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Appropriate physical activity protects renal function decline and increases survival rate in the elderly population: A nationwide analysis of the National Health Insurance Service Senior Cohort

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Objectives: Appropriate exercise reduces the incidence of cardiovascular disease and mortality. This study analyzed data from the National Health Insurance Service Senior cohort to determine whether physical activity affects their renal function deterioration and survival in the elderly.

Methods: A total of 135,269 subjects aged 65 years or older with estimated glomerular filtration ratio (eGFR) > 60 mL/min/1.73 m^2 in 2009 or 2010 were enrolled. The intensity and frequency of exercise obtained using questionnaires. The intensity of exercise was divided into vigorous, moderate, and mild activity groups. The frequency of each exercise was divided into 0–2 (reference), 3–5, and 6–7 days. The association with outcomes investigated until 2015 was analyzed.

Results: In all three exercise groups, the higher the exercise frequency was, the younger the age was and the higher the proportion of men was, the higher the frequency of hypertension and diabetes was, and interestingly, the higher the frequency of drinking and smoking was (all variables, $P < 0.001$, respectively). The three exercise groups showed no difference in the incidence of proteinuria; but with the less exercise group, eGFR tended to be higher and the triglyceride and LDL cholesterol was lower. In the multivariate Cox regressions, the higher exercise group showed lower cardiovascular mortality and all-cause mortality in all types of exercise (all variables, $P < 0.001$, respectively). However, in the case of 50% eGFR decline, the groups that did vigorous exercise or mild exercise for 6–7 days were effective after adjustment of confounding factors in the elderly (vigorous activity: HR 0.683, 95% CI 0.524–0.891, $P = 0.005$, mild activity: HR 0.86, 95% CI 0.75–0.985, $P = 0.029$).

Conclusions: Continuous physical activity over mild intensity is associated with a decreased risk of rapid eGFR decline and increased survival in elderly subjects.