

Letters

RESEARCH LETTER

Feeling Old vs Being Old: Associations Between Self-perceived Age and Mortality

Self-perceived age reflects appraisals of health, physical limitations, and well-being in later life.¹ Older people typically feel younger than their chronologic age, and it is thought that those who feel younger than their actual age have reduced mortality.^{2,3} We sought to confirm this relationship in a large representative population sample, and to understand the role of existing health problems, poor physical function, depression, sociodemographic factors, social isolation, impaired cognitive function, and health behaviors in explaining the association.

Methods | This study was approved by the National Research Ethics Service, and all participants provided written consent. We analyzed data from the second wave (2004-2005) of the English Longitudinal Study of Ageing.⁴ Self-perceived age was measured by asking respondents, “How old do you feel you are?” All-cause mortality and deaths from cancer and cardiovascular disease up to March 2013 were recorded. We divided participants into those whose self-perceived age was close to their chronologic age (1 year older to 2 years younger), those who felt more than 1 year older than their chronologic age, and those who felt 3 or more years younger than their actual age (similar results emerged when the difference between self-

perceived and actual age was modeled as a continuous variable). Cox proportional hazards regression models were used to test associations between self-perceived age and mortality, adjusting for different sets of covariates.

Results | The sample consisted of 6489 individuals 52 years and older. Mean (SD) actual age was 65.8 (9.3) years, while the mean self-perceived age was 56.8 (13.3) years. Most respondents (69.6%) felt 3 or more years younger than their actual age, with 25.6% having a self-perceived age close to their chronologic age and 4.8% who felt more than 1 year older than their chronologic age.

The crude mortality rate during the mean follow-up period of 99 months was 14.3% in participants who felt younger, 18.5% in those who felt about their actual age, and 24.6% in those who felt older (Table 1). Adjustment for covariates had pronounced effects on the associations between self-perceived age and mortality. Nevertheless, when we combined the factors that were independently associated with mortality in models 1 through 8, feeling older than actual age remained a significant independent predictor of mortality (model 9: hazard ratio, 1.41; 95% CI, 1.10-1.82). Results were similar after excluding deaths occurring within 12 months of baseline (Table 2). Analyses of separate causes of death showed a strong relationship between self-perceived age and cardiovascular death, but no association between self-perceived age and cancer mortality (Table 2).

Table 1. Self-perceived Age and All-Cause Mortality Risk

Perceptions of Age	Chronologic Age				
	Younger (n = 4515)	About the Same (n = 1661)		Older (n = 313)	
		Hazard Ratio (95% CI)	P Value	Hazard Ratio (95% CI)	P Value
Death, No. (%)	646 (14.3)	307 (18.5)		77 (24.6)	
Model 1: age and sex	1 [Reference]	1.29 (1.12-1.47)	.001	2.59 (2.04-3.28)	.001
Model 2: age, sex, and sociodemographic factors ^a	1 [Reference]	1.27 (1.10-1.45)	.001	2.36 (1.86-3.00)	.001
Model 3: age, sex, and depression ^b	1 [Reference]	1.22 (1.07-1.40)	.004	2.23 (1.75-2.85)	.001
Model 4: age, sex, and social engagement ^c	1 [Reference]	1.25 (1.09-1.44)	.001	2.33 (1.83-2.96)	.001
Model 5: age, sex, and cognitive function ^d	1 [Reference]	1.24 (1.08-1.42)	.002	2.30 (1.81-2.92)	.001
Model 6: age, sex, and physical health ^e	1 [Reference]	1.06 (0.92-1.22)	.43	1.70 (1.32-2.17)	.001
Model 7: age, sex, and mobility ^f	1 [Reference]	1.18 (1.03-1.36)	.02	2.07 (1.62-2.62)	.001
Model 8: age, sex, and health behavior ^g	1 [Reference]	1.21 (1.05-1.38)	.007	1.93 (1.52-2.46)	.001
Model 9: fully adjusted ^h	1 [Reference]	1.05 (0.91-1.20)	.51	1.41 (1.10-1.82)	.007

^a Wealth, education, and ethnicity.

^b Clinical depression in the past 2 years, as well as current depressive symptoms.

^c Marriage, social isolation, social activities, and loneliness.

^d Immediate recall, delayed recall, and verbal fluency.

^e Baseline fair or poor self-rated health, long-standing limiting illness, coronary heart disease, cancer, diabetes mellitus, chronic lung disease, stroke, and arthritis.

^f Baseline impaired mobility and activities of daily living.

^g Smoking, physical activity, and alcohol consumption.

^h Age, sex, wealth, ethnicity, baseline fair or poor self-rated health, long-standing limiting illness, coronary heart disease, cancer, arthritis, impaired mobility and activities of daily living, social isolation, social activities, loneliness, delayed recall, verbal fluency, smoking, and physical activity.

Table 2. Self-perceived Age and Mortality Risk Subgroup Analyses^a

Characteristic	Chronologic Age		
	Younger	About the Same	Older
Excluding Deaths in First 12 Months (945 Deaths)			
Percentage who died (95% CI)	13.4 (12.4-14.3)	16.3 (14.7-17.8)	26.3 (22.8-29.9)
Age and sex, HR (95% CI)	1 [Reference]	1.25 (1.08-1.44)	2.68 (2.09-3.42)
Fully adjusted, HR (95% CI)	1 [Reference]	1.03 (0.89-1.19)	1.50 (1.15-1.95)
Death From Cancer (363 Deaths)			
Percentage who died (95% CI)	5.3 (4.6-6.0)	6.2 (5.1-7.3)	6.7 (4.2-9.2)
Age and sex, HR (95% CI)	1 [Reference]	1.20 (0.95-1.51)	1.54 (0.96-2.46)
Fully adjusted, HR (95% CI)	1 [Reference]	1.03 (0.81-1.30)	1.13 (0.69-1.84)
Death From Cardiovascular Disease (327 Deaths)			
Percentage who died (95% CI)	4.5 (3.9-5.1)	5.6 (4.6-6.6)	10.2 (7.9-12.5)
Age and sex, HR (95% CI)	1 [Reference]	1.30 (1.02-1.65)	3.10 (2.09-4.63)
Fully adjusted, HR (95% CI)	1 [Reference]	1.09 (0.85-1.39)	1.55 (1.01-2.38)

Abbreviation: HR, hazard ratio.

^a Percentage of mortality adjusted for age and sex (95% CIs) and adjusted HRs with 95% CIs.

Discussion | We found that self-perceived age predicted all-cause and cardiovascular mortality during the following 8 years. Although baseline health, physical disability, and health behavior accounted for some of the association, after adjusting for all covariates, there remained a 41% greater mortality hazard in people who felt older than their actual age compared with those who felt younger than their actual age. Our study used data from a large nationally representative survey and a simple measure of self-perceived age. We tested for reverse causality by excluding deaths within 12 months of baseline and found that the association was not due to participants in the terminal phases of their lives rating themselves as feeling older than their real age.

The mechanisms underlying these associations merit further investigation. Possibilities include a broader set of health behaviors than we measured (such as maintaining a healthy weight and adherence to medical advice), and greater resilience, sense of mastery, and will to live among those who feel younger than their age.⁵ Self-perceived age has the potential to change, so interventions may be possible.⁶ Individuals who feel older than their actual age could be targeted with health messages promoting positive health behaviors and attitudes toward aging.

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- Levy B. Stereotype embodiment: a psychosocial approach to aging. *Curr Dir Psychol Sci*. 2009;18(6):332-336.
- Kotter-Gröhn D, Kleinspehn-Ammerlahn A, Gerstorf D, Smith J. Self-perceptions of aging predict mortality and change with approaching death: 16-year longitudinal results from the Berlin Aging Study. *Psychol Aging*. 2009;24(3):654-667.
- Uotinen V, Rantanen T, Suutama T. Perceived age as a predictor of old age mortality: a 13-year prospective study. *Age Ageing*. 2005;34(4):368-372.
- Steptoe A, Breeze E, Banks J, Nazroo J. Cohort profile: the English Longitudinal Study of Ageing. *Int J Epidemiol*. 2013;42(6):1640-1648.
- Levy BR, Slade MD, Kunkel SR, Kasl SV. Longevity increased by positive self-perceptions of aging. *J Pers Soc Psychol*. 2002;83(2):261-270.
- Stephan Y, Chalabaev A, Kotter-Gröhn D, Jaconelli A. "Feeling younger, being stronger": an experimental study of subjective age and physical functioning among older adults. *J Gerontol B Psychol Sci Soc Sci*. 2013;68(1):1-7.