Does socio-economic status predict grip strength in older Europeans? Results from the SHARE study in non-institutionalised men and women aged 50+

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ABSTRACT

Background Reduced hand-grip strength predicts disability, morbidity and mortality, but whether it is shaped by socio-economic experiences is yet unknown. The authors examined the association of education, occupation, income and wealth with grip strength in older Europeans.

Methods Data came from the Survey of Health, Ageing and Retirement in Europe comprising 27,351 participants ages 50+ in 11 countries. Grip strength was objectively measured using a handheld dynamometer. Estimates were obtained based on multivariate linear regression controlling for a wide set of confounders, demographics, health and disability measures, and behavioural risk factors.

Results In the total sample, education, occupational class, income and wealth predicted grip strength among men, whereas only education and wealth predicted grip strength among women. While education and income effects were inconsistent in most countries, wealth consistently predicted grip strength in each country. A one-point increase in the log of wealth was associated with 0.38 kg (95% CI 0.31 to 0.45) higher grip strength in men and 0.18 kg (95% CI 0.15 to 0.21) higher grip strength in women. While education, income and occupation effects disappeared after adjustment for health measures, log of wealth effects remained significant in both men (0.22, 95% CI 0.15 to 0.29) and women (0.08, 95% CI 0.05 to 0.11). Wealth effects were particularly evident in the two lowest quintiles.

Conclusion Old-age socio-economic and financial circumstances as measured by wealth are associated with grip strength, particularly among the least wealthy, while circumstances defined earlier in life as measured by education, income and occupation do not consistently predict grip strength.

INTRODUCTION

In old age, hand-grip strength is a strong predictor of disability,1–7 morbidity8,9 and mortality,10–14 Lower socio-economic status is associated with higher self-rated disability,15,16 but whether it relates to objective disability measures such as grip strength has not yet been extensively examined.15 Contrary to self-reports, grip strength is an objective performance measure that does not suffer the biases inherent to self-reports.17,18 How grip strength is shaped by socio-economic circumstances in older Europeans is not yet well understood.

Education, income, occupation and wealth are socio-economic dimensions operating at different points over the life course, involving potentially different pathways and aetiological periods (figure 1). Education is defined early and represents influences that operate over a long aetiological period. Defined later in life, wealth is a measure of life-long accumulated earnings,29–26 potentially influencing health over a shorter aetiological period. Occupation and income are particularly relevant at middle age, with an aetiological period extending from working age to old age. These four measures might thus have different associations with grip strength.

We examined education, occupation, income and wealth effects on hand-grip strength in Europeans aged 50+. We hypothesised that wealth is the strongest predictor of grip strength in old age, because it is a comprehensive measure that reflects cumulative socio-economic experiences over the life course. In addition, we expected education to have long-running effects on grip strength, reflecting early-life influences operating both directly and indirectly via occupation, income and wealth. We hypothesised that lower occupations were associated with manual jobs involving higher grip strength but leading to poorer health,21 resulting in conflicting associations with grip strength. We examined these hypotheses on representative samples of older Europeans in 11 European countries.

METHODS

Study population

Data came from the 2004 wave of the Survey of Health, Ageing and Retirement in Europe (SHARE), including comparable data across countries. Specific details are provided elsewhere.22–26 Representative samples of the non-institutionalised population aged 50+ were drawn from national or regional population registries, or from multistage sampling in Sweden, Denmark, Germany, The Netherlands, Belgium, France, Switzerland, Austria, Italy, Spain and Greece. The average household response rate was 61.6%, ranging from 39% (Switzerland) to 81% (France). From a total of 27,444 respondents aged 50+, we excluded 93 individuals with missing sampling weights, for a final sample of 27,351 participants.

Hand-grip strength

Hand-grip strength was measured by trained interviewers using a handheld dynamometer (Smedley, 5 Dynamometer, TTM, Tokyo, 100 kg).22–25 Participants were instructed to stand (preferably) or sit, with the elbow at 90°, the wrist in neutral position,