

## The Pattern of Mortality in Severe Neuroses

By ANDREW SIMS and PATRICIA PRIOR

**SUMMARY** Is there an increased relative risk of death in severe neurosis? 1,482 patients from three psychiatric units in different hospitals in Birmingham were followed-up after a mean of 10.9 years. 91 per cent of the sample were traced and 139 patients were found to have died; a highly significant increased mortality for both sexes for all causes of death. Although suicide and accidents contributed disproportionately, particularly in early follow-up, there was still a markedly increased mortality from the combined categories of nervous respiratory and cardiovascular disease, more evenly distributed in time.

### Introduction

Neurosis is often regarded as a prolonged and irritating condition which occurs independent of or alongside somatic illness and makes management of the latter more difficult. Nosologically, it is unsatisfactory and poorly defined, but its importance lies in the frequency of neurotic diagnosis both in hospital and general practice. The International Statistical Classification of Diseases (W.H.O., 1965) includes within Categories 300–309 neuroses, personality disorders and other non-psychotic mental disorders. It is usually regarded as benign and as a very rare cause of death, but in 1973 an increased mortality was described in a 12-year follow-up study of neurotic patients treated in hospital (Sims, 1973a). It is known that there is an increased mortality for psychiatric patients treated in hospital (Rorsman, 1974). Babigian and Odoroff (1969) studied mortality in different categories of patient from the Monroe County Case Register and found the relative risk of death for neuroses to be 2.0 times the risk for the general population for males, and 1.8 times that for females. In Scotland, Innes and Millar (1970) found the death risk for neurosis was 1.1 times that for the general population while Keehn, Goldberg and Beebe (1974) followed up U.S. army veterans medically discharged for psychoneurosis in 1944 and found a relative death risk of 1.4.

A large part of the increased mortality of psychiatric populations has been found to be due

to suicide and accident. When a psychiatric approach was used to assess accidental and undetermined deaths, the legal procedure for ascertainment was found to have under-represented suicide by 40 per cent (Ovenstone, 1973). A high proportion of suicides showed evidence of mental illness before death (Barraclough *et al.*, 1974), as did 60 per cent of cases of accidental death from poisoning, drowning and falling (Holding and Barraclough, 1977). Though increased mortality from suicide has been ascribed to 'depression', this probably includes some neuroses, as the differentiation of depressive illness (I.C.D. 297) from depressive neurosis (I.C.D. 300.4) is difficult, especially when diagnosis is retrospective after suicide (Registrar General, 1968).

Significant associations have been described between the occurrence of physical illness and the mental state. This subject is confused by teleological problems and by the intrinsic difficulty of measuring the personality and the state of mind. However a few clues do exist; an association has been reported between carcinoma and affective disorders (Kerr *et al.*, 1969), cancer and extraversion (Coppin and Metcalfe, 1963), coronary heart disease and behaviour pattern (Carruthers, 1969) and between many other physical conditions and different psychological stresses.

If there is a link between neurosis and subsequent proneness to premature death, then it is necessary to explore and describe the state

of mind that is associated with such a risk. Various psychological explanations have been suggested. For instance, the 'last straw' hypothesis has been used to explain the increased mortality associated with bereavement (Rees and Lutkins, 1967) and with the experience of the home having been flooded (Bennet, 1970) while a number of other studies have attempted to link state of mind with the development of physical illness. The affect of hopelessness was found to be significantly associated with the presence of cancer in a series of women on whom cervical biopsy was carried out (Schmale and Iker, 1966).

The present survey was undertaken to investigate the pattern of mortality in a larger series of patients, treated in hospital for neurosis, in order to confirm the apparent increase in mortality observed in the original small sample and to explore in more detail specific causes of death.

### Method

Throughout this study, psychiatric diagnoses are coded according to the 8th revision and deaths according to the 7th revision of the International Classification of Diseases (W.H.O., 1957 and 1965).

The series comprised all patients treated for neurosis (I.C.D. Rubrics 300–309) in three Birmingham hospitals over the years 1959–1968. The hospitals included two teaching hospital psychiatric units and one small hospital that became a Regional Psychotherapy Unit during the time of the study. This latter included the subjects of the study in mortality referred to above (Sims, 1973a). Patients diagnosed as suffering from alcoholism (I.C.D. 303) and drug dependence (I.C.D. 304) were normally referred to an appropriate regional unit at another hospital and so these diagnoses do not occur in the sample. The only exclusions to be made were for patients with inadequate documentation and for readmissions within the period of study.

Diagnosis was obtained from a data coding form and from full case summaries. The causes and circumstances of death were considered to be important and these were studied through the Certificates of Death for each of the 139

patients. It was noted whether the death had been reported to the coroner and if so the nature of the verdict. A separate psychiatric assessment of the circumstances of death was carried out, using coroners' records, hospital case notes and accounts from relatives or friends, to see whether the mental state had materially contributed to death. Suicide was accepted as being a psychiatric death and others were categorized as 'quasisuicide', i.e. death was possibly or partly attributable to their mental state or psychiatric condition.

For the purposes of the mortality analysis, tracing was initially through the central register of the National Health Service. Local Family Practitioner Committees, coroners and hospitals also gave useful information. The method conformed with a previous follow-up study of neurosis (Sims, 1973b). The period of observation was of necessity variable; cases were submitted in separate batches for tracing and the termination date for each batch was taken as three months prior to the receipt of the final trace.

The survival of the series was expressed in terms of patient-years at risk by sex, age at diagnosis and years from diagnosis. By applying age and sex-specific mortality rates derived from the Registrar General's Statistical Review (1961) to the years at risk, expected numbers of deaths were computed—first for all causes and then for eleven main-cause groupings. Patients who were untraced at the time of the analysis were counted as alive at the termination date. However, if the computed period of survival exceeded the expectation of life—as given by the E.L.T. 12—the latter value was used in place of the computed value. Deaths occurring during the period of observation were grouped according to the underlying cause of death, as given on the death certificate. The Poisson distribution was used to test the significance of differences between observed and expected numbers and the probability of the observed number or more occurring by chance was computed.

### Results

#### *Demographic data of sample*

Neuroses represented 23 per cent of psychiatric admissions to the two teaching hospital

units and 72 per cent to the unit which became a psychotherapy centre over the years of the study. Diagnostically, the three hospitals showed no significant difference in usage of the term neurosis. Within this category, the diagnoses of anxiety neurosis (I.C.D. 300.0), hysterical neurosis (I.C.D. 300.1), phobic neurosis (I.C.D. 300.2) and depressive neurosis (I.C.D. 300.4) accounted for 86 per cent of the patients. The only major difference was that 'phobic neurosis' was used much more frequently in one hospital (30 per cent of neurotic diagnoses) compared with the other two (14 per cent). The mean age at the time of admission to hospital for males in the sample was 37.5 years and for females 36.4; that for the two teaching hospital units was 40.4 years and for the psychotherapy centre 33.9. There did not appear to be any other important differences between the subjects from different hospitals and they are therefore dealt with as a single sample.

The age distribution of the sample is shown in Table I. Analysis of marital status showed that 68.3 per cent were married, 24.7 per cent single, 4.4 per cent widowed and 3.0 per cent divorced or separated. In terms of birthplace: 42.5 per cent were born in Birmingham, 12.1 per cent within 15 miles of Birmingham, 28.2 per cent elsewhere in the United Kingdom, 11.9 per cent in Ireland, 2.3 per cent elsewhere in Europe and a further 3.0 per cent in other parts of the world. Asian and West Indian immigrants were rarely referred for neurosis in the years when the sample accumulated (1959-67).

TABLE I  
*Age distribution of sample at time of admission*

Age Range	Total	
	N	%
15-24	290	19.6
25-34	423	28.5
35-44	422	28.5
45-54	219	14.8
55-64	94	6.3
65-	34	2.3
<b>Total</b>	<b>1,482</b>	<b>100</b>

#### *Mortality analysis*

The results of tracing, with the survival history of the sample, are shown in Table II; 91.2 per cent of the sample were successfully traced, while at the termination date, 9.4 per cent of the whole sample were found to have died. The series was observed for a total of 16076.5 patient years (mean = 10.9 years).

TABLE II  
*Results of tracing: survival history of sample*

	Male	Female	Total
Alive	440	772	1,212
Dead	67	72	139
Not traced	47	84	131
<b>Total</b>	<b>554</b>	<b>928</b>	<b>1,482</b>

Certificates of death were available for the 139 patients who had died. Of these, 79 (57 per cent) were not reported to the coroner, 31 (22 per cent) were reported to the coroner with autopsy but without inquest and for 29 deaths (21 per cent), an inquest was carried out. Of the 60 deaths reported to the coroner, a verdict of suicide was recorded for 14; 14 were considered accidental deaths; 29 to have died from natural causes and three received an 'open verdict'.

Suicide was accepted as being a psychiatric death and, as stated above, 14 patients came into this category. A further 17 were categorized as quasisuicide, i.e. death was possibly or partly attributable to their mental state or psychiatric condition. Not surprisingly, this showed considerable overlap with the coroners' verdicts of 'accidental death' and 'open verdict'. However, two of these 'quasisuicides' were not reported to the coroner and one was considered by the coroner to be a death from natural causes.

Table III displays the results by main-cause grouping. The observed number of deaths from all causes in males exceeded the expected number, the difference being highly significant ( $P < 0.001$ ). The excess could be attributed to three main-cause groupings, namely accidental deaths ( $P < 0.001$ ), circulatory diseases

TABLE III  
Observed and expected numbers of deaths by main-cause groupings

Cause of death	Male			Female		
	Expected number	Observed number	Probability	Expected number	Observed number	Probability
All causes	40.77	67	less than	43.15	72	less than
I Infective and parasitic diseases	0.81	0	—	0.64	0	—
II Malignant neoplasms	9.94	9	—	12.37	15	—
III Allergic, endocrine, metabolic, nutritional	0.42	1	—	0.93	2	—
IV Diseases of blood	0.10	1	—	0.22	0	—
V Mental disorders	0.05	0	—	0.10	0	—
VI Diseases of the nervous system	3.86	7	—	6.64	12	<0.05
VII Diseases of the circulatory system	14.31	23	<0.05	12.66	14	—
VIII Diseases of the respiratory system	5.34	10	<0.05	3.83	9	<0.05
IX Diseases of the digestive system	1.26	2	—	1.29	1	—
X Diseases of the genito-urinary system	0.80	1	—	0.88	0	—
XVII Accidents, poisoning and violence (E800-999)	3.37	12	<0.001	2.39	19	<0.001
Remainder	0.51	1	—	1.19	0	—

— not significant

TABLE IV  
Accidental deaths—Group EXVII

			Expected number	Observed number	Probability
Accidents, poisoning and violence	E800-999	M	3.37	12	<0.001
		F	2.39	19	<0.001
		T	5.76	31	<0.001
Self-inflicted death	E970-979	M	0.98	6	<0.001
		F	1.09	8	<0.001
		T	2.07	14	<0.001
Accidental death excluding self-inflicted death	E800-969 980-999	M	2.39	6	<0.05
		F	1.30	11	<0.01
		T	3.69	17	<0.001

( $P < 0.05$ ) and respiratory diseases ( $P < 0.05$ ). For all other cases, the observed numbers were close to their expectations. For females, the results were similar except that nervous diseases showed an excess ( $P < 0.05$ ) instead of circulatory diseases, for which the observed number was close to expectation.

In Table IV, accidental deaths are analysed into three categories. Not only was there a very

highly significant excess of suicides ( $P < 0.001$ ) but also of other accidental deaths ( $P < 0.05$ ).

The results are summarized in Table V. When deaths from diseases of the nervous, circulatory and respiratory systems, suicides and other accidental deaths were accounted for, the observed number of deaths from all other causes was found to be close to expectation. Deaths categorized as quasisuicides appear in

TABLE V  
Observed mortality of neurotic sample

	Expected	Observed number (Quasisuicide)	Probability	Relative risk
All causes of death	83.92	139 (17)	<0.001	1.7
Diseases of the nervous, respiratory and circulatory systems	46.64	75 (2)	<0.001	1.6
Self-inflicted death	2.07	14 (0)	<0.001	6.8
Accidents, poisoning and violence excluding self-inflicted death	3.69	17 (14)	<0.001	4.6
Remainder	31.52	33 (1)	—	1.0

— not significant

parentheses after the observed number, in which they are included. The removal of quasisuicides from the observed number would alter the level of significance in only one instance—that of ‘accidental deaths excluding self-inflicted injury’, when the remaining three deaths would be close to the expected number of 3.69.

Figure 1 displays the pattern of cumulative relative risk of death over time. In the first four years following hospital admission, there was a nine-fold increased risk of suicide. In subsequent years the risk decreased, but still showed a 3.4-fold relative risk for these years. In contrast, deaths from all other causes showed an increase in relative risk to 1.5-fold

during the first four years, after which it remained constant.

### Discussion

Although neurosis is not a precisely defined term, the sample is considered to be representative of those patients treated in hospital for neurosis who are, on the whole, the more severe sufferers from this condition. The sample of neurosis was formed from three different hospitals, with no marked differences in mortality pattern between them. The International Statistical Classification of Diseases categories for the neuroses (I.C.D. 300–309) include other conditions, e.g. personality disorders (I.C.D. 301) and feeding disturbances (I.C.D. 306.5). In the present sample, 95.4 per cent had a first diagnosis of neurosis (I.C.D. 300) and it seemed more meaningful to include categories I.C.D. 301–309, as they are not readily distinguishable from I.C.D. 300. The most difficult interfaces diagnostically are those between neurosis and (i) normality, (ii) personality disorder alone, and (iii) affective disorders.

A coroner is closely constrained in making his verdict and because of the stringent evidence required for proof of suicide, he prefers to err in favour of accidental death rather than suicide (Burton, 1977). When psychiatrists have evaluated modes of death, they have found that there are many more deaths in which a subject's

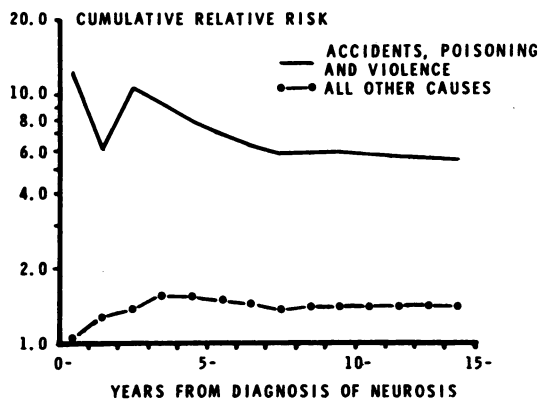


Fig 1.—Mortality in severe neurosis.

expressed wish to die is followed by death (Ovenstone, 1973). For this reason, we have used the term 'quasisuicide' where death was possibly or partly attributable to their mental state or psychiatric condition (Sims, 1973a). In this sample, 11 out of 14 accidental deaths and the three open verdicts were considered quasisuicide by retrospective psychiatric assessment of death. There were three other quasisuicides which were either not reported to the coroner or were given a verdict of natural causes. As there is less information available on those whose deaths were not reported to the coroner, this is likely to be an underestimate of quasisuicide.

The results show that mortality is increased within the follow-up interval for a series previously treated in hospital for neurosis. In comparison with the general population, the relative risk is 1.7. The most important cause of the increase is undoubtedly accidental death (relative risk—5.4) and in particular suicide (relative risk—6.1). Nevertheless, even when these two major causes of death (suicide and accidental death) have been accounted for, there is still a major excess of deaths from nervous, circulatory and respiratory diseases (combined relative risk—1.6). It is most unlikely that this mortality can be explained by the neurotic symptoms at the time of diagnosis obscuring a lethal physical illness that is already present. If this were the case, the physical manifestations of the disease would occur soon and death would be likely to ensue within a year or two of discharge from hospital. Also, potential misdiagnoses are not reported to any appreciable extent amongst the causes of death.

The time at which death occurs during the follow-up period shows a distinct pattern, between accidental and self-inflicted deaths and all other causes. Accidental death is most likely to occur within the first year and the risk decreases over the years. It seems probable that this mortality is associated with the condition for which the patient was admitted and the risk remains for longer than the period of acute treatment. The lower mortality from other causes in the first three years is probably explained by the screening process that has

occurred in general practice referral and hospital admission procedure. If identifiable physical illness were present at that time, they would not have been referred to a psychiatric hospital nor diagnosed as having neurosis, and so at the beginning of the follow-up period the sample is biased in favour of physical fitness.

It appears that, in some way, hospital admission for neurosis is associated with premature mortality, certainly from suicide and accident, but also from natural causes. This could be either because the neurotic is more likely to put himself in a potentially lethal situation, or because the mental state of neurosis predisposes to the development of a serious illness, or because neurosis renders the prognosis less favourable in those afflicted with an illness. The findings of this paper support the first hypothesis, at least in respect of the mortality from suicide and accidental death. There remains uncertainty as to the extent of the contribution of the latter two possibilities.

#### Acknowledgements

We gratefully acknowledge support from the West Midlands Regional Health Authority. We are very grateful to Mrs Barbara Rudge for her research clerical work and to Mr David Smith for help with computing.

#### References

- BABIGIAN, H. M. & ODOROFF, C. L. (1969) The mortality experience of a population with psychiatric illness. *American Journal of Psychiatry*, **126** (4), 470–80.
- BARRACLOUGH, B. M., BUNCH, J., NELSON, B. & SAINSBURY, P. (1974) A hundred cases of suicide: clinical aspects. *British Journal of Psychiatry*, **125**, 355–73.
- BENNET, G. (1970) Bristol floods 1968. Controlled survey of effects on health of local community disaster. *British Medical Journal*, **iii**, 454–8.
- BURTON, J. (1977) The Coroner. *British Journal of Psychiatry News and Notes*, June 1977, 13–16.
- CARRUTHERS, M. E. (1969) Aggression and atheroma. *Lancet*, **ii**, 1170–1.
- COPPEN, A. & METCALFE, M. (1963) Cancer and extraversion. *British Medical Journal*, **ii**, 18–19.
- HOLDING, T. A. & BARRACLOUGH, B. M. (1977) Psychiatric morbidity in a sample of accidents. *British Journal of Psychiatry*, **130**, 244–52.
- INNES, G. & MILLAR, W. M. (1970) Mortality among psychiatric patients. *Scottish Medical Journal*, **15**, 143–8.
- KEEHN, R. J., GOLDBERG, I. D. & BEEBE, G. W. (1974) Twenty-four year mortality follow-up of army veterans with disability separations for psychoneurosis in 1944. *Psychosomatic Medicine*, **36**, 27–46.

- KERR, T. A., SCHAPIRA, K. & ROTH, M. (1969) The relationship between premature death and affective disorders. *British Journal of Psychiatry*, **115**, 1277–82.
- OVENSTONE, I. M. K. (1973) A psychiatric approach to the diagnosis of suicide and its effect upon the Edinburgh statistics. *British Journal of Psychiatry*, **123**, 15–21.
- REES, W. D. & LUTKINS, S. G. (1967) Mortality of bereavement. *British Medical Journal*, **4**, 13.
- REGISTRAR GENERAL (1961) *Statistical Review of England & Wales for the Year 1961*. London: H.M.S.O.
- (1968) *A Glossary of Mental Disorders: Studies on Medical and Population Subjects No. 22*. London: H.M.S.O.
- RORSMAN, B. (1974) Mortality among psychiatric patients. *Acta psychiatrica scandinavica*, **50**, 354–75.
- SCHMALE, A. H. & IKER, H. P. (1966) The affect of hopelessness and the development of cancer. I. Identification of uterine cervical cancer in women with atypical cytology. *Psychosomatic Medicine*, **28**, 714–21.
- SIMS, A. C. P. (1973a) The mortality in neurosis. *Lancet*, **ii**, 1072–6.
- (1973b) Importance of a high tracing rate in long term medical follow-up studies. *Lancet*, **ii**, 433–5.
- W.H.O. (1957) *International Classification of Diseases: Manual of the International Statistical Classification of Diseases, Injuries and Causes of Death, 7th Revision*. Geneva.
- (1965) *International Statistical Classification of Diseases, Injuries and Causes of Death, 8th Revision*. Geneva.

\*A. C. P. Sims, M.A., M.D., M.R.C.Psych., Senior Lecturer and Honorary Consultant, Department of Psychiatry, Queen Elizabeth Hospital, Birmingham B15 2TH,

M. P. Prior, B.Sc., Department of Social Medicine, Medical School, University of Birmingham

\* Address for reprints.

(Received 28 October 1977; revised 9 March 1978)