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Title: Six-minute walk distance is a surrogate parameter of physical activity in patients with idiopathic pulmonary fibrosis

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Body: Rationale The previous studies reported that physical activity (PA) was one of the important factors associated with health-related quality of life (HRQOL) in patients with idiopathic pulmonary fibrosis (IPF). PA was assessed correctly by a mean of daily step counts during 2 weeks, but this method was time-consuming. The aims of this study were to find the surrogate parameters for PA and to reconfirm the relationships between PA and HRQOL in patients with IPF. Methods Our study included 38 outpatients with IPF and a mean age of 71.3 years, who visited the Sapporo Medical University hospital from October 2011 to June 2012. The mean number of steps per day during 2 weeks was recorded with the uniaxial accelerometer and used as an index of PA. We measured the clinical characteristics, pulmonary, physical and mental functions, and HRQOL. Multiple regression analysis was used to reveal the parameters that affected PA. Results The mean PA was 5146.4 (steps/day) and statistically correlated with age ($r = -0.646$; $p < 0.001$), Base Dyspnea Index ($r = 0.420$; $p = 0.009$), DLCO ($r = 0.512$; $p = 0.003$), 6-minute walk distance (6MWD) ($r = 0.646$; $p < 0.001$), and dyspnea during the 6-minute walk test ($r = -0.365$; $p = 0.024$). PA was also statistically correlated with SGRQ and SF36. However, mental functions were not correlated with PA. Stepwise multiple regression analysis revealed that PA was estimated by age and 6MWD (adjusted $R^2 = 0.575$; $p < 0.001$). We derived a regression equation as follows: PA (steps/day) = -211.9 x age (yr) + 13.3 x 6MWD (m) + 13332. Conclusion PA of patients with IPF correlate with their HRQOL and the appropriate surrogate parameters of PA may be age and 6MWD.