

Mortality among patients treated for alcoholism: a 5-year follow-up

JAN DE LINT,* MA; TOBY LEVINSON,† MA

Summary: During a 5-year follow-up of 154 male and female patients treated for alcoholism at the Donwood Institute, 22 deaths were recorded — almost 4 times the expected number. Typical causes were accidents, suicide, cirrhosis of the liver, cancers of the upper digestive and respiratory tracts and ischemic heart disease. Compared with other samples of alcoholics, unusually few deaths occurred during the first 2 years of follow-up, which suggests the importance of the post-treatment attention given to these patients and the need to greatly extend the duration of aftercare.

Résumé: La mortalité parmi des malades traités pour alcoolisme: catamnèse de 5 ans

Nous avons suivi pendant 5 ans 154 malades des deux sexes traités pour alcoolisme à l'Institut Donwood et avons enregistré 22 décès durant cette période — soit près 4 fois plus que le nombre escompté. Parmi les causes de décès figuraient accidents, suicide, cirrhose hépatique, cancer des voies digestives et des voies respiratoires et cardiopathies d'origine ischémique. Par comparaison avec d'autres groupes d'alcooliques, nous avons constaté un nombre exceptionnellement faible de morts durant les 2 premières années de la période postobservation, ce qui permet de croire à l'importance de l'attention donnée à ces malades après traitement et au besoin d'étendre considérablement la durée des soins post-thérapeutiques.

In the study of alcoholism, much interest has been focused on the mortality associated with excessive consumption of alcohol.¹⁻⁴ Thus, concomitant variation between populations in amounts of alcohol consumed and rates of death from causes known or suspected to be alcohol-related has been demonstrated or alleged, life histories of persons who died from a cause known or suspected to be alcohol-related have been investigated, and subsequent mortality in alcoholics followed up for several years has been described.

A common criticism of the correlational studies is that the populations that were compared over time, in space,

by occupation, or in some other way, may have differed not only in their rates of alcohol use but also in some other etiologically relevant characteristic. For example, variation between populations in rates of death from liver cirrhosis may be attributable in part or in whole to variation in such factors as exposure to industrial toxins, incidence of hepatitis or quality of diagnostic techniques and not to variation in levels of alcohol use. On the other hand, it is extremely unlikely that any such factor would show the same peculiar variation over time, in space or by occupation as do mortality due to liver cirrhosis and alcohol consumption;⁵ and, indeed, there is no evidence to support such a possibility.

The retrospective studies have been criticized on the grounds that the data on alcohol use by a deceased person obtained from relatives or some other source may not always have been reliable. In addition, estimation of expected frequencies of alcohol dependence or excessive drinking in samples of deceased persons is difficult. If one finds that, of a group of men of lower social class between the ages of 40 and 60 years who have died from pneumonia, 12% were alcohol-dependent, does that percentage exceed the expected frequency of alcohol dependence among men of similar age and social class?

Compared with correlational and retrospective investigations, follow-up studies have distinct advantages. First, they examine in detail the mortality of persons known to be alcohol-dependent; thus, a more convincing link between mortality and alcohol dependence can be established than is possible by the other two approaches. Second, they permit detailed comparisons of observed and expected death rates and therefore can provide better estimates of the extent to which alcohol dependence brings about excessive mortality from certain causes in the general population. One difficulty with the follow-up approach is that the different samples of alcoholics tend to represent somewhat different lifestyles and environments. For this reason, if one wishes to make definite statements about the overall effect of alcoholism on mortality in a given area, a wide variety of samples of alcoholics should be investigated.

In Ontario, mortality data have been examined for patients at the Addiction Research Foundation's clinic, chronic drunkenness offenders, alcoholics identified through an extensive regional survey and patients admitted for alcoholism to a private psychiatric hospital in a small town.⁶⁻⁹ An extensive follow-up investigation, designed initially to evaluate the treatment program of the Donwood Institute in Toronto,¹⁰ enabled us to extend our knowledge about the effects of alcohol on mortality.

From the Addiction Research Foundation and the Donwood Institute, Toronto

*Senior scientist, Addiction Research Foundation

†Clinical psychologist, Clarke Institute of Psychiatry, Toronto; consultant, Donwood Institute

Reprint requests to: Mr. Jan de Lint, Addiction Research Foundation, 33 Russell St., Toronto, Ont. M5S 2S1

Methods and discussion of results

The subjects for the follow-up study, carried out from Apr. 30, 1969 to Apr. 30, 1974, were 154 male and female patients admitted to the Donwood Institute during the first 4 months of 1969 who were addicted primarily to alcohol. Most were married, high school or college graduates, and in professional, semiprofessional, managerial or proprietary occupations.¹⁰

Subject-years of exposure to risk of death

The age and sex distribution in subject-years of exposure

Table I—Subject-years of exposure to risk of death of 154 alcoholics, by age and sex

Age group (yr)	Subject-years of exposure		
	Men	Women	Total
20 - 24	5	2	7
25 - 29	9	4	13
30 - 34	33	9	42
35 - 39	50	28	78
40 - 44	114	35	149
45 - 49	124	36	160
50 - 54	104	43	147
55 - 59	74	10	84
60 - 64	41	—	41
65 - 69	25	—	25
70 - 74	5	—	5
Total	584	167	751

Table II—Expected (f.) and observed (o.) number of deaths from all causes*

Age group (yr)	Men		Women		Total				
	Subject-years	f.	Subject-years	f.	Subject-years	f.			
20 - 24	5	0.0076	0	2	0.0009	0	7	0.0085	0
25 - 29	9	0.0112	0	4	0.0023	0	13	0.0135	0
30 - 34	33	0.0456	2	9	0.0074	0	42	0.0530	2
35 - 39	50	0.1002	0	28	0.0350	0	78	0.1352	0
40 - 44	114	0.3842	3	35	0.0696	0	149	0.4538	3
45 - 49	124	0.6816	4	36	0.1103	0	160	0.7919	4
50 - 54	104	0.9727	3	43	0.2078	1	147	1.1805	4
55 - 59	74	1.1039	3	10	0.0748	1	84	1.1787	4
60 - 64	41	0.9957	2	—	—	—	41	0.9957	2
65 - 69	25	0.9287	1	—	—	—	25	0.9287	1
70 - 74	5	0.2769	2	—	—	—	5	0.2769	2
Total	584	5.5083	20	167	0.5081	2	751	6.0164	22

*The 11 subjects "lost" during the follow-up period are included in the tabulations.

Table III—Observed and expected number of deaths in samples of alcoholics

Year and reference no.	Description of sample	Sample size	Sex	Follow-up period	Subject-years of exposure	No. of deaths		Observed/expected ratio
						Observed	Expected	
1965 ⁸	Alcoholics identified in the course of case-finding survey	339	M & F	1953-64	3 594	84	46.57	1.8
1967 ¹¹	Persons admitted to alcoholism treatment facilities	1 343	M & F	1954-61	7 289	217	72.6	3.0
1967 ¹²	Persons admitted for alcoholism to hospital psychiatric department	1 722	M	1925-62	34 951	1 061	496.9	2.1
1969 ¹³	Persons admitted to alcoholism clinic	802	M & F	1959-64	3 479	90	22.9	3.9
1969 ⁹	Persons admitted for alcoholism to psychiatric hospital	128	M & F	1961-66	?	15	≈7	≈2
1971 ⁷	Persons arrested for drunkenness three or more times in a year	343	M	1940-61	4 214	191	89.7	2.1
1972 ⁶	Persons admitted to alcoholism clinic	6 514	M & F	1951-63	41 149	738	346.2	2.1
1973 ¹⁴	Alcoholic employees in one industry	899	M & F	1965-69	?	102	31.7	3.2
1974 ¹⁵	Persons admitted for alcoholism to mental hospitals	935	M & F	1953-67	≈10 000	309	112.7	2.7
1975, present study	Persons admitted to alcoholism clinic	154	M & F	1969-74	751	22	6.02	3.7

to the risk of death is shown in Table I. Age-specific subject-years of exposure were calculated as follows: A patient who was 33 years old on Apr. 30, 1969 and still alive at the end of the 5-year period contributed 2 subject-years of exposure to the group of men aged 30 to 34 years and 3 subject-years of exposure to the group aged 35 to 39 years.

Expected and observed mortality

Expected rates of death from all causes and some selected causes were calculated for each age group on the basis of the mortality of the Ontario population in the years 1970, 1971 and 1972 as reported in "Vital Statistics, Province of Ontario". These rates were then applied to the subject-years of exposure to obtain the number of deaths to be expected during the study: 6 for the entire group; 5.5 and 0.5 for men and women, respectively (Table II). The observed total number of deaths was 22 (20 among the men and 2 among the women) — 3.7 times the expected rate. However, 11 patients were lost during follow-up and were assumed to be alive at the end of the study; since it is probable that at least 1 or 2 have died, the number of deaths observed may well be an underestimate of actual mortality.

Comparison with other studies

The observed/expected mortality ratio in our sample differs notably from some of the ratios obtained in recent investigations^{6-9,11-15} (Table III). One explanation may be that some groups were followed up for much longer periods and, since expected death rates increase rapidly with age, the actual number of deaths in such groups would tend to deviate less from expected values than the number in groups followed up for only a short time. Another explanation may be that the samples of alcoholics selected for these studies represented somewhat different lifestyles and environments. For example, Pell and D'Alonzo¹⁴ studied employed alcoholics and excluded those who had been dismissed or had left employment during the follow-up; Giffen, Oki and Lambert⁷ sampled drunkenness offenders whose drinking bouts were interspersed with long periods of enforced sobriety in jail; and Vincent and Blum⁹ studied patients treated for alcoholism in a private psychiatric hospital.

With one exception¹⁴ the expected death rates in these studies were calculated on the basis of the age- and sex-specific rates of death in the general population and, because the general population includes alcoholics, the

expected death rates are somewhat inflated. Hence, the observed/expected mortality ratios are falsely low and, accordingly, the mortality attributable to alcoholism is underestimated.

Causes of death

Correlational, retrospective and follow-up investigations all have shown this excess mortality among alcoholics to be largely attributable to such causes as liver cirrhosis, suicide, cardiovascular diseases, pneumonia, cancers of the upper digestive and respiratory tracts, and accidents. The Donwood sample is no exception (Table IV). The relatively small numbers in each of the categories of cause of death do not warrant the calculation of cause-specific ratios of observed/expected mortality. However, the combined number of deaths expected from liver cirrhosis, accidents and suicide is less than 1 and, therefore, the number of deaths from these causes far exceeded expectation.

Deaths soon after treatment

Surprisingly few of our subjects died in the first 2 years after treatment, but in other follow-up investigations a different pattern was observed (Fig. 1). It has been

Table IV—Observed mortality by specific cause among 154 alcoholics

Cause of death	ICD* no.	No. of deaths		
		Men	Women	Total
Cancer of upper digestive and respiratory tracts	141,162	3	0	3
Alcoholism	303	1	0	1
Ischemic heart disease	410	3	0	3
Cerebrovascular disease	433	1	0	1
Cirrhosis of liver	571	1	1	2
Accidents	859,898, 911,916	4	0	4
Suicide	950,955 957	3	0	3
Other	345,348 398,491 569	4	1	5
All causes		20	2	22

*International Classification of Diseases, 8th revision, Geneva, World Health Organization, 1965

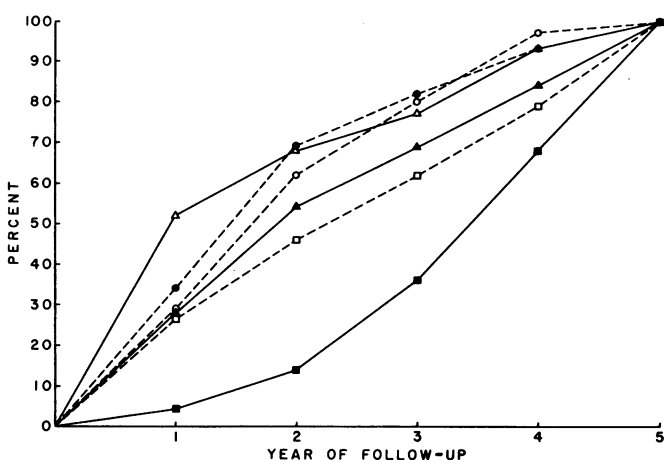


FIG. 1—Cumulative percentage distribution of deaths during follow-up in several studies: △ = ref. 7; ● = ref. 16; ○ = ref. 13; ▲ = ref. 17; □ = ref. 6; ■ = present study.

suggested that, because alcoholics are averse to acknowledging their illness and are already in serious condition when admitted to a clinic, a very high mortality during the 1st year of follow-up is to be expected.^{6,13} We deliberately excluded patients with serious organic complications¹⁰ but so did some of the other follow-up investigators.^{6,13} A more plausible explanation is that the extensive post-treatment attention given to the Donwood patients delayed several of the deaths. If a much larger sample of patients at the Donwood Institute were to be followed up and a similar pattern to emerge, a strong case for an even more extensive aftercare program than now exists could be made.

Conclusions and recommendations

Higher rates of death among alcohol-dependent persons have been attributed foremost to chronic alcohol excess but also to certain behaviours and conditions typically associated with alcohol dependence, such as depression, heavy smoking, tendency to neglect proper nutrition and health care, and exposure to environmental hazards.¹⁸⁻²³ In our view the majority of deaths in the Donwood sample can indeed be linked to alcohol use and some related factors. The relatively small size of the sample precludes detailed comparisons with other samples of alcohol-dependent persons. However, some tentative conclusions and recommendations seem justified. First, since some excess mortality is related to conditions and behaviours other than alcohol dependence, therapeutic programs should continue to take these other factors into account and not concentrate solely on the person's dependence on alcohol. Second, since so few deaths occurred shortly after intensive treatment at the institute, it seems that the additional year of continuing outpatient therapy delayed, if not prevented, the usual high mortality shortly after discharge.

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