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Age at retirement and long term survival of an industrial population: prospective cohort study

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Abstract

Objective To assess whether early retirement is associated with better survival.

Design Long term prospective cohort study.

Setting Petroleum and petrochemical industry, United States.

Subjects Past employees of Shell Oil who retired at ages 55, 60, and 65 between 1 January 1973 and 31 December 2003.

Main outcome measure Hazard ratio of death adjusted for sex, year of entry to study, and socioeconomic status.

Results Subjects who retired early at 55 and who were still alive at 65 had a significantly higher mortality than those who retired at 65 (hazard ratio 1.37, 95% confidence interval 1.09 to 1.73). Mortality was also significantly higher for subjects in the first 10 years after retirement at 55 compared with those who continued working (1.89, 1.58 to 2.27). After adjustment, mortality was similar between those who retired at 60 and those who retired at 65 (1.06, 0.92 to 1.22). Mortality did not differ for the first five years after retirement at 60 compared with continuing work at 60 (1.04, 0.82 to 1.31).

Conclusions Retiring early at 55 or 60 was not associated with better survival than retiring at 65 in a cohort of past employees of the petrochemical industry. Mortality was higher in employees who retired at 55 than in those who continued working.

Introduction

Few studies have evaluated the effect of early retirement on survival.¹⁻⁴ Some researchers concluded that early retirement harms health, attributing this to illness before retirement or the change of life events associated with retirement.¹⁻³ On the other hand, there is a widespread perception that early retirement is associated with longer life expectancy and that retiring later leads to early death.⁵⁻⁶ We carried out a long term

prospective cohort study of employees of the petrochemical industry in the United States who retired at 55, 60, and 65 to assess whether there is any survival advantage of early retirement.

Subjects and methods

Our study population consisted of all past employees of Shell Oil in the United States who retired at 55, 60, or 65, and employees who were actively working at 55 or 60, during a period of 31 years between 1 January 1973 and 31 December 2003. In the main analysis we compared the survival of employees who retired at 55 (n=839) and 60 (n=1929) and were still alive at 65 with those who retired at 65 (n=900). The average ages at the end of the study were 72, 76, and 80, with, respectively, 10%, 20%, and 52% over 80. We followed up employees who retired at 55 or 60 from the time they reached 65. We excluded the first 10 years of survival for those retiring at 55, and we determined time to death from age 65, or the end of the study, whichever was earlier, yielding 21 years of follow-up and 173 deaths. We excluded the first five years of survival for those retiring at 60, yielding 26 years of follow-up and 581 deaths.

To assess the health status of those who retired before the normal retirement age of 65, we compared the mortality of those who retired at 55 (n=1439) or 60 (n=2116) with those who were still working at 55 (n=15 543) or 60 (n=6783). If early retirement before 65 was taken by some workers because of failing health, mortality would be expected to be higher among early retirees than among those who did not retire at these ages. Overall, 137 employees who retired at 55 and 994 employees who continued working at 55 died by age 65, whereas 98 employees who retired at 60 and 317 employees who continued working at 60

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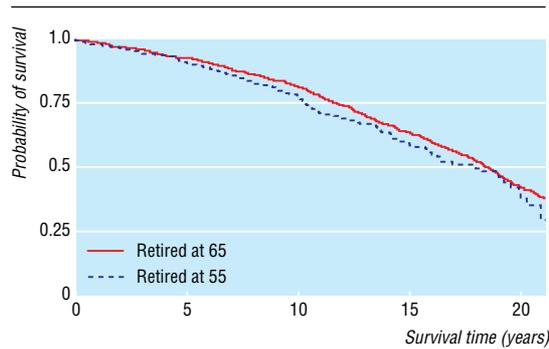


Fig 1 Kaplan-Meier survival curves for employees of Shell Oil, United States, who retired early at 55 and survived to 65 and those who retired at 65

died by age 65. We calculated the hazard ratio for the first 10 years after retirement (until 65) of those who retired at 55, and for the first five years (until 65) for those who retired at 60.

We identified subjects through Shell Oil's health surveillance system.⁷ This system was established in 1979 and contains data on vital status and other health related variables for all US employees of the company from 1973 onwards. We used several sources to determine the vital status of the subjects as of 31 December 2003 (see bmj.com). The outcome variables for the survival analysis were time to death or end of the study, and the censoring variable (dead or living). Covariates in the analysis included categorical variables representing sex and employment grade, and a continuous variable representing the calendar year that the subjects entered the study. Adjustment for year of entry to the study controlled for the effect of changes in mortality trends over the study period. We used employment grade as a proxy for socioeconomic status, a high status being assigned for employees in managerial or professional positions and a low status being assigned for those in skilled, semi-skilled, non-skilled, or clerical positions. (See bmj.com for details of statistical analysis.)

Results

Women accounted for about 11% (10% among early retirees and 12% among those retiring at 65) of the study population during follow-up. More than half of early retirees who reached 65 (57% who retired at 55

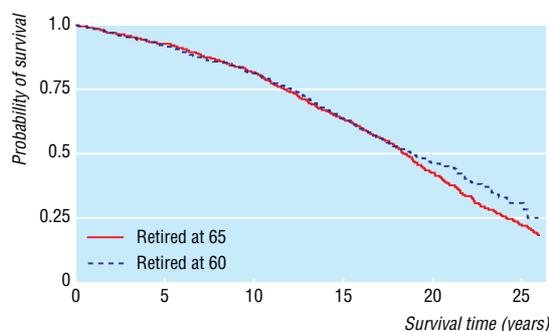


Fig 2 Kaplan-Meier survival curves for employees of Shell Oil, United States, who retired early at 60 and survived to 65 and those who retired at 65

Adjusted hazard ratios (95% confidence intervals) by explanatory variables for employees of Shell Oil, United States, who retired early at 55 or 60 compared with those who retired at 65

Explanatory variables	No of subjects	Adjusted hazard ratio* (95% CI)
Retired at 55 and reached 65 during study period†		
Retirement group:		
Retired at 65	900	1.00
Retired at 55	839	1.37 (1.09 to 1.73)
Sex:		
Women	197	1.00
Men	1542	1.83 (1.34 to 2.48)
Socioeconomic status:		
High‡	871	1.00
Low§	868	1.17 (1.01 to 1.36)
Calendar year of entry to study	1739	0.98 (0.97 to 1.00)
Retired at 60 and reached 65 during study period†		
Retirement group:		
Retired at 65	900	1.00
Retired at 60	1929	1.06 (0.92 to 1.22)
Sex:		
Women	276	1.00
Men	2553	1.48 (1.16 to 1.89)
Socioeconomic status:		
High‡	1418	1.00
Low§	1411	1.09 (0.97 to 1.23)
Calendar year of entry to study	2829	0.97 (0.96 to 0.99)

*Hazard ratios reflect values with all other variables in model.

†1 January 1973 to 31 December 2003.

‡Managerial or professional positions.

§Skilled, semiskilled, non-skilled, or clerical positions.

and 53% who retired at 60) were in the high socioeconomic group whereas less than half (44%) of those who retired at 65 were in this group (see bmj.com). The Kaplan-Meier survival curve shows a consistently lower probability of survival for employees who retired at 55 (173 deaths) than for those who retired at 65 (462 deaths; fig 1). This difference was not, however, statistically significant ($P=0.09$, log rank test). Likewise, the risk of death was similar between these two retirement groups (unadjusted hazard ratio 1.17, 95% confidence interval 0.98 to 1.41). For most of the follow-up period the survival curves were similar for employees who retired at 60 and those who retired at 65 (581 and 541 deaths; fig 2), and there was no significant difference in either survival or risk of death for these two groups.

After adjustment for sex, calendar year of entry to the study, and socioeconomic status, employees who retired at 55 and were still alive at 65 had significantly higher mortality than those who retired at 65 (hazard ratio 1.37, 1.09 to 1.73; table). The risk of dying was about 80% greater in men than it was in women (1.83, 1.34 to 2.48) and retirees in the low socioeconomic category had a higher mortality than retirees in the high category (1.17, 1.01 to 1.36). Among employees who retired at 60, mortality was similar to those who retired at 65 (hazard ratio 1.06, 0.92 to 1.22). Men had a higher mortality than women (1.48, 1.16 to 1.89). Mortality did not differ significantly by socioeconomic status (1.09, 0.97 to 1.23; table).

We could not assess directly the issue of whether employees who retired at a younger age were in poorer health than those who retired later as data were not available to identify the type of retirement for each employee (for example, retirement due to disability compared with normal retirement). Regardless of socioeconomic status, employees who retired at 55 had

almost a twofold higher mortality by 65 than those who continued working (1.89, 1.58 to 2.27). The mortality by 65 of employees who retired at 60 was similar to those who continued working at 60 (1.04, 0.82 to 1.31).

Discussion

The long term survival of people who retire early at ages 55 or 60 is no better than that of those who retire at 65. On the contrary, mortality improved with increasing age at retirement for people from both high and low socioeconomic groups, defined according to employment grade. It is reasonable to assume that some workers retired at 55 because of failing health, as the mortality for this group in the first 10 years after retirement was almost twofold higher than that of their peers who continued working. The health status of those who retired at 60, however, was similar to those who continued working at 60.

The finding of lower survival among employees of low socioeconomic status, regardless of age at retirement, is not unexpected and is consistent with other studies.⁸⁻¹¹ Similarly, it was not unexpected that men had statistically higher mortality than women and that those retiring in more recent years had better survival.

Several studies found lower survival among those retiring early and attributed this to poor health status forcing early retirement.¹⁻³ Our study confirmed the finding of lower survival in people who take early retirement at age 55, but we did not find evidence of lower survival among those who retired at 60. To reduce potential bias due to differences in health status between early and late (age 65) retirees, we excluded survival for the first 10 years of follow-up after retirement at 55 and for the first five years after retirement at 60 for early retirees. Although the effect of early retirement because of failing health may not be totally eliminated, survival rates remained significantly greater for those who retired at 65 compared with those who retired at 55. The difference in survival between those who retired between 60 and 65 was, however, small and not statistically significant.

What is already known on this topic

There is a widespread perception that early retirement is associated with longer life expectancy and later retirement is associated with early death

No consensus has been reached on the comparative survival or mortality of people who retire early or late

What this study adds

Early retirement at 55 or 60 is not associated with increased survival

Employees who retired at 60 had similar survival to those who retired at 65

Differences in mortality could not be attributed to the effects of sex, year of entry to the study, or socioeconomic status

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Twenty five years of HIV infection in haemophilic men in Britain: an observational study

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The first HIV seroconversion in the United Kingdom in a man with haemophilia was in 1979.¹ After HIV was identified, measures were taken to remove the risk of HIV transmission via blood products, and since 1986 no HIV infections have occurred through this route in the developed world. The epidemic is now 25 years old in haemophilic men. Although the introduction of highly active antiretroviral therapy (HAART) has altered the course of HIV infection, many haemophilic men died before this became available. It is important to monitor those remaining alive to determine their long term outcomes and to assess the impact of coinfection with hepatitis C virus.

Participants, methods, and results

The Royal Free Hospital haemophilia cohort, consisting of 111 men with haemophilia infected with HIV after treatment with contaminated clotting factor concentrates (median age 22 (range 2-77) years at infection), has been described previously.² All are coinfecting with hepatitis C virus. Follow-up time—calculated from seroconversion date to the date of death, last clinic visit (for those lost to follow-up), or

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