MORTALITY AMONG PSYCHIATRIC INPATIENTS IN SINGAPORE

L C C Lim, L P Sim, P C Chiam

ABSTRACT

This study examines the Standardized Mortality Ratio (SMR) by age, sex and cause of death among psychiatric inpatients in Singapore. Mortality in mentally ill inpatients was found to be 2.79 times that of the general population. The SMR decreased with age and the SMR for those 70 years and above was lower than that reported in the literature. The mortality ratio was most accentuated in the younger patients, especially in the female. Excess mortality was observed in both the natural as well as the unnatural causes of death. Among the natural causes of death, infection and pneumonia showed high excess in mortality. In the unnatural causes of death, suicide was predominant.

Keywords: mortality, psychiatric inpatient, Singapore

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INTRODUCTION

Mortality studies provide useful information on the course of mental disorder and the efficacy of treatment. Reduced life expectancy has long been observed in psychiatric inpatients. Except for a recent report from Nigeria[1] all previous studies were conducted in the West. The Standardized Mortality Ratio (SMR) in psychiatric inpatients vary between 2.0 times[2-5] to 5.1 times[6] that of the reference population (Table I). The steady decline in the mortality rates over the years[7] has been attributed to modern treatment and shorter duration of inpatient care[8].

There is a relative dearth of information on mortality among psychiatric inpatients in the Far East. This study was undertaken to investigate the mortality pattern of psychiatric inpatients in Singapore. We examined the SMR by age, sex and cause of death and compared the data to those that had been reported in the West.

Table I: The Standardized Mortality Ratio in Psychiatric Inpatients

Study	Country/City	Year	SMR
Odegard	Norway	1952	5.1
Innes	Scotland	1960-65	2.0
Babigian	New York	1969	3.0
Brook	Denmark	1980-81	2.0
Casadebaig	France	1982	3.0

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MATERIAL AND METHOD

Singapore is an island city republic in Southeast Asia with a multi-racial population of 2.6 million. The material for this study consisted of all inpatient deaths in Woodbridge Hospital in the years 1985-1986. Woodbridge Hospital, with 50 wards and a total of 2,300 inpatient beds, is the main psychiatric centre in Singapore. We do not have a national patient register but between 1978 and 1986, the hospital conducted a comprehensive inpatient census on the last day of each year. Because the data was fairly consistent from year to year, it was assumed that the number of inpatients on the 31st December 1985 and 1986 were representative of the number of inpatients for the respective year.

Of the original 4,026 patients recorded for the two years, 32 were excluded because of unknown age. Another 10 were rejected because they were less than 15 years old and there were no deaths in this age group. The final number that was included in our study was 3,984 patients. Under the Singapore law, all deaths in the psychiatric institution are reported to the coroner. The case records of these patients were examined to provide demographic data. The cause of death in every case was traced from the post-mortem reports and the Singapore Registry of Births and Deaths.

The patient at risk, expressed in "person-years", was calculated by multiplying the mean number of patients in hospital by the mean duration of hospital stay for each sex- and age-specific groups. The Standardized Mortality Ratio (SMR), obtained from observed/expected deaths, is a measure of the risk of death in the patient relative to the risk in the general population of the same sex and age constitution. The observed deaths were the actual number of deaths recorded for the sex- and age-specific group. The number of expected deaths were computed from sex- and age-specific person-years at risk and the sex- and age-specific mortality rates for the Singapore population[9]. All psychiatric diagnosis was in accordance with the Ninth Revision of the International Classification of Diseases (ICD-9)[10].

Statistical analysis was carried out to determine the significance of the standardized mortality ratio. This was tested by calculating the probability of obtaining the observed number of deaths on the assumption that the number of deaths in a particular category followed a Poisson distribution. The SMR was considered significant if the probability obtained was 0.05 or less.

RESULTS

Demographic characteristics

Of the 3,984 patients (2,224 males and 1,760 females), 120 inpatient deaths were documented. This figure included the 37 patients who died within two weeks of transfer to a general hospital for treatment of their terminal illnesses. One hundred and four patients were Chinese, six were Malay, and eight were Indian. There were 59 males and 61 females with a mean age of 58.67 years (range 15-91 years). Of these, 70 (58.3%) had a diagnosis of schizophrenia, 34 (28.3%) senile and presenile organic psychoses and 8 cases (6.7%) each of affective psychoses and mental retardation.

General mortality

Table II illustrates the SMR by age. There were significantly more deaths among psychiatric inpatients. Mortality in our mentally ill patients was about 2.79 times that of the general population. The SMR decreased with age and the SMR in those 70 years and above was lower than those reported in Western literature.

Table II: Observed and Expected Mortality by Age Groups

Age (yrs)	No. of patients	Observed	Expected	SMR
15-19	58	1	0.02	50.00*
20-39	1570	21	1.22	17.21***
40-59	1512	38	7.60	5.00***
60-69	456	23	9.25	2.49***
≥70	388	37	24.87	1.49*
Total	3984	120	42.96	2.79***

*p<0.05 ***p<0.001

Mortality by sex

The SMR for males (2.85) was slightly higher than the SMR for females (2.73) (Table III). When the age-specific SMR was examined, females especially those below the age of 50 years had a higher SMR than the males. This excess in female mortality was observed in all age groups except those who were 70 years and above.

Table III: Age and Sex Specific Mortality Ratio

Age grp	Male			Female		
(years)	Obs	Exp	SMR	Obs	Exp	SMR
15-19	0	0.01	-	1	0.01	100.00**
20-24	1	0.06	16.70	1	0.01	100.00**
25-29	2	0.19	10.50*	2	0.03	66.67***
30-34	5	0.25	20.00***	3	0.08	37.50***
35-39	4	0.43	9.30**	3	0.17	17.65***
40-44	2	0.53	3.80	3	0.14	21.40***
45-49	5	0.91	5.50**	6	0.44	13.64***
50-54	5	1.40	3.60*	4	0.92	4.35*
55-59	5	2.00	2.50	8	1.26	6.35***
60-64	7	2.90	2.40*	4	1.65	2.43
65-69	8	2.50	3.20**	4	2.20	1.82
≥70	15	9.50	1.60	22	15.40	0.06
Total	59	20.68	2.85***	61	22.31	2.73***

*p<0.05 **p<0.01 ***p<0.001

Psychiatric diagnosis

Schizophrenia was the most common diagnosis in our sample and this was followed by Senile and Presenile Dementia (Table IV). Fifteen of the 70 schizophrenic patients died of unnatural causes whereas 31 of the 34 senile and presenile dementia patients died of natural causes.

Table IV: Cause of Death by Diagnostic Groups

Psychiatric Disorder	Cause of Death		
	Natural	Unnatural	Total
Schizophrenia	55	15	70
Affective psychosis	6	2	8
Senile and presenile dementia	31	3	34
Mental retardation	7	1	8
Total	99	21	120

Causes of death

Among the natural causes of death, infection and pneumonia accounted for the greatest number of deaths (Table V). Mortality from cancer and diseases of the cardiovascular system, the two main causes of death in Singapore, were relatively less common in our mentally ill patients. There is little difference between the males and females.

Table V: Cause of Death in Psychiatric Inpatients

Cause of death	Sex		
	Male	Female	Total
Total Natural	47	52	99
Pneumonia	16	24	40
Infection	15	10	25
Cardiovascular	8	7	15
Cancer	7	7	14
Cerebrovascular	1	2	3
Other	0	2	2
Total Unnatural	12	9	21
Suicide	9	3	12
Other	3	6	9

The 12 cases of inpatient suicides have been described elsewhere[11]. Most of these patients were single, unemployed, rejected by their families and had previous histories of suicidal attempts. The 5 who died within the hospital premises did so by hanging. The rest, while on leave from hospital, jumped to their deaths. Of the other unnatural causes of death, 8 were accidental deaths and the remaining patient was poisoned by his brother.

Majority (88%) of those who died of natural causes were above the age of 40 and had prior histories of physical illnesses (87%). In contrast, 48% of those who died of other causes were less than 40 years old and only 33% had prior histories of physical illnesses (Table VI & VII).

Table VI: Cause of Death by Age Groups

Age group (years)	Natural cause (N=99)	Unnatural cause (N=21)
<40	12	10
40-59	32	6
60-69	20	3
≥70	35	2

p<0.01 Chi square = 16.05

Table VII: Physical Illness by Cause of Death

Prior history of physical illness	Natural cause (N=99)	Unnatural cause (N=21)
Yes	86 (86.8%)	7 (33.3%)
No	13 (13.2%)	14 (66.7%)

p<0.001 Chi square = 23.57 (after Yates correction)

DISCUSSION

The relatively unbiased cohort of admissions from a city state with reliable health statistics makes our findings worthy of comment. The 120 inpatient deaths reflect the small population in Singapore and a stable crude death rate of 5.2 per thousand over the past decade[9]. Our data highlighted the similar excess in mortality among psychiatric inpatients in Singapore.

The SMR of 2.79 in our study was comparable to the more recent reports in the West. Zilber et al[12] noted the interactions between SMR and age, sex, psychiatric diagnosis and cause of death. Hence age- and sex-specific SMR is a better indicator of excess mortality. Similar to earlier studies[4,5], excess mortality was also accentuated in the younger age groups, especially in females who were less than 50 years old.

The lower SMR of 1.6 in males and 0.06 in females were observed in those 70 years and above. This is an interesting finding because the SMR for this age group is usually three to four times that of the general population[4,5]. The differences in study populations could account for this discrepancy. Singapore has a relatively young population and the prevalence of dementia is 1.8%[13]. Only 1.25% of Woodbridge Hospital inpatients had a diagnosis of senile or presenile dementia[14]. Another reason to account for this observation is related to culturally determined patterns of health-seeking behaviour. Elderly patients with dementia would be nursed either by relatives or in nursing homes rather than being sent to a mental hospital.

Death from infection and pneumonia had consistently being shown to be elevated among psychiatric inpatients. They accounted for half the deaths in our study despite a decline of these as causes of death in the general population[9]. One possible reason is because of the longer duration of hospitalization among psychiatric patients. Haughland et al[15] attributed this to the 'setting phenomenon' because of increased exposure to infection as a result of relative overcrowding in a psychiatric hospital.

The rate of inpatient suicides in Singapore is 0.25 per 100,000 population[11]. This is lower than the rate of 0.66 per 100,000 reported by Langley and Bayatti[16] in United Kingdom. The traditional custodial approach to patients and the cultural disapproval of suicide act probably account for the disparity in rates[11]. The 5 cases who choked to death were chronic patients who had been on long term phenothiazine treatment. This is an interesting observation that requires further investigation. Homicide is uncommon among psychiatric inpatients and our case was unusual because the assailant was the victim's brother.

Schizophrenia was the most common diagnosis because majority of the patients admitted to Woodbridge Hospital had a diagnosis of schizophrenia[14]. The finding that 9 out of a total of 70 schizophrenic patients (12.87%) died of suicide was comparable with other published studies[15,16]. Majority of our patients with dementia were elderly, debilitated and they eventually died from natural causes.

Although 82% of those who died in our sample were at least 40 years of age, excess mortality was highest in the younger age groups. Further analysis of the data reveals that the majority of those who died of natural causes were at least 40 years of age (87%) and had prior histories of physical illness (87%). In contrast, those who died of unnatural causes were younger and only a third of them had prior histories of physical illnesses. These findings suggest that psychiatric illnesses per se does not contribute to excess mortality in the natural causes of death but only to the unnatural causes of death. It is in this latter group that preventive mental health measures should be directed at in order to reduce mortality among psychiatric inpatients. Our finding supports the observation that the fall in mortality in psychiatric inpatients over the past decades has been felt least of all among the younger age groups[7].

In conclusion, excess mortality among psychiatric inpatients is a stable finding. The mortality patterns of psychiatric inpatients in Singapore is comparable to that in the West. Epidemiological data on the mortality of psychiatric patients is necessary in monitoring the effectiveness of treatment provisions and in planning future psychiatric services for our patients.

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REFERENCES

1. Abiodun OA. Mortality in a psychiatric population: a Nigerian psychiatric hospital experience. Acta Psychiatr Scand 1988; 77: 654-7.
2. Innes G, Miller WM. Mortality among psychiatric patients. Scott Med J 1970; 15: 143-8.
3. Babigian HM, Odoroff CL. The mortality experience of a population with psychiatric illness. Am J Psychiatry 1969; 126: 470-80.
4. Brook OH. Mortality in the long stay population of Dutch mental hospitals. Acta Psychiatr Scand 1985; 71: 626-35.
5. Casadebaig F, Quemada N. Mortality in psychiatric inpatients. Acta Psychiatr Scand 1989; 79: 257-64.
6. Odegard O. The excess mortality of the insane. Acta Psychiatr Neurol 1952; 27: 353-67.
7. Sims A. Why the excess mortality from psychiatric illness? Br Med J 1987; 294: 986-7.
8. Craig TJ, Lin SP. Mortality among psychiatric inpatients. Arch Gen Psychiatry 1981; 38: 935-8.
9. Yearbook of statistics Singapore 1985/86. Department of Statistics Singapore, 1986.
10. International Classification of Diseases. Ninth revision. Geneva: World Health Organization, 1978.
11. Lim LCC, Sim LP. A study of psychiatric inpatient suicides in Singapore. Singapore Med J 1988; 29: 141-4.
12. Zilber N, Schufman N, Lemer Y. Mortality among psychiatric patients - the groups at risk. Acta Psychiatr Scand 1989; 79: 248-56.
13. Kua EH. Prevalence of mental disorders in the elderly in Singapore. Ann Acad Med Singapore 1987; 16: 264-6.
14. Woodbridge Hospital Annual Report 1986. Ministry of Health, Singapore.
15. Haughland G, Craig TJ, Goodman AB, Siegel C. Mortality in the era of deinstitutionalization. Am J Psychiatry 1983; 140: 848-52.
16. Langley GE, Bayatti NN. Suicides in Exe Vale Hospital, 1972-81. Br J Psychiatry 1984; 145: 463-7.