Design: Prospective general population birth cohort study with data from birth to four years, drawn from the Southampton Women’s Survey. Grip strength was measured using a Jamar handgrip dynamometer at age four years. We also measured height and weight and assessed body composition (lean mass) using dual energy x-ray absorptiometry. Multiple regression was used to relate grip strength to birthweight allowing for adjustment for confounding factors.

Setting: Southampton, UK.

Participants: 968 children took part in a sub-study assessing body composition and had their grip strength measured at age four years. Their socio-demographic characteristics were similar to the remainder of the cohort.

Main outcome measure: Grip strength in kilograms.

Results: Birthweight was positively associated with grip strength, with each kilogram of birthweight being associated with a 0.5 kg increase in grip strength (95% CI 0.30 to 0.70). Grip strength was also strongly related to current body size and adjustment of the birthweight relationship for height and weight attenuated the relationship such that it became non-significant with a 1 kg increase in birthweight being associated with 0.15 kg (95% CI -0.05 to 0.34 kg) increase in grip strength. Adjustment for absolute and percentage lean mass instead of height and weight attenuated the increase in grip strength (95% CI 0.30 to 0.70). Grip strength was generally higher when multiple imputation was used, but the overall conclusions remained the same. The coefficients using Heckman selection differed from those for the complete case and multiple imputation analyses, with lower coefficients for all SEP variables. Whitehall II: Educational qualifications and current occupational SEP were significantly associated with verbal ability for all missing data methods, after adjusting for age, sex, marital status, employment status (working/retired/long-term sick) and number of times the cognitive tests had been taken. The effect of childhood SEP was not significant. The coefficients were generally higher for multiple imputation than complete case analysis, whereas the Heckman selection coefficients were lower for educational qualifications and adult SEP (regression coefficient (95% CI) -4.46 (-5.12 to -3.78) for Heckman selection vs -5.15 (-5.75 to -4.55) for complete case).

Conclusion: Educational qualifications and adult SEP were significant predictors of verbal ability in middle to older age, but results for childhood SEP were inconclusive. Greater differences exist between the results from different missing data methods in the older Whitehall II sample, which may be due to greater selective dropout, which is better accounted for by Heckman selection.