Early mortality risk reduced up to 40 percent through increased physical activity and sports

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"Any physical activity is better than none," Guenther Samitz, the author of the study, advises. Credit: morgueFile

Even though previous studies have been shown the link between regular exercises and improved health the exact dose-response relation remains unclear. Guenther Samitz, researcher in physical activity and public health at the Centre for Sports Sciences and University Sports of the University of Vienna has investigated this relationship with a meta-study representing more than 1.3 million participants. The research project was carried out in collaboration with public health scientists and

epidemiologists of the Universities of Bern, Switzerland and Bristol, UK. The results of the study have been published in *International Journal of Epidemiology*.

One week is 10.080 minutes, already 150 minutes of moderate-intensity physical activity per week protect against chronic diseases and premature death according to the recommendations of the World Health Organisation (WHO). A research group around Guenther Samitz of the Centre for Sports Sciences and University Sports at the University of Vienna investigated that link between increased levels of physical activity of different domains (occupation, daily living, transportation, and leisure) and all-cause mortality. The investigators also assessed to what extent current WHO recommendations for physical activity decrease the risk of premature death in adult populations.

80 studies with 1.3 million study participants

The study was conducted as a systematic review including multiple meta-analyses. Meta-analyses combine the results of individual studies that address a set of predefined research questions. In Public Health and Medicine the evidence from meta-analyses is often used to update or revise recommendations and guidelines for prevention and therapy.

The researchers identified about 7,000 potentially relevant reports, of which a total of 80 cohort studies with more than 1.3 million study participants from Europe, Canada, United States, and Asia fulfilled the strict inclusion criteria. At study onset participants had to be free of cardiovascular disease, cancer and other chronic conditions. Study participants were followed up by a median of 11 years. 'The results of the included studies were combined and controlled for other potential influential factors, e.g. cigarette smoking, alcohol uptake, body mass index, blood pressure, nutrition, education and social factors,' explained Guenther Samitz.

Women benefit more than men

In Europe only about one third of the adult population meets the minimum WHO recommendation for physical activity. Higher levels of physical activity were associated with reduced all-cause mortality, regardless whether in job, daily living, leisure or active transportation. However, the association was higher for leisure time physical activity and activities of daily living, and mortality reductions were more pronounced in women when compared with men. Women and older persons even had a survival benefit when engaging in regular light- to moderate-intensity activities of daily living, e.g. domestic work, gardening, walking or bicycling to the shopping mall. It is unclear why the survival benefit from physical activity across all domains was consistently higher for women. The study authors suspect that changes in female hormone levels, in oestrogen metabolism and body fat distribution could partly be responsible for this difference.

Some physical activity is good, more is better

In a second step the investigators quantified the mortality benefit in dependence upon the physical activity dose per week. For light- to moderate intensity activities of daily living, e.g. housework, gardening, stair climbing, walking and bicycling for transportation, an increase of one hour per week compared to no physical activity was associated with a reduction in mortality of four percent. Dr. Samitz said that with moderate-intensity leisure activities (e.g. Nordic walking, hiking, social dance) the risk reduction increased to six percent, and with vigorous-intensity aerobic activity or sports (e.g. jogging, bicycling (>10 miles per hour), tennis, ball sport), the reduction in all-cause mortality was even nine percent per one hour increment per week.

Meeting the WHO´s recommended level of 150 minutes per week of

moderate physical activity of daily life or during leisure was associated with a reduction in mortality risk by ten percent. For vigorous exercise and sports the reduction in mortality risk was more than twofold higher (22 %).

300 minutes (five hours) per week, this activity level is recommended for extended health benefits, were associated with a reduction in mortality risk by 19% and 39% for moderate-intensity activities of daily living, and vigorous-intensity aerobic activity and sports, respectively. But even for lower levels than recommended by the WHO the researchers observed a significant survival benefit.

'Any physical activity is better than none and even activities of daily life are associated with a survival benefit, but more and vigorous-intensity physical activity are associated with a larger reduction in all-cause mortality', summarizes Samitz and he recommends: 'Nonetheless, sedentary adults should start with moderate-intensity physical activities and slowly increase weekly dose and intensity, because in sedentary adults vigorous-intensity physical activity is associated with increased risk of musculoskeletal injuries and adverse cardiac events.'

More information: Guenther Samitz, Matthias Egger and Marcel Zwahlen. Domains of physical activity and all-cause mortality: systematic review and dose-response meta-analysis of cohort studies. *International Journal of Epidemiology* 2011; 1-19. DOI: 10.1093/ije/dyr112

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