

# The Mortality Risk Among Persons with Psychiatric Hospitalizations

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## ABSTRACT

**Background:** Persons affected by severe mental disorders have a higher mortality risk than the general population.

**Objectives:** To investigate the overall mortality and selected natural and external causes of death by age, gender and mental health-related variables among persons who were ever admitted to psychiatric inpatient services.

**Methods:** This cohort study compared the mortality risk among Israeli Jews aged 18 and over who were ever hospitalized in psychiatric facilities until 2006, as recorded in the Psychiatric Case Register (PCR), with never-hospitalized subjects. The national database on causes of death was linked to the PCR.

**Analysis:** Mortality rates were computed by age, gender and psychiatric diagnosis, while proportions of deaths were computed by time from discharge. Rates were also analyzed by time-periods of date of death to check for possible association with mental health policy decisions. Age-adjusted and age-specific mortality rates and rate ratios (RR) were computed for persons in the PCR compared with those never hospitalized.

**Results:** The age-adjusted mortality rate of hospitalized psychiatric persons was double that of the non-hospitalized, RR = 1.98 (95% CI 1.96-2.00). The rate was higher in both genders and for persons of all age groups, particularly for the young. The highest RRs were found for external causes of death, in particular suicide (RR = 16.34, 95% CI 15.49-17.24). Natural causes also showed higher risk, except for malignancies (RR = 1.13, 95% CI 1.10-

1.16). The risk for death was highest for persons admitted for substance abuse, while it was almost equal for those diagnosed with either schizophrenic or affective disorders. The rate ratios were not observed to change as a result of policy decisions, e.g., dehospitalization and the introduction of the atypical antipsychotics. A third of all deaths and 62% of suicides occurred before discharge or within a year from discharge.

**Conclusions:** This study highlights the importance for advancing programs of both preventative and curative medical care among persons who had psychiatric inpatient care.

Persons with psychiatric disorders have an enhanced risk for comorbid physical diseases (1-3). Yet, for a number of reasons (4), medical care for persons with severe psychiatric disorders is often found to be substandard (5). As a result, their mortality risk, particularly for severe mental disorders, is higher than that of the general population (cf. 6-11). Studies ascertaining this risk were conducted in a number of countries, among them, the U.S. (6), Canada (7), Scandinavia (8-10), the U.K. (11), and in Israel over two decades ago (12).

Despite those uniform findings some questions may be raised:

First, are persons hospitalized in Israeli psychiatric institutions in recent years partially or fully free from the same mortality risk? Although research has noted that the Israeli health system has deficiencies (13), the country has a highly developed and nationally-insured medical care system implemented in 1995, as well as free

inpatient and community-based (for curative and rehabilitation care) psychiatric facilities (14). Conceivably, these factors could lead to timely access to medical care, and, as a result, to the possible reduction of the untreated incidence and prevalence of comorbid physical disorders and subsequent mortality.

Admittedly, years ago Israel was not found at a comparative advantage with regard to the control of natural causes of death (12), but since the first study was conducted positive changes have taken place in the health system that could have reduced the risk. Is this indeed the current case in Israel when in countries with well developed health services, e.g., Scandinavia (8-10), the mortality risk for persons hospitalized for psychiatric disorders was found higher than among suitable comparison groups?

Second, is the risk for suicide different from the countries cited above since its overall rate is lower in Israel (15)?

Past studies have shown that increased overall mortality risks are present for all psychiatric disorders, although not equally. For example, Hiroeh et al. (16, 17) showed an enhanced risk of dying by homicide in men with a diagnosis of schizophrenia and in individuals with affective psychosis. The authors also found that the highest risk of death by homicide and accidents was among persons abusing substances, while the highest risk to die by suicide was among persons using drugs. Hoyer et al. (8) found in a study restricted to persons hospitalized for affective disorders that the risk of mortality was increased overall, but in a slightly different proportion among the affective subgroups. Honkonen et al. (9) found that the highest risk for death from external causes was in persons admitted with mood disorders, while for natural causes the risk was higher in persons diagnosed with schizophrenia spectrum disorders. However, they also concluded that "alcohol consumption plays a major role in causing excess deaths that could be potentially avoided." Zilber et al. reported that in Israel the highest risk was for hospitalized persons diagnosed with ICD-9 drug addiction and, in descending order, alcoholism, organic disorders, personality disorders, neuroses, schizophrenia and affective disorders (12).

Importantly for our study, Israel offers several methodological advantages for an unbiased exploration of the mortality risk and relevant associations among persons affected with severe mental disorders, since their hospitalizations are registered by law in a nationwide database. This almost eliminates the possibility of missing subjects who are admitted. Also, among Israel-born Jews (18) a study showed that most or all of the affected persons with

schizophrenia are hospitalized in psychiatric facilities, thus reducing or eliminating selectivity factors. In addition, Israel possesses both an updated register of mortality and yearly estimates of the general population.

## OBJECTIVE

This cohort study explored the death risk among Jewish-Israelis who were ever hospitalized in psychiatric facilities for different disorders by age, gender and psychiatric diagnoses for overall mortality and by selected causes of death. In addition, it explored the time of death (before or after discharge), and number and length of their hospitalizations. It also examined differences in risk over the years, to assess whether it was modulated following service-related policy decisions:

- 1) By the National Insurance Law, which entered into effect in 1995 assuring universal access to medical care;
- 2) By the generalized administration of the second generation of antipsychotics since 2000, given their possible adverse health side-effects, such as diabetes (19);
- 3) By the coming into effect of the rehabilitation law implemented since 2000, that facilitates the ongoing process of dehospitalization through the provision of a "basket" of services to the persons discharged from inpatient psychiatric facilities (20); and
- 4) By the possible impact of the publication of Zilber et al.'s study in 1989 (12) on policy decisions seeking to reduce the identified mortality risk.

## METHODS

We utilized the national psychiatric case register (PCR) to identify all Jewish-Israelis over the age of 18 who were ever admitted to psychiatric in-patient facilities (including some day-hospital units) from the beginning of the PCR (in the early 1950s) and every year henceforth until the end of 2006.

The PCR cumulatively enters all admissions and discharges to all psychiatric inpatient facilities using a unique identification number. As noted above, the reporting is mandated by law (21). It is a reasonable assumption that all Jewish-Israelis with a severe psychiatric disorder were hospitalized, particularly in the early years of the study when the supply of beds was relatively high (22). In contrast, the Arab-Israeli minorities, particularly women, use the psychiatric inpatient services considerably less (22). To avoid a biased sample, the latter group was not included in this study.

The PCR includes the respective dates and diagnosis made by a clinical psychiatrist upon admission and discharge, and socio-demographic information. Diagnoses are recorded according to ICD-10; those made prior to the last WHO classification have been updated. We grouped the cases by the psychiatric diagnosis at discharge (whether the person was alive or deceased) during the last admission (given the higher diagnostic reliability the longer the period of observation) as follows: drug and alcohol addiction (F10-F19); all non-affective psychotic disorders (including schizophrenia) (F20-F29); affective disorders (F30-F39); organic brain disorders (F00 – F09, G40); and others (F40-F99, Z03, Z032, Z04, Z046).

The nationwide database of causes of death is under the responsibility of the Central Bureau of Statistics (CBS). During the years 1981-1997, the causes of death were coded according to the 9th edition of the International Classification of Diseases and according to the 10th edition since 1998. The mortality records with causes of death for the years of our study, 1981-2006, were linked with the PCR. The causes of death were grouped as follows (with ICD-10 codes, equivalent ICD-9 codes were used before 1998):

1) Natural causes: infectious diseases (A00-B99); cancer (C00-C97); diabetes (E10-E14); heart diseases (I00-I09, I11, I13, I20-I51); cerebrovascular diseases (I60-I69); respiratory diseases (J10-J18, J40-J47); and other, 2) external causes: accidents (V01-X59, Y85-Y86), suicide (X60-X84, Y870); homicide (X85-Y09, Y871); and other. Total deaths comprise natural, external and missing causes.

For all those on the mortality file found in the PCR, the respective dates of admission and discharge for first and last hospitalization were added to the file. Time to death was calculated as the difference between the dates of death and of the last discharge. If the death was recorded as having taken place on discharge date, the death could have occurred following the release procedures, or during the hospital stay, or while the person was on leave or with the status of runaway, or in the general hospital where the person may have been transferred for specialized medical or surgical care. This risk-period of death was grouped as follows: on the day of discharge; less than three months; three months–one year; and over a year.

In this study we followed up all subjects who ever had a psychiatric hospitalization since the beginning of 1981 until the end of 2006 to check for their mortality. To be included in the follow up, persons hospitalized before 1981 had to be alive at the beginning of that year. The denominator, based on the total Jewish population for each year by

age and gender, was extracted from data provided by the Central Bureau of Statistics (CBS), while the total number of persons ever hospitalized for each year by gender, age and psychiatric diagnosis was extracted from the PCR.

For comparison of deaths during different years, the following periods were used: 1981-1985; 1986-1990; 1991-1995; 1996-2000; and 2001-2006. Age was grouped into ages 18-44, 45-64 and 65 and over.

Confidentiality was strictly assured since the authors who analyzed the data had no access to the identity of the persons linked by both databases.

## ANALYSIS

Gender and age-specific and age-standardized mortality rates were calculated using the direct method based on the 1996 total Jewish population as standard, for persons ever hospitalized in psychiatric facilities (hospitalized) and for those never hospitalized (non-hospitalized). Rate ratios (RR) and their respective 95% confidence intervals (CI) were calculated as well.

## RESULTS

The number of persons aged 18 and over who were ever hospitalized in psychiatric facilities from the 1950s until the end of 2006, and who were alive at the beginning of 1981 (for those hospitalized before that year) was 136,687 (men, 52.4%; women, 47.6%). The accumulated number of deaths for the hospitalized persons during the years 1981-2006 was 42,836. The total number of deaths of the Jewish-Israeli population during those 25 years was 752,600.

The age distribution and psychiatric diagnoses of the total population of the ever hospitalized, alive each year between 1981-2006, by gender and age, are shown in Table 1. Diagnoses of organic and affective disorders were more prevalent at age 65 and over (13.6% and 34.6%, respectively), while the diagnosis of non-affective psychotic disorders was more prevalent at younger ages. The percent of women diagnosed with drug and alcohol addiction (1.1%) was lower than of men (5.3%), but higher for affective disorders (women, 23.4%; men, 12.0%). The average age of women was higher than for men (37.9% of them were aged 18-44 compared to 50.9% for men.)

## MORTALITY RISK BY CAUSE AND PSYCHIATRIC DIAGNOSIS

Table 2 shows the age-adjusted mortality rates by causes of death for all hospitalized and non-hospitalized subjects. The total age-adjusted mortality rate per 100,000

**Table 1.** *Psychiatric diagnoses by average age and gender of Jewish Israelis aged 18 and over who ever had a psychiatric hospitalization, 1981-2006\* (%)*

Age/Psychiatric diagnosis at discharge		Organic disorders	Drug and alcohol addiction	Non-affective psychotic disorders	Affective disorders	Other disorders	Unknown	Total
Men	All diagnoses							
18-44	50.9	2.8	5.1	52.4	6.8	31.4	1.5	100.0
45-64	35.3	4.6	6.0	46.6	13.3	26.0	3.5	100.0
65+	13.8	14.3	4.7	32.4	28.0	17.0	3.6	100.0
<b>Total</b>	<b>100.0</b>	<b>5.0</b>	<b>5.3</b>	<b>47.6</b>	<b>12.0</b>	<b>27.5</b>	<b>2.5</b>	<b>100.0</b>
Women								
18-44	37.9	2.4	1.6	52.6	13.0	28.7	1.8	100.0
45-64	37.2	3.9	1.0	49.5	23.9	18.3	3.5	100.0
65+	24.9	13.2	0.6	33.6	38.5	11.0	3.1	100.0
<b>Total</b>	<b>100.0</b>	<b>5.6</b>	<b>1.1</b>	<b>46.7</b>	<b>23.4</b>	<b>20.4</b>	<b>2.7</b>	<b>100.0</b>
Total								
18-44	44.7	2.6	3.6	52.4	9.3	30.3	1.6	100.0
45-64	36.2	4.2	3.5	48.0	18.5	22.2	3.5	100.0
65+	19.1	13.6	2.1	33.2	34.6	13.3	3.3	100.0
<b>Total</b>	<b>100.0</b>	<b>5.3</b>	<b>3.3</b>	<b>47.2</b>	<b>17.5</b>	<b>24.1</b>	<b>2.6</b>	<b>100.0</b>

\*Computed from total yearly population of those who ever had a psychiatric hospitalization and were alive for each year.

persons aged 18 and over during the follow-up years (1981-2006) for the ever-hospitalized group was twice as high as that of the never-hospitalized persons in psychiatric facilities, RR = 1.98 (95% CI 1.96-2.00).

Higher rate ratios were found for various specific natural causes among the ever-hospitalized group, except for cancer. The highest rate ratios were found for infectious, RR = 2.38 (95% CI 2.24-2.52), and respiratory diseases, RR = 2.40 (95% CI 2.31-2.50).

The rate ratios for external causes of death were markedly higher than for natural causes among the ever-hospitalized group, for suicide, RR= 16.34 (95% CI 15.49-17.24); homicide, RR = 3.60 (95% CI 2.92-4.42); accidents, RR = 2.63 (95% CI 2.50-2.77); and other external causes, RR = 4.58 (95% CI 4.17-5.03). We also calculated rate ratios for both genders and found them to be similar, except for suicide, where the RR was particularly high for women, RR = 28.07 (95% CI 25.43-30.99) compared to men, RR = 12.32 (95% CI 11.55-13.14).

Table 2 also shows the age-adjusted rates by causes of death and different psychiatric disorders. The age-adjusted mortality rates were highest for persons diagnosed with organic disorders (4138, 95% CI 4026-4250), followed by those with drug and alcohol addiction (3474, 95% CI 3313-3635). Age-adjusted rates for those with drug and alcohol addiction were about twice as

high as those for persons diagnosed with non-affective psychotic (1695, 95% CI 1666-1724) or affective disorders (1583, 95% CI 1545-1621). Mortality rates for the latter two diagnoses were similar. All rates were calculated by 100,000 persons.

Among natural causes of death, rates were higher for those with organic disorders followed by those with drug and alcohol addiction except for diabetes, where the rate for persons with drug and alcohol addiction (75, 95% CI 53-102) was close to those diagnosed with non-affective psychotic (77, 95% CI 71-83) and affective disorders (66, 95% CI 59-72). Among the total external causes of death, those with organic disorders (250, 95% CI 209-291) had rates close to those with non-affective psychotic (232, 95% CI 221-244) and affective disorders (249, 95% CI 226-271), while persons with drug and alcohol addiction had rates about twice as high (520, 95% CI 450-590) as those in the other diagnostic groups. All rates were calculated per 100,000 persons.

Suicide rates were highest among persons with affective disorders (161, 95% CI 142-181), followed by those with drug and alcohol addiction (156, 95% CI 116-204), and about a quarter higher than those with non-affective psychotic disorders (129, 95% CI 120-138). The mortality rate from accidents was much higher among those with drug and alcohol addiction disorders (186,

**Table 2.** Age-adjusted rates for Jewish-Israelis aged 18 and over who ever had a psychiatric hospitalization by psychiatric diagnosis and cause of death and RRs compared with non-hospitalized subjects, 1981- 2006. Rates per 100,000 persons

Causes of death/ psychiatric diagnosis	Psychiatric diagnosis at discharge					All psychiatric diagnoses**	Non- hospitalized	Rate ratio <sup>#</sup>
	Organic disorders	Drug or alcohol addictions	Non-affective psychotic disorders	Affective disorders	Other disorders			
Infectious diseases	148.8	80.3	41.6	36.7	39.5	52.3	22.0	2.4
Cancer	399.2	443.1	224.1	240.3	231.6	261.6	232.1	1.1
Diabetes	173.2	74.5	76.7	65.5	71.8	84.9	40.6	2.1
Heart diseases	932.6	524.4	368.3	373.2	323.6	451.9	283.5	1.6
Cerebrovascular diseases	380.1	172.8	104.3	117.8	95.2	143.8	88.3	1.6
Respiratory diseases	271.5	206.8	106.3	72.7	83.4	116.7	48.6	2.4
Other natural causes	1574.4	1433.9	530.8	419.1	409.3	622.1	229.9	2.7
Total natural causes	3879.9	2935.7	1452.2	1325.3	1254.5	1733.4	945.0	1.8
Accidents	133.2	185.6	77.4	66.9	58.1	82.7	31.4	2.6
Suicide	81.4	155.9	128.9	161.4	86.6	121.5	7.4	16.3
Homicide	..	43.0	3.5	..	8.9	6.5	1.8	3.6
Other external causes	33.1	135.3	22.6	20.0	21.7	27.6	6.0	4.6
Total external causes	249.8	519.8	232.4	248.6	175.3	238.4	46.7	5.1
Total*	4138.1	3474.0	1695.0	1583.2	1440.9	1983.0	1002.5	2.0

<sup>#</sup> Rate ratio: all hospitalized/non-hospitalized.

.. Rates based on less than 5 cases.

\* Total rates include missing death causes.

\*\* Rates for all diagnoses include missing recorded diagnoses

95% CI 145-226) than for all other diagnoses. All rates were calculated per 100,000 persons.

Table 3 shows mortality rates by age group and causes of death for all hospitalized and the never-hospitalized subjects, and for different psychiatric disorders. Age-specific RRs for all causes were higher in the younger groups. The RRs for total mortality ranged from 1.55 (95% CI 1.53-1.57) for persons aged 65 and above, to 7.07 (95% CI 6.86-

7.30) for persons aged 18-44. RRs were higher for external than for natural causes of death in all age groups. The rate ratios for both genders were found to be similar, except for external causes of death at younger ages, 18-44, where the RRs for women, 15.13 (95% CI 13.77-16.61) were considerably higher than for men, 6.54 (95% CI 6.19-6.92).

Rates for total natural causes of death for persons diagnosed with organic disorders were over twice as high as

**Table 3.** Death rates for Jewish-Israelis aged 18 and over who ever had a psychiatric hospitalization by psychiatric diagnoses, age groups and causes of death, and for non-hospitalized, 1981-2006. Rates per 100,000 persons

Causes of death	Age group	Psychiatric diagnosis at discharge					All psychiatric diagnoses**	Non- hospitalized	Rate ratio <sup>#</sup>
		Organic disorders	Drug or alcohol addictions	Non-affective psychotic disorders	Affective disorders	Other disorders			
Total natural causes	18-44	917.0	1170.6	251.2	167.0	229.2	290.6	45.1	6.4
	45-64	3330.5	3442.2	1331.0	1108.9	1020.3	1426.6	490.4	2.9
	65+	15039.6	8546.0	5762.8	5603.5	5114.6	7153.1	4667.0	1.5
Total external causes	18-44	202.3	593.5	250.7	224.3	157.8	202.3	26.7	8.7
	45-64	211.0	463.9	182.5	240.6	157.9	211.0	31.0	6.5
	65+	472.9	342.9	241.4	374.7	264.1	472.9	138.1	2.4
Total*	18-44	1119.3	1783.8	507.1	396.4	392.1	526.9	74.5	7.1
	45-64	3548.3	3926.8	1522.6	1358.2	1195.5	1639.7	531.5	3.1
	65+	15551.4	8915.3	6035.3	6006.4	5401.8	7515.7	4844.0	1.6

<sup>#</sup> Rate ratio: all hospitalized/non-hospitalized.

\* Total rates include missing death causes.

\*\* Rates for all diagnoses include missing recorded diagnoses.



among those with non-affective psychotic and affective disorders at all ages. For total external causes of death, the age group 18 - 44 had lower rates, while for those aged 45 - 64 the rates were similar to those with non-affective psychotic and affective disorders.

The mortality rate among persons with drug and alcohol abuse was higher than other diagnostic categories for all causes. This was found in particular for all natural causes of death in the 18-44 age group, where the rate was 1171 (95% CI 1053-1298), almost five times higher than among those with non-affective psychotic disorders (251,95% CI 230-266); seven times higher than for those with affective disorders (167,95% CI 40-198); and 26 times higher than for non-hospitalized persons. All rates were calculated per 100,000 persons.

The mortality rate for persons with affective disorders was similar or lower than for those with non-affective psychotic disorders. The exception was for all external causes of death at older ages, in particular for persons aged 65 and over, where the rate was 375 (95% CI 341-409) for those with affective disorders compared to 241 (95% CI 214-271) for those with non-affective psychotic disorders. All rates were calculated per 100,000 persons.

#### OVERALL AND SPECIFIC MORTALITY RISKS BY TIME PERIOD

The RRs of mortality among the ever-hospitalized persons compared to the never hospitalized have been stable since the beginning of the 90s, RR = 1.91 (95% CI 1.87-1.95) in 1991-1995, compared with slightly higher rate ratios for earlier years, RR = 2.05 (95% CI 2.00-2.10) in 1986-1990, and RR = 2.16 (95% CI 2.11-2.21) in 1981-1985 (Table 4).

Among specific natural causes of death, the greatest

**Table 4.** Rate ratios of age-adjusted death rates for Jewish-Israelis aged 18 and over who ever had a psychiatric hospitalization compared with non-hospitalized subjects by causes of death, selected psychiatric diagnoses and period of death, 1981-2006

Causes of death	Years of deaths					
	1981-1985	1986-1990	1991-1995	1996-2000	2001-2006	1981-2006
Rate ratios all hospitalized/non-hospitalized						
Infectious diseases	3.66	2.76	2.10	2.39	1.95	2.38
Cancer	0.99	1.11	1.11	1.18	1.15	1.13
Diabetes	2.36	2.25	2.04	1.97	2.07	2.09
Heart diseases	1.70	1.57	1.60	1.56	1.60	1.59
Cerebrovascular diseases	1.86	1.86	1.56	1.46	1.52	1.63
Respiratory diseases	3.01	2.40	2.14	2.26	2.32	2.40
Other natural causes	3.15	2.99	2.84	2.54	2.43	2.71
Total natural causes	2.00	1.89	1.78	1.79	1.79	1.83
Accidents	2.97	2.24	2.42	2.67	2.96	2.63
Suicide	21.48	18.05	13.05	15.26	16.24	16.34
Other external causes	5.14	4.98	3.34	5.16	3.75	4.35
Total external causes	5.51	4.73	4.58	5.35	5.37	5.10
<b>Total*</b>	<b>2.16</b>	<b>2.05</b>	<b>1.91</b>	<b>1.93</b>	<b>1.93</b>	<b>1.98</b>
Rate ratios for persons with non-affective psychotic disorders/non-hospitalized						
Diabetes	2.24	2.03	1.90	1.77	1.78	1.89
Total natural causes	1.41	1.55	1.55	1.54	1.60	1.54
Total external causes	5.30	4.68	4.15	5.28	5.42	4.97
<b>Total</b>	<b>1.65</b>	<b>1.78</b>	<b>1.71</b>	<b>1.68</b>	<b>1.74</b>	<b>1.71</b>
Rate ratios for persons with affective disorders/non-hospitalized						
Diabetes	0.96	1.50	1.60	1.79	1.65	1.61
Total natural causes	1.22	1.37	1.33	1.49	1.49	1.40
Total external causes	5.56	4.49	5.44	5.47	5.61	5.32
<b>Total</b>	<b>1.47</b>	<b>1.60</b>	<b>1.56</b>	<b>1.63</b>	<b>1.64</b>	<b>1.60</b>

\* Total rates include missing death causes

reduction in RR during the period 1981 - 2006 occurred for infectious diseases, where the RR in 2000 - 2006 was almost half that in 1981-1985. The RR for respiratory diseases also was reduced by about a quarter during the same years. We further investigated the source of this decrease by checking individual infectious disease groups, and found this decrease reflected in septicaemia (which constitutes about 70% of infectious disease mortality in recent years) where the RR fell from 3.84 (95% CI 3.25-4.54) in 1981-1985, to 1.97 (95% CI 1.72-2.25) in 2000-2006. Most of the decrease occurred until 1995. Similarly, we checked subgroups of respiratory diseases, and found that the mortality rates from influenza and pneumonia among the hospitalized have also decreased greatly over the period investigated, the RR fell from 4.19 (95% CI 3.74-4.70) in 1981-1985, to 2.27 (95% CI 1.98-2.59) in 2000-2006.

In contrast, rates for chronic lower respiratory diseases remained stable, with the RR increasing slightly.

The RR for diabetes has remained stable after a small initial reduction from the period of 1980-1985. As for suicide, the RR in 1991-2000 decreased by about a third compared to the years 1981-1985 (Table 4).

The RRs for diabetes has declined steadily for persons diagnosed with non-affective psychotic disorders, while for those diagnosed with affective disorders it has generally increased. Analogously for the total natural causes of death, the RR has been relatively stable for those with non-affective psychotic disorders but increased somewhat for those with affective disorders.

### IN-HOSPITAL DEATH AND TIME

#### FROM HOSPITAL DISCHARGE UNTIL DEATH

Overall, a larger proportion of deaths occur before or, particularly, soon after discharge among younger patients than among older ones. One fifth (20%) of deaths for persons aged 18-44 took place before discharge from the psychiatric facilities compared to 17%, among those aged 45-64, and 12%, among those aged 65 and over. For those aged 18-44, 54% of deaths occurred before discharge from hospital or during the first year thereafter, compared to 37%, for those aged 45-64 and 29%, for those aged 65 and over (Figure 1). Proportions for men and women were found to be similar.

As for different causes of death, more suicides occur in hospital or on the day of recorded discharge than for deaths due to natural causes or other external causes. Two thirds, 62%, of suicides occurred before discharge from hospital or during the first year thereafter, compared to 42%, from other external causes and 32%, from natural causes of death (Figure 2). This was found, in particular, in hospitalized persons aged 18-44, where 25% of suicides occurred before or on the recorded day of discharge, and 70% before discharge or within the first year.

A larger proportion of deaths occur in hospital or on the recorded day of discharge for persons with the diagnosis of non-affective psychosis, 25%, than for those with affective disorders, 7%, or with other diagnoses, 11% (Figure 3).

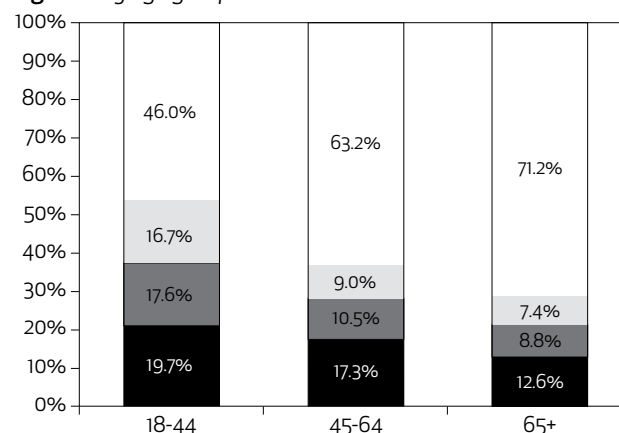
### DISCUSSION

Our findings clearly replicated those reported by the literature. Those findings were made in studies conducted in different countries, including Israel over two decades ago, using different methods and procedures,

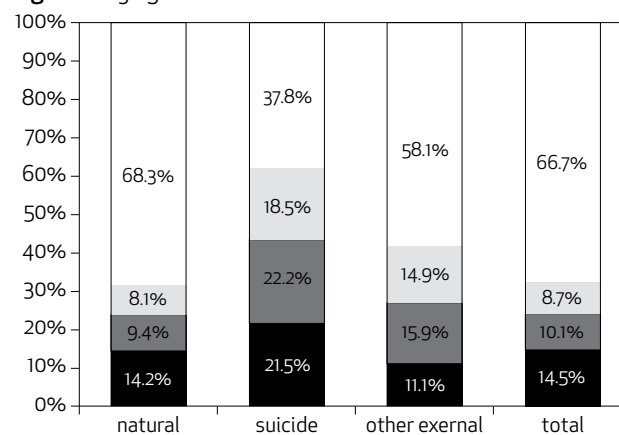
**Figures 1-3.** Proportion of deaths by time elapsed since discharge for Jewish-Israelis aged 18 and over who were ever hospitalized in psychiatric facilities, 1981 - 2006 (% of total deaths) (N=42,836)



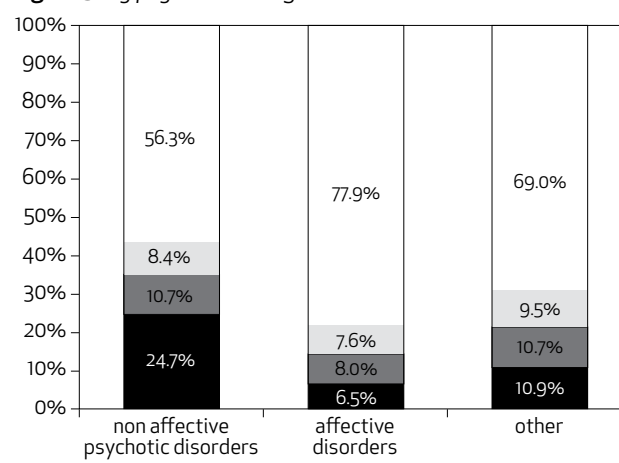
**Figure 1.** By age groups



**Figure 2.** By age death



**Figure 3.** By psychiatric diagnoses



e.g., hospital- and community-based individuals, and measures to ascertain risk (6-12). We, as others, found a higher risk for overall mortality and for specific causes of death, except for cancer, among the psychiatrically hospitalized population. Suicide rates, too, were much higher in the hospitalized group. Relatively high RRs of all external causes of death were found among both men and, particularly, among women. This gender difference could be partially attributed to their lower risk among women than men in the general population.

The mortality risk was higher among the younger groups, 18-44, suggesting that psychiatric hospitalizations serve as a risk indicator (23) among individuals who have yet to reach the age where death is more frequent. Importantly, the external causes of death, such as accidents, homicide and suicide have higher RRs than those linked to natural causes, as shown by Hiroeh et al. (16) in a study based on the Danish Psychiatric Register. The case of homicide in our study, although based on a relatively small number of events, is of interest, since the notion of dangerousness is often ascribed to people with severe mental disorders but hardly raised with regard to their own victimization.

Like Hiroeh et al. in Denmark (17) and Zilber et al. in Israel (12), but in contrast with Kisely et al. in Canada (7), we found that the mortality risk for cancer did not differ from the general population. This negative finding is consistent with results obtained in a large Israeli study in which the cancer risk among persons hospitalized for schizophrenia (24) and in their parents (25) was found lower than in the general population.

Another negative finding was observed, and this is the reduction of mortality due to infectious and some respiratory diseases (pneumonia and influenza) over the study period, which perhaps reflects increased hygiene and better and timely prevention and treatment of infections.

The risk of mortality in our study was present among hospitalized persons diagnosed with all disorders, and, as noted earlier in Finland, among both persons with short- (9) and long-stays in hospital (26). Importantly, for the younger adults (18-44), the risk period of death by suicide in particular was at the time the person was registered as still being in hospital (this includes those who left the premises on account of authorized or non-authorized leave of absence, or discharges against medical advice) or within the year following discharge.

Several "negative" findings in our study are of marked interest:

1. The process of deinstitutionalization that accompanies the decade-old law on the "Rehabilitation of Persons with Psychiatric Disabilities in the Community" (20) does not seem to have raised the overall mortality risk. Note that the reduction in beds in psychiatric institutions was 10.7%, in the years 1986-1990; 4.7%, in the years 1991-1995; and 17.8%, in the years 1996-2000. In the years 2001-2006, when the law entered into effect, the reduction escalated to 40.5%. Assuming that the reduction in beds over time determined that persons with more severe disorders were admitted, the "negative" finding is of even greater interest.
2. For suicide, the findings prompt cautious surveillance of the risk, in view of a relatively recent study conducted in Denmark which showed an increased risk for suicide coinciding with a 50% reduction in the number of in-patient beds (8). In Israel, the RRs for suicide in the years 2001-2006 were lower than in the years 1981-1990, but slightly higher than in the intermediate years, 1991-2000.
3. The introduction of atypical antipsychotics in the treatment of persons with non-affective psychosis has not increased the risk for deaths caused by diabetes and other natural causes of death. This negative finding requires surveillance as well, to check for deaths among persons who had received those antipsychotics for a longer period of time than we observed. The need for surveillance is further highlighted by the fact that the RR for diabetes among those hospitalized with non-affective psychotic diagnosis for the years 2001-2006 is slightly higher, 1.78, than for the total natural causes, 1.60. The respective RRs for the same period for those diagnosed with affective disorders were 1.65 and 1.49.
4. As noted above, in our study the mortality risk for cancer was not different than for the general population.
5. The previous Israeli report on mortality among hospitalized persons was published in 1989 (12). The study used the same database we did and included all people who had a recorded hospitalization in 1978 (N=16,147). Their deaths were followed up until 1983 (N=2427). It is clear from our results that any decline in the risk for death started before publication of those results, and did not become accelerated following it (Table 4).

Our findings pose a considerable challenge for medical and psychiatric services, in terms of their interpretation and required actions. Several putative factors have



been raised to account for the elevated mortality risk that, acting singly or in combination, affect all four groupings of psychiatric disorders we investigated, such as inactive lifestyle, risk-taking, smoking, diet, medication, neurohumoral mechanisms and inadequate self- and medical services care (3). The relative weight of each factor towards explaining the findings has not been determined. Clearly, however, active programs are undoubtedly required, as proposed by all researchers who have investigated this subject, as follows:

First, advocacy targeting the health system is required. We know by now that persons with schizophrenia carry an unhealthy life style (27), yet programs of health promotion (3), particularly tailored for these persons, are rare or totally absent in the health and mental health systems in Israel.

Second, self- and service-based stigmatic attitudes and behaviors constitute barriers to the adequate care of persons with mental disorders in the general health services (3-5). Programs to address both types of stigma-related problems are wanting. Admittedly, stigma is not the sole barrier to adequate care, since persons with severe and persistent mental disorders may neglect medical treatment once a problem had been identified and treatment begun. Therefore, both service and patient-related factors need to be addressed by well-formulated health education programs, including the active involvement of the primary health care practitioners and the organizations of service users and their families.

Third, preventive and curative-oriented programs aimed at the natural causes of mortality should preferably be started while the affected persons are in hospital, and, subsequently, be continued in the psychiatric and substance abuse clinics and, as noted above, involve the service users and their families.

Fourth, the heightened risk for deaths from external causes calls for assertive programs of intervention that may reduce such a risk. Obviously, a fully rational formulation of such a program requires comprehensive research, including the reconstruction of the way the service operates, and the individual-, family- and community-related events that may have triggered the decision to commit suicide or lead to self-endangering behavior. Our epidemiological study has merely indicated the existence of the heightened risk of potentially preventable factors. The national program of suicide prevention (28) is a timely development, inasmuch as it attempts to provide interventions to individuals at increased risk, such as those who were the subject of this study.

There are some limitations to our inquiry: 1) For diagnoses of both the mental disorders and causes of death we relied on two databases that collect clinical and not research diagnoses; 2) to explore the possible effect of the new generation of antipsychotics we had to rely on a proxy, the year of their introduction into the services, since we lacked direct access to the patients' prescriptions; and 3) we did not include minority groups of the general population. However, with regard to the latter limitation, we have no grounds to assume that the results may not apply to those groups as well.

Yet, we believe that the limitations are balanced out by several strengths: 1) Most likely, we had a complete enumeration of persons diagnosed with schizophrenia (18); and 2) in contrast to the previous local study (12), we had a considerably longer period of observation, and a much larger number of followed-up persons. These enabled us to conduct a more adequate examination of the effect of different variables, such as age, gender and causes of death and time-periods of risk.

## CONCLUSION

This study has again raised a case for action that requires the assertive involvement of the health services (general and psychiatric) as well as family and service user organizations to modify the current situation. Conceivably, the announced transfer of the responsibility for ambulatory care to the four national health providers may facilitate the medical care that this population requires. But short of targeted action, such as health education for service users and families, and programs for the reduction of stigma among health agents, we may find that a mere organizational procedure may fail to change the serious risk that we, and many others before us, have shown. As a model of care for people with mental disorders (e.g., depression) in the primary health setting, we refer the reader to a recently published study showing how treatment of patients with poorly controlled diabetes, coronary heart disease or both, were successfully assisted by a specially designed nurse-based program (29).

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