

# Low Muscle Strength In Adolescence Increases Mortality Risk Later In Life

It is well known that hypertension and high body mass index during adolescence are associated with premature mortality. Now, a long-term prospective study of more than a million Swedish adolescents has turned up yet another risk factor: low levels of muscular strength.

The study was published online November 20 in the *British Medical Journal*.

The authors of the study, led by Francisco Ortega, a research associate in the Department of Physical Education and Sport, School of Sport Sciences, University of Granada, Spain, point out that muscle strength in adulthood has been linked to all-cause and cardiovascular mortality in adults. Until now, however, similar data have been lacking in adolescents.

Similarly, they say, better cardio-respiratory fitness is associated with better mental health in adults, but there has been scant evidence whether muscle strength at any age is associated with future mental health and suicide mortality.

"This study provides strong evidence that a low level of muscular strength in late adolescence, as measured by knee extension and handgrip strength tests, is associated with all cause premature mortality to a similar extent as classic risk factors such as body mass index or blood pressure," the researchers write.

Ortega and colleagues followed up 1,142,599 young men aged between 16 and 19 years who were evaluated for service in the Swedish military. During a median follow-up of 24 years, the researchers assessed the extent to which muscle strength in adolescence was associated with all-cause premature mortality, which they defined as death before age 55 years. They also looked into cause-specific premature mortality resulting from cardiovascular disease, cancer, and suicide.

The study is based on conscription data from 1969 to 1994. The researchers explain that no information on young women was available during that time, so their study was limited to young men.

During follow-up, 26,145 (2.3%) of the study participants died. Suicide was the most common cause of death (22.3% of deaths), much more than cancer (14.9%) or cardiovascular disease (7.8%).

Participants who scored high on the knee extension and handgrip muscle strength tests had a 20% to 35% lower risk for death from any cause and from cardiovascular disease compared with those who scored low on the strength tests. Further, the researchers note, those differences were independent of body mass index or blood pressure status.

There was no link seen between muscle strength and death caused by cancer, the researchers note.

Mental health also seemed to be linked to muscle strength. "Stronger adolescents had a 20-30% lower risk of death from suicide and were 15-65% less likely to have any psychiatric diagnosis (such as schizophrenia and mood disorders)," the researchers report.

All-cause mortality per 100,000 person years ranged between 122.3 for the weakest individuals and 86.9 for the strongest.

Among the weakest adolescents, cardiovascular disease was 9.5 per 100,000 person-years compared with 5.6 in the strongest adolescents.

Similarly, suicide risk was higher among the weakest adolescents, at 24.6 per 100,000 person-years compared with 16.9 in the strongest individuals.

Ortega and his colleagues conclude, "Low muscular strength should be considered an emerging risk factor for major causes of death in young adulthood."

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