

Assessing the Impact of Physical Inactivity on Dialysis Adequacy and Functional Health in Peritoneal Dialysis Patients

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Abstract : Background: Peritoneal dialysis (PD) is a prevalent renal replacement therapy for patients with end-stage renal disease. Despite its benefits, PD patients often experience reduced physical activity and physical function, which can negatively impact dialysis adequacy and overall health outcomes. Despite the known benefits of maintaining physical activity in chronic disease management, the specific interplay between physical inactivity, physical function, and dialysis adequacy in PD patients remains underexplored. Understanding this relationship is essential for developing targeted interventions to enhance patient care and outcomes in this vulnerable population. This study aims to assess the impact of physical inactivity on dialysis adequacy and functional health in PD patients. Methods: This cross-sectional study included 135 peritoneal dialysis patients from multiple dialysis centers. Physical inactivity was measured using the International Physical Activity Questionnaire (IPAQ), while physical function was assessed using the Short Physical Performance Battery (SPPB). Dialysis adequacy was evaluated using the Kt/V ratio. Additional variables such as demographic data, comorbidities, and laboratory parameters were collected to control for potential confounders. Statistical analyses were performed to determine the relationships between physical inactivity, physical function, and dialysis adequacy. Results: The study cohort comprised 70 males and 65 females with a mean age of 55.4 ± 13.2 years. A significant proportion of the patients (65%) were categorized as physically inactive based on IPAQ scores. Inactive patients demonstrated significantly lower SPPB scores (mean 6.2 ± 2.1) compared to their more active counterparts (mean 8.5 ± 1.8 , $p < 0.001$). Dialysis adequacy, as measured by Kt/V, was found to be suboptimal ($Kt/V < 1.7$) in 48% of the patients. There was a significant positive correlation between physical function scores and Kt/V values ($r = 0.45$, $p < 0.01$), indicating that better physical function is associated with higher dialysis adequacy. Also, there was a significant negative correlation between physical inactivity and physical function ($r = -0.55$, $p < 0.01$). Additionally, physically inactive patients had lower Kt/V ratios compared to their active counterparts (1.3 ± 0.3 vs. 1.8 ± 0.4 , $p < 0.05$). Multivariate regression analysis revealed that physical inactivity was an independent predictor of reduced dialysis adequacy ($\beta = -0.32$, $p < 0.01$) and poorer physical function ($\beta = -0.41$, $p < 0.01$) after adjusting for age, sex, comorbidities, and dialysis vintage. Conclusion: This study underscores the critical role of physical activity and physical function in maintaining adequate dialysis in peritoneal dialysis patients. These findings highlight the need for targeted interventions to promote physical activity in this population to improve their overall health outcomes. Future research should focus on developing and evaluating exercise programs tailored for PD patients to enhance their physical function and dialysis adequacy. The findings suggest that interventions aimed at increasing physical activity and improving physical function may enhance dialysis adequacy and overall health outcomes in this population. Further research is warranted to explore the mechanisms underlying these associations and to develop targeted strategies for enhancing patient care.

Keywords : inactivity, physical function, peritoneal dialysis, dialysis adequacy

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