Device-Measured Physical Activity, Sedentary Behaviour and Risk of Chronic Kidney Diseases Across Levels of Grip Strength - PubMed

ABSTRACT

Abstract Background: The study aimed to investigate whether the associations of accelerometer-measured physical activity (PA) and sedentary behaviour (SB) with incident chronic kidney disease (CKD) vary based on different levels of hand grip strength, identifying the modifying role of grip strength in these associations. Methods: The study included 87 487 adults from the UK Biobank. PA and SB were quantified using accelerometers over 7-day period, while grip strength was assessed using a hand dynamometer. CKD events were ascertained through hospital records or death registries. Results: Participants had a mean age of 62.3 years, with 57.2% (50 062) identifying as female and 97% as White. Over a median follow-up of 7.0 years, the total incidence rate of CKD was 4.7 per 1000 person-years. Participants who performed higher volumes of PA were more likely to be younger; have better control of body weight, blood glucose and blood pressure; and have fewer major comorbidities ($p < 0.001$). Total PA, moderate-to-vigorous intensity PA (MVPA), and light intensity PA (LPA), were inversely associated with CKD risk in a dose-response manner (all p overall < 0.050). In contrast, SB was associated with a higher risk of CKD (p overall < 0.001). Hand grip strength significantly modified the relationship between PA, SB, and CKD risk (p interaction < 0.10). The associations of total PA (HR, 0.70; 95% CI, 0.59-0.84), MVPA (HR, 0.75; 95% CI, 0.65-0.88), LPA (HR, 0.81; 95% CI, 0.69-0.94), and SB (HR, 1.43; 95% CI, 1.21-1.69) with CKD risk were more remarkable among individuals with lower hand grip strength. Of note, physical inactivity ranked higher in relative strength for predicting CKD than hypertension, diabetes, and obesity. Conclusions: Hand grip strength could significantly modify the associations of accelerometer-measured PA and SB with the risk of CKD. Regardless of intensity, PA consistently correlates with reduced risk of CKD, while SB is associated with increased risk, especially among individuals with lower grip strength. Notably, physical inactivity was found to be as predictive of CKD as traditional risk factors, highlighting the importance of promoting PA, especially among those with lower grip strength. Keywords: UK Biobank; grip strength; physical activity; sedentary behaviour; triaxial accelerometer.

CONFLICT OF INTEREST

Conflict of interest statement J.Z. is funded by the National Natural Science Foundation Project Cultivation Special Fund of the Third Affiliated Hospital of Sun Yat■sen University (2022GZRPYMS09). J.W. is supported by Guangzhou Science and Technology Program (2023A03J0829), and Guangdong Basic and Applied Basic Research Foundation (2024A1515011349). Other co■authors declared that there are no conflicts of interest.

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