

Ischemic Heart Disease Mortality of Firemen and Policemen

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Abstract: Ischemic heart disease (IHD) mortality of Connecticut firemen and policemen is studied for the years 1960-78, using death certificate data. The mortality of these two occupations is expected to be greater than that of other workers. Standardized Mortality Odds Ratios for firemen and policemen are greater than 1.00. Although some increased IHD risk for firemen and policemen is suggested, the exact role of occupational risk factors remains to be determined. (*Am J Public Health* 1986; 76:1140-1141.)

Introduction

Fire fighters face special hazards which may affect mortality from coronary heart disease or ischemic heart disease (IHD). Exposure to carbon monoxide^{1,2} and other products of combustion^{3,4} results in impairment of pulmonary function.⁵⁻⁸ Carbon monoxide, in particular, is suspected of advancing atherosclerosis and damaging the heart through restriction of oxygen. In addition, response to alarms increases heart rates to near maximal levels, and heart rates may continue to be elevated during fire fighting.^{9,10} While risk factors such as blood pressure and serum cholesterol levels may not be higher than average, fire fighters are more frequently smokers.^{11,12} Smoking tobacco has a damaging effect on pulmonary function which can obscure occupational hazards.¹³ Job assignment and retirement policy based, in part, on health can confound efforts to determine long-term effects.^{14,15}

Despite the difficulties of demonstrating the consequences of these occupational risks, it is reasonable to expect greater incidence and mortality from IHD for fire fighters. Earlier studies^{16,17} found higher mortality from cardiovascular diseases or IHD. However, recent studies^{12,18,19} with more carefully defined cohorts find incidence or mortality similar to that of the comparison population.

Although police are not exposed to toxic substances as are fire fighters, other aspects of their work are similar. Like fire fighters, police may experience excessive job-related stress and are more likely to be cigarette smokers. Therefore, the IHD risk for police may be greater than that of other workers.

Some support for the hypothesis of elevated risk for both police and fire fighters is available.^{17,20} On the other hand, a recent study of myocardial infarction (MI),²¹ which includes both firemen and policemen in the study population, finds they are a healthy population whose age-specific rates of MI are not excessive; their risk factors are in the normal range, except they are "relatively heavy" and more frequently smokers.

In the context of these issues, this study reexamines the question of whether firemen and policemen suffer from greater IHD mortality than other workers. Deaths among

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males are surveyed in the State of Connecticut for nearly two decades.

Methods

The primary data source consists of State of Connecticut death certificates. "Usual occupation" is coded according to a modified version of the US Census Bureau's Occupational Codes. IHD deaths are defined in terms of the underlying cause of death: Code 420 of the International Classification of Diseases Adapted (ICDA), Seventh Revision; and Codes 410-414 of the Eighth Revision. Between the ages of 25 and 59, 115 of 306 deaths to firemen and 161 of 401 deaths to policemen are identified as IHD deaths.

Time may affect IHD mortality. With Woolf's method,²² a chi square test of six odds ratios suggests the IHD mortality of policemen compared to the standard population (all other male workers in Connecticut) varies over time. The probability of finding a chi square greater than or equal to 10.636 with five degrees of freedom is less than 0.06. As a result, mortality ratios were calculated for six time periods from 1960 to 1978 (data available on request to authors). However, only summary ratios for the six time periods are presented.

Mortality Odds Ratios (MORs), standardized by five age groups,²³ compare the study populations with the standard population. In addition, firemen and policemen are compared directly to each other. The summary MOR is the average of the MORs for the six time periods, weighted by the reciprocals of the variances. Standardized Mortality Ratios (SMRs),²² with populations at risk estimated from the US Census Bureau tabulations of occupations for Connecticut, are also calculated. The overall SMR, like the summary MOR, is a weighted average. The weights used are the reciprocals of the variances.

TABLE 1—Ischemic Heart Disease Mortality of Connecticut Firemen and Policemen, Ages 25-59: Mortality Ratios Based upon Deaths for Six Time Periods*

Mortality Ratios and 95% Confidence Intervals**			
Firemen		Policemen	
SMR	MOR	SMR	MOR
1.52 (1.23,1.81)	1.07 (0.91,1.23)	1.49 (1.25,1.73)	1.32 (1.16,1.48)
Number of Deaths			
Firemen (N = 306)		Policemen (N = 401)	
IHD	Other	IHD	Other
115	191	161	240

*Since occupational data are not coded for 1963 and grouping of years should not cross ICDA revisions, the time periods are of slightly unequal size: 1960-62; 1964-65; 1966-68; 1969-71; 1972-74; and 1975-78.

**The summary Standardized Mortality Ratio (SMR) is the weighted average of the six SMRs for each time period. The weights used are the reciprocals of the variances of the individual SMRs. Similarly, the overall MOR presented is the weighted average of the six MORs for each time period; the weights are the reciprocals of the variances.

Results

Mortality ratios for firemen and policemen are shown in Table 1. Although both MORs are somewhat greater than one, the MOR for policemen is greater than that for firemen. Compared to the MORs, SMRs are larger.

When firemen are compared directly to policemen, the MOR is 0.62 (95 per cent confidence limits: 0.56, 0.68), suggesting lower mortality for firemen compared to policemen.

Discussion

Mortality ratios suggest somewhat higher IHD mortality for Connecticut firemen and policemen, compared to other workers. When firemen and policemen are compared directly to each other, the mortality of policemen is somewhat greater than that of firemen. For all comparisons, when an excess of deaths is found, it is usually small. The average MOR for firemen suggests an excess of 7 per cent, and for policemen, 32 per cent.

In this and other studies, explanations for finding the mortality of fire fighters and police less than expected in view of their risk factor exposures include unique local conditions, variations according to time, and, most important, "the healthy worker effect." Fire fighters and police are healthy compared to the general population, and to most other occupations, as a result of selectivity in recruitment, job assignment, and retirement.

Since precise person-years of employment are not available, results from this study are necessarily tentative. Occupational risks affecting IHD probably exist, but our data suggest that their contribution to IHD mortality is small.

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