

Risk of death among homeless women: a cohort study and review of the literature

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§ See related article page 1251

Abstract

Background: Homeless people are at high risk for illness and have higher death rates than the general population. Patterns of mortality among homeless men have been investigated, but less attention has been given to mortality rates among homeless women. We report mortality rates and causes of death in a cohort of women who used homeless shelters in Toronto. We also compare our results with those of other published studies of homeless women and with data for women in the general population.

Methods: A cohort of 1981 women not accompanied by dependent children who used homeless shelters in Toronto in 1995 was observed for death over a mean of 2.6 years. In addition, we analyzed data from published studies of mortality rates among homeless women in 6 other cities (Montreal, Copenhagen, Boston, New York, Philadelphia and Brighton, UK).

Results: In Toronto, mortality rates were 515 per 100 000 person-years among homeless women 18–44 years of age and 438 per 100 000 person-years among those 45–64 years of age. Homeless women 18–44 years of age were 10 times more likely to die than women in the general population of Toronto. In studies from a total of 7 cities, the risk of death among homeless women was greater than that among women in the general population by a factor of 4.6 to 31.2 in the younger age group and 1.0 to 2.0 in the older age group. In 6 of the 7 cities, the mortality rates among younger homeless women and younger homeless men were not significantly different. In contrast, in 4 of the 6 cities, the mortality rates were significantly lower among older homeless women than among older homeless men.

Interpretation: Excess mortality is far greater among homeless women under age 45 years than among older homeless women. Mortality rates among younger homeless women often approach or equal those of younger homeless men. Efforts to reduce deaths of homeless women should focus on those under age 45.

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Previous studies have focused on excess mortality observed among homeless people relative to their counterparts in the general population. In Philadelphia, the mortality rate among homeless adults was 3.5 times higher than the rate in the general population.¹⁴ In a study of homeless people in Boston, mortality rates among men were 5.9, 3.0 and 1.6 times higher than those in the general population for people 18–24, 25–44 and 45–64 years of age respectively.¹⁵ A study of people using homeless shelters in New York found age-adjusted death rates 2 to 3 times higher than those in the city's general population.¹⁶ Among men using homeless shelters in Toronto, mortality rates were 8.3, 3.7 and 2.3 times higher than rates among men in the general population aged 18–24, 25–44 and 45–64 years respectively.¹⁷

Although a significant proportion of homeless people are women,¹ relatively little attention has been focused on patterns of mortality in this subgroup. Among homeless people, single men, single women and women accompanied by children tend to have different health problems. For example, the prevalence of substance abuse is lower among homeless single women than among homeless single men, but the rate of major depression is higher.^{18,19} Such differences may have an effect on mortality rates. In this study, we focus on homeless single women, who tend to have more health problems than homeless women accompanied by children.^{19,20}

In the general population, mortality rates among younger women are one-third to one-half those among younger men.²¹ Low socioeconomic status is strongly associated with shorter life expectancy, but within every socioeconomic stratum women have a longer life expectancy than men do.^{22,23} Whether this survival advantage is attenuated or lost altogether among homeless women is an important question, because the underlying mechanisms (e.g., addictions leading to drug overdose, or depression leading to suicide) might be amenable to targeted intervention. We therefore conducted this study to determine whether homeless women lose the survival advantage associated with being female. Our first objective was to determine mortality rates among women who use homeless shelters in Toronto. Our second objective was to analyze published data on mortality rates among homeless women compared with those among women in the general population and among homeless men.

Homelessness is an important problem in the United States,^{1,2} Canada³ and the United Kingdom.⁴ Earlier studies have documented the high burden of illness among homeless people due to mental illness and addictions,⁵ medical conditions,^{6–8} tuberculosis and HIV infection,^{9–11} and traumatic injuries.¹² These illnesses, in conjunction with severe poverty and often inadequate access to health care, lead to high mortality rates among homeless people.¹³

Methods

We compiled a database of single women 18–64 years of age who had stayed at homeless shelters in Toronto in 1995. A similar database of single men has been described in a previous report.¹⁷ The database included full name, sex, date of birth, and dates of shelter admission and discharge. We excluded homeless adults who were accompanied by dependent children, because previous studies have shown that homeless mothers have far fewer health problems than homeless single women.^{19,20} The database did not include women staying at facilities exclusively for victims of domestic violence.

Our database did not include homeless women who were living on the street and had not used any homeless shelter during the 1995 calendar year. The size of this population can be estimated from the proportion of people using meal programs who are homeless but have not recently stayed at a shelter.²⁴ A survey conducted in Toronto indicated that 93% of homeless people using meal programs had stayed at a homeless shelter within the previous year.¹⁷ Thus, our database probably included most women who were homeless in Toronto during 1995.

Deaths in the study population were ascertained by comparing the database of shelter users with Ontario death certificate records for the years 1995–1997, as described previously.¹⁷ The death certificate database includes all deaths in Ontario. Causes of death were determined from death certificates, which were precoded according to the International Classification of Diseases, 9th revision.²⁵ Person-years of observation were calculated according to previously described methods, with the period of observation defined as time from first shelter admission in 1995 through Dec. 31, 1997, or, in the case of decedents, date of death.^{14,17} Mortality rates were calculated by dividing the number of deaths by the person-years of observation in each age group; rates were expressed as deaths per 100 000 person-years.

The Research Ethics Board of St. Michael's Hospital approved the study protocol. Because this study analyzed routinely collected administrative data and posed no significant risk to subjects, informed consent was not obtained.

We identified all published studies that provided mortality rates or data from which mortality rates could be calculated among both homeless women and homeless men in a clearly defined cohort or geographic area. We performed a MEDLINE search for articles published in English between January 1966 and September 2003 using the search terms "homeless persons" and "mortality" or "death." Additional papers were identified through manual review of the references of articles identified by the MEDLINE search. We excluded studies in which mortality rates could not be calculated on the basis of published data^{26–31} and studies that reported mortality rates among homeless men only.^{32–34}

We identified 6 studies that met our inclusion criteria. They had been conducted in Montreal,³⁵ Copenhagen,³⁶ Boston,¹⁵ New York,¹⁶ Philadelphia¹⁴ and Brighton, UK.³⁷ The Montreal study reported mortality rates among 479 street youths who were followed from 1995 to 1998 in a prospective cohort study of HIV infection and risk behaviours.³⁵ The Copenhagen study provided 11-year follow-up data on mortality rates among 70 women and 509 men who stayed at a homeless shelter in 1991.³⁶ The Boston study examined mortality rates among 5547 women and 11 745 men, most of whom were shelter residents, who had contact with a Health Care for the Homeless Program from 1988 to 1993.¹⁵ We also used supplemental unpublished data from that study, which was conducted by one of us (S.W.H.). The New York study reported mortality rates in a representative sample of 311

women and 949 men who resided in homeless shelters from 1987 to 1994.¹⁶ Supplemental data on mortality rates in the general population of that city for the same period were obtained from a US Centers for Disease Control and Prevention database.³⁸ The Philadelphia study involved 983 women and 6378 men who used homeless shelters or who lived on the street and had contact with a team of outreach workers from 1985 to 1988.¹⁴ The Brighton study examined mortality rates among 297 women and 630 men living in low-cost bed and breakfast hotels used as temporary housing for homeless people during the period 1981 to 1992.³⁷

Age-specific mortality rates (deaths per 100 000 person-years of observation) were calculated for the Toronto homeless cohort and were obtained or calculated from the 6 other studies. We selected age groupings that were as comparable as possible across studies, within the limitations of available data. For each city, we calculated 3 rate ratios: the mortality rate among homeless women compared with that among women in the general population, the mortality rate among homeless women compared with that among homeless men, and the mortality rate among women compared with that among men in the general population. General population data were matched according to the homeless person's age at the begin-

Table 1: Characteristics of women 18–64 years of age who used shelters for the homeless in Toronto in 1995

Characteristic	No. of women* n = 1981
Age	
Mean, yr	35.1
No. (and %) in specific age groups	
18–24 yr	368 (19)
25–44 yr	1178 (59)
45–64 yr	435 (22)
Mean duration of follow-up (and SD), yr	2.6 (0.3)
Cause of death	
18–44 yr group	
HIV/AIDS	3
Poisoning, unintentional†	3
Poisoning, undetermined whether unintentional or purposely†	3
Suicide‡	1
Injury by motor vehicle	1
Injury by firearms (undetermined whether unintentional or purposely)	1
Staphylococcal septicemia	1
Lung cancer	1
Epilepsy	1
Systemic lupus erythematosus	1
Unknown	5
All causes	21
45–64 yr group	
Suicide§	2
Acute myocardial infarction	1
Unknown	2
All causes	5

*Except where indicated otherwise.

†Poisoning was due to opiates in 3 cases and unspecified drug(s) in 3 cases.

‡Mechanism of suicide was poisoning by tranquilizers.

§Mechanism of suicide was drowning in 1 case and jumping or lying before a moving object in 1 case.

ning of the study. Mortality rates and mortality rate ratios were not adjusted for race. The 95% confidence intervals for rate ratios were calculated according to standard formulas.³⁹

Results

The Toronto homeless cohort comprised 1981 single women and 8933 single men who stayed at homeless shelters in Toronto in 1995. The characteristics of the single women are summarized in Table 1; comparable data for the men have been reported previously.¹⁷ We identified 26 women who died during a total of 5221 person-years of observation (mean 2.6 years of observation per person), which yielded a crude mortality rate of 498 per 100 000 person-years. Mean age at death was 39 years. Among women 18–44 years of age, the most common causes of death were HIV/AIDS and drug overdose (Table 1).

Age-specific mortality rates for homeless women in Toronto, Montreal, Copenhagen, Boston, New York, Philadelphia and Brighton are shown in Table 2. Absolute mortality rates among homeless women varied considerably from city to city. Among younger homeless women, mortality rates were lower in Toronto than in all cities except Boston and Brighton. Among older homeless women, mortality rates in Toronto were lower than in all other cities. However, these differences did not achieve statistical significance.

Rate ratios comparing mortality rates among homeless women with those among women in the general population are shown in Fig. 1. In the younger age group, rate ratios ranged from 4.6 to 31.2 and were significantly greater than 1.0 in every study where a 95% confidence interval could be calculated. In the older age group, the rate ratios ranged from 1.0 to 2.0. The confidence intervals were wider in the older age group, because of the smaller number of women of this age in the homeless population. The confidence interval for the rate ratio included 1.0 in every city except Boston. These findings indicate that homeless women under about 45 years of age experience very high excess mortality compared with the general population, but the mag-

nitude of excess mortality is far less among older homeless women.

Rate ratios comparing mortality rates among homeless women and homeless men are shown in Fig. 2. In the younger age group, the rate ratios ranged from 0.4 to 1.1 and tended to exceed the rate ratio for younger women compared with younger men in the general population (Fig. 2). In Montreal, Copenhagen, New York and Philadelphia, younger homeless women were as likely as younger homeless men to die. The mortality rate ratio for Toronto was 0.8 and did not change significantly when deaths due to HIV/AIDS or to unintentional injuries and other external causes were eliminated from the analysis.

In contrast to the younger age group, the mortality rate ratio for older homeless women compared with older homeless men ranged from 0.3 to 0.7. This value was not significantly different from the rate ratio for older women compared with older men in the general population of each city (Fig. 2). Thus, older homeless women retained the usual female survival advantage over their homeless male counterparts.

Interpretation

In this study of mortality rates among homeless women in Toronto and 6 other North American and European cities, we found that the mortality rate was about 5- to 30-fold higher than expected among younger homeless women. In contrast, the mortality rate among older homeless women was no more than 2-fold higher than expected. These observations suggest that efforts to reduce deaths among homeless women should focus on those under the age of 45 years. Given that HIV/AIDS and drug overdose are the most common causes of death in these women,¹⁵ programs to prevent and treat HIV infection and to improve access to treatment for drug addiction are essential. Mental health issues must also be addressed, given the high prevalence of depression among homeless women²⁰ and their high risk of suicide.

A second major finding of our study is that the survival

Table 2: Mortality rates among homeless women in 7 cities

City and reference	Study period	No. of homeless women	Younger subjects		Older subjects	
			Age group, yr	Deaths per 100 000 person-years	Age group, yr	Deaths per 100 000 person-years
Toronto (current study)	1995–1997	1981	18–44	515	45–64	438
Montreal ³⁵	1995–1998	147	14–25	1020	NA	NA
Copenhagen ³⁶	1991–2002	70	15–44	2444	45–64	2712
Boston ¹⁵	1988–1993	5547	18–44	390	45–64	1004
New York ¹⁶	1987–1994	311	20–44	1341	45–64	844
Philadelphia ¹⁴	1985–1988	983	15–54	916	55–74	1299
Brighton, UK ³⁷	1981–1992	297	16–44	261	45–64	2579

Note: NA = not available.

advantage normally associated with being female is greatly attenuated among younger homeless women. In the general population, young women have a much lower risk of dying and a longer life expectancy than young men have.²¹⁻²³ The effects of poverty do not reverse this trend; in fact, the dif-

ference in life expectancy between women and men is more pronounced among those of low socioeconomic status.²² In the homeless population, however, the mortality rate among younger women was similar to that among their male counterparts, which indicates that the adverse health effects of

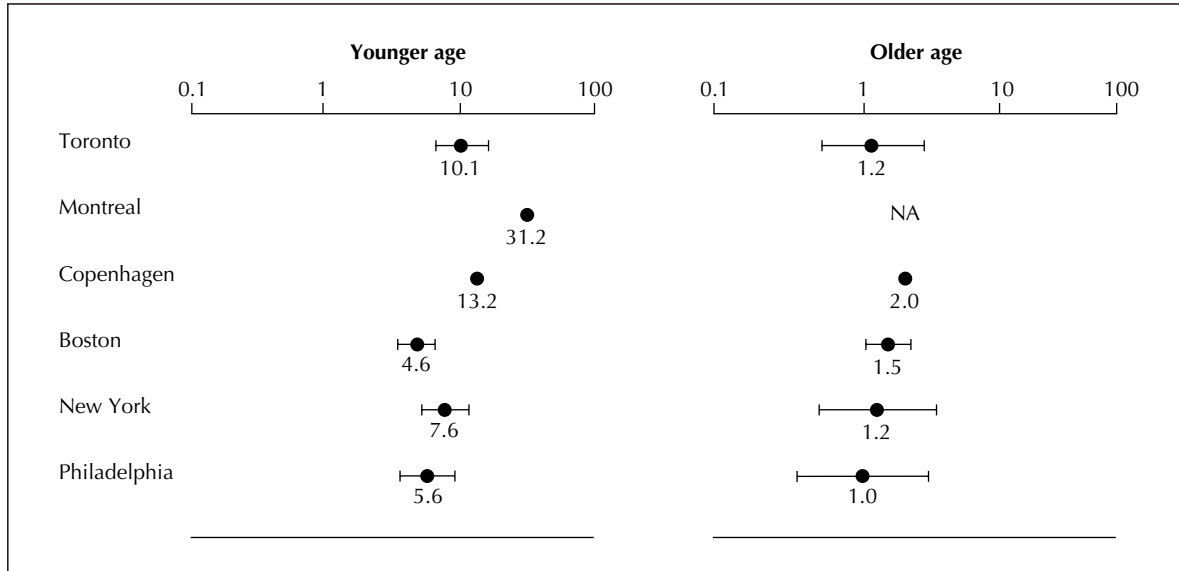


Fig. 1: Rate ratios comparing mortality rates among homeless women with those among women in the general public. Younger and older age groups were defined, respectively, as 18–44 and 45–64 years for the Toronto and Boston studies, 15–44 and 45–64 years for the Copenhagen study, 20–44 and 45–64 years for the New York study, and 15–54 and 55–74 years for the Philadelphia study. Younger age group was defined as 14–25 years for the Montreal study. Bars indicate the 95% confidence intervals (when available). NA = not available.

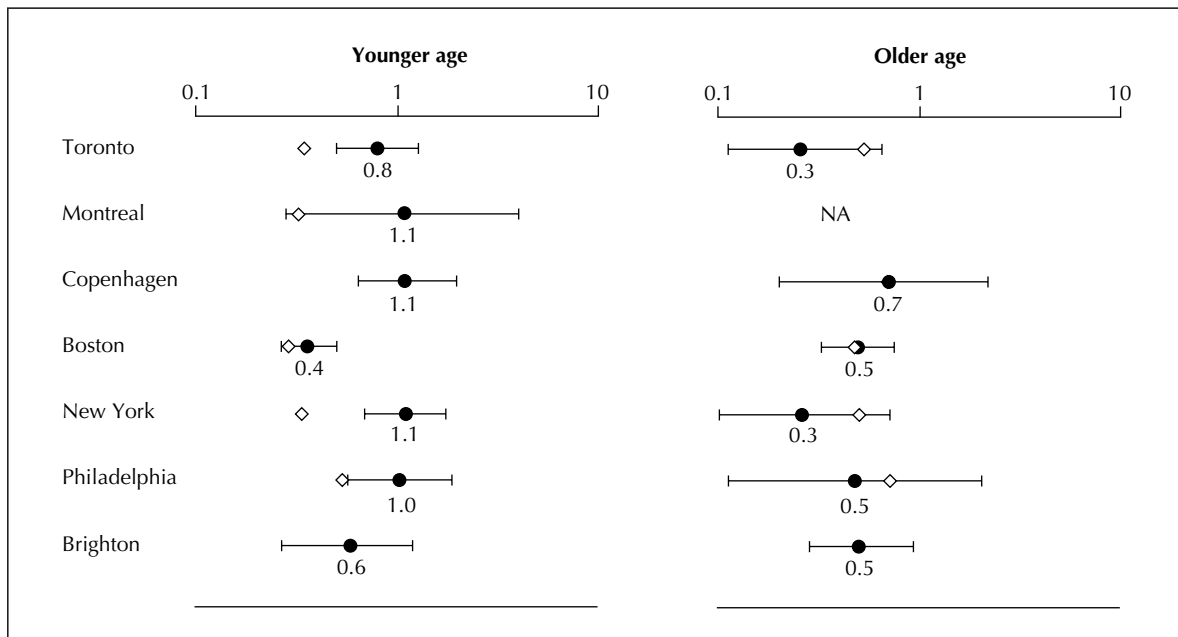


Fig. 2: Rate ratios comparing mortality rates among homeless women and homeless men. Younger and older age groups were defined, respectively, as 16–44 and 45–64 years for the Brighton study; age groups for the other studies are defined in the caption to Fig. 1. Bars indicate the 95% confidence intervals (when available), and open diamonds represent rate ratios comparing mortality rates among women and men in the general population.

the social environment and health behaviours of younger homeless women must be particularly severe.⁴⁰

The precision of our data on mortality rates is limited by certain factors. Rates in the Toronto cohort might have been slightly underestimated because we did not identify deaths among people who left Ontario. Our review of the literature included a heterogeneous group of studies performed in different cities and years over follow-up periods ranging from 2.6 to 11 years. Longer follow-up periods may be associated with higher apparent levels of excess mortality, if homeless people are compared with a reference group that is fixed at the age that the homeless people were at the beginning of the study.

In conclusion, being a homeless single woman under the age of 45 years is associated with a greatly heightened risk of death; in contrast, older homeless women are much less likely to die than older homeless men. In most cities, the mortality rate of younger homeless women achieves near parity with that of younger homeless men. For younger homeless women, programs to address addictions, HIV infection and mental health issues are potentially life-saving interventions. Future research should examine how access to better health care and housing for this vulnerable group of women might reduce their risk of death.

This article has been peer reviewed.

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