=2 F=1	12%	40	M=16 F=12	19.58%	76.5**
Total	M=17 F=8 M:F=1.8	100%	49	M=76 F=67 M:F=1.13	100%	75[§]

*Mean age of naturally deceased vs mean age of suicides, among "Schizophrenia and other psychotic disorders" patients, $P < 0.005$, Wilcoxon test.

**Mean age of naturally deceased vs mean age of suicides among "Adjustment disorders" patients, $P < 0.005$, Wilcoxon test.

[§] Mean age of all patients naturally deceased vs mean age of all suicides $P < 0.0001$, Wilcoxon test

5. DISCUSSION

This study highlights that the psychiatric patients of our Mental Health Service shared with the general population the more frequent causes of death, cancer and cardiovascular disorders, but presented a higher risk of suicide, which was the third cause of death in comparison to the local population.

In particular, the rate of death caused by cardiovascular and lung diseases increased among our patients during the last years of the observation period. This data may reflect the current condition of psychiatric patients who, since they are not recluses in psychiatric hospitals as in the past, mostly share the same health problems of the local population (overweight, bad eating habits, sedentary life, etc). At the same time, this data can express the increased vulnerability of our patients to some important risk factors for metabolic and cardiovascular alterations such as smoking habits, largely diffused among the psychiatric population [3], irregular and unruly lifestyle habits, strictly related to psychiatric illness and the effects of new anti-psychotic drugs, more frequently used in the last years [53]. In our sample, patients affected by Dementias had a higher rate of mortality in comparison to the general population, probably due to the high number of patients who required Mental Health Service treatment because they presented severe disruptive behaviour associated to Dementias, as observed in other studies. Also patients with gastrointestinal diseases had a higher rate of mortality in comparison to the general population, probably due to the frequent co-morbidity of psychiatric diseases in pathological use of alcohol and other substances [23]. The similar rate of cancer in both psychiatric and general populations during the whole observation period of our study is similar to other recent findings which contradict the previous literature research hypothesizing that mental diseases, particularly schizophrenia treated with anti-psychotic drugs, provided protection from cancer [54]. From our study it can be indirectly inferred that severe psychiatric conditions can reduce the average life expectancy, since the mean age of death of all patients, with the exception of those with Dementias, was less than that of the general Italian population [52]. In this regard, we have to underline that our sample was constituted by a group of severely ill patients who needed psychiatric treatment for a long time and required frequent psychiatric hospitalizations.

Among our psychiatric sample, suicide, which presented a rate of 15% of all deaths, was the only cause of death statistically significantly related to psychiatric diagnosis (Depressive disorders and Schizophrenia and other psychosis) and was related to younger age of death. These data, in accordance with some authors, suggest that suicide is strictly related to major psychiatric disorders and, indirectly, indicate that depressive and schizophrenic disorders may represent significant risk for suicide [18,19,55]. Nevertheless we have to put in evidence that identifying possible pathological traits such as hopelessness or affective temperamental traits rather than specific Axis I disorders would be the better strategy to establish the risk of suicide, as evidenced by recent research [31,32,37]. The age of our suicidal patients ranged between 21 and 30 years, with a rate of frequency greater overall for men than women, in accordance with the literature [42]. The lower prevalence of suicide among women in younger age groups and the increased risk for suicide during the last decades of a woman's life overlap other author observations. It can be related to women's biological cycle of life and to the losses that may occur in the later stages of life [56]. The gory modality of self-injurious acts in our suicidal patients suggests that they suffered from acute and severe psychic alterations. Moreover, the time between the last psychiatric visit (12 days on average) or the psychiatric hospital discharge (73 days on average) and suicide was brief. This data, overlapped to other Authors [46,57], can be interpreted as a final request for ask

help from patients, who although had strong intentions to commit suicide, tried to communicate their future death to professionals [58].

Finally, although at the end of the observation period the frequency of suicide among psychiatric patients appeared reduced and overlapped the general population one, the percentage of suicides remained high. These data lead us to pessimistically conclude that the capacity of the psychiatric service institution to prevent this tragic event was limited.

6. CONCLUSION

Our psychiatric patients shared with the local population the first two causes of death, neoplastic and cardiovascular diseases, but presented higher frequency of suicide, in accordance with other recent studies [2,3,11].

In our psychiatric sample, the patients who committed suicide were statistically significantly younger in comparison to others and killed themselves after a very short time from the last psychiatric consultation or hospital discharge.

We can conclude that our patients showed the same epidemiological risks of the socio-cultural environment where they lived, even now as in past centuries, despite the isolation they have been forced into by society. Nevertheless, psychiatric patients presented an additional risk of suicide, that remains the worst psychiatric outcome. It is a complex phenomenon, which needs both complete assessment of risk factors and tailored multi-dimensional therapeutic programs to be prevented.

Suicide is among the leading causes of death worldwide [59] and the suicide risk assessments have to be a standard practice in psychiatric treatment settings [60]. The necessity to identify individuals at risk for suicide was underlined by World Health Organization (1996) [61], U.S. Surgeon General (U.S. Public Health Service, 1999) [62], and U.S. Department of Health and Human Services (2000) [63].

The World Health Organization (WHO), by means of a study entitled Suicide Trends in At-Risk Territories (START), stimulated the development of international registration systems for fatal and nonfatal suicidal behaviours, in order to promote suicide research and prevention across different areas of the globe [64]. In fact, only assessment of suicide risk helps to determine treatment priorities and ensure that appropriate safety measures are put in place [65]. A recent systematic review of suicide prevention evidenced that tailoring best evidence and culturally-specific individual strategies into one coherent suicide prevention program for groups at high risk of suicide offer considerable promise [66]. Finally, we underline that understanding patient motivations and the awareness of professionals that suicide risk can be hidden in many situations, may constitute the best preventive strategies.

7. LIMITS OF THIS STUDY

Our study is limited by the brief observation period (5 years) and by the small sample. The retrospective method adopted can underestimate many elements. Another important issue is the lack of data in order to evaluate differences between psychiatric patients and the general population in terms of demographic variables such as age, gender distribution, socioeconomic status.

Nevertheless, this study highlights a clinical reality, which is often not completely analyzed because of physiological "resistance" inherent in the human problem of death. Our sample is representative of the psychiatric population of the geographic area of origin: they suffered from severe psychiatric disorders and presented complex social and clinical problems.

8. IMPLICATIONS FOR FUTURE

This data should make us reflect on the need for rehabilitative treatment for the unruly habits of our patients and for more accurate research about the side-effects of our medications. These allow clear improvement in the prognosis of mental illness, but are not devoid of risks, particularly for cardiovascular disease, which can lead to a premature death.

Regarding suicide which we can interpret in many different ways (emblematic behaviour of psychic suffering, protest, despair or extreme attempt to escape from an unbearable situation), we can underline that it requires the same attention as an "endemic" disease, which must be considered a morbid entity itself and not only a fatal consequence of psychiatric illness.

CONSENT

All authors declare that written informed consent was obtained from all our psychiatric patients for treatment in MHD before death. For local population data provided by the registry of the Clinical Epidemiology Service of Modena were totally anonymously.

For all cases of deceased people informed consent is not applicable since any personal information was reported in this study.

ETHICAL APPROVAL

All authors hereby declare that this research have been examined and approved by the appropriate ethics committee and have therefore been performed in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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