

Physical and psychological determinants of fall risk in patients with diabetic neuropathy: a prospective investigation

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Background and aims: People with diabetic peripheral neuropathy (DPN) are more likely to fall and report diminished levels of physical activity (PA). However, determinants of DPN-related falls and PA are not well described. This prospective study examined the physical (DPN severity and unsteadiness) and psychological factors (fear of falling (FoF) and generalized distress) in their relationship to falling and PA levels.

Materials and methods: Twenty-two type 2 diabetes patients (18 males; age: 70±9years, Vibration Perception Threshold, VPT: 23±11V, Neuropathy disability score: 6±3 score/10) wore hip mounted activity monitors for 4 weeks (adherence: 17±6 days). Daily activity levels were separated into minutes of: sedentary, light, moderate and vigorous. Unsteadiness at baseline was measured objectively- by Berg balance test (48±6 score/56) and subjectively - by patient self-report (2-item NeuroQoL; 3.7±1 score/5). Diaries were used to self-record falls during the study (8/22 individuals fell at least once, median: 2 [range: 1-12] falls per faller). FoF at baseline was assessed with Falls Self-Efficacy-International Scale (FES-I; 29±12 score/64); generalized distress-with Hospital Anxiety and Depression Scale (HADS; 18±3 score/21). Associations between variables were assessed by Pearson's correlations.

Results: More severe DPN was associated similarly with self-reported unsteadiness ($r=.41$, $p=.03$) and with objective, Berg balance test ($r=.43$, $p<.02$). Berg and self-reported measures of unsteadiness were significantly correlated ($r=.49$, $p=.02$, Fig.1), however, whilst self-reported unsteadiness was associated with greater FoF ($r=.64$, $p<.01$) and with fall incidence ($r=.68$, $p<.01$), objectively measured unsteadiness was associated with FoF only ($r=.68$, $p<.01$), and not reported fall incidence. Higher levels of FoF were strongly associated with increased fall incidence ($r=.81$, $p<.01$), while increased generalized distress was associated higher fall incidence ($r=.47$, $p=.04$). Higher levels of light activity were associated with more falls ($r=0.73$, $p<.01$).

Conclusion: These findings suggest that subjective measures such as self-reported DPN-unsteadiness and fear of falling may be valuable indicators of fall risk and of at least similar value compared to simple laboratory measures of balance such as the Berg Balance test. This makes the case for incorporating psychological components in carefully designed multifactorial interventions. Moreover, as increments even in light activity levels are associated with more falls, potentially due to increased opportunities to fall, balance should be taken into consideration when designing interventions to improve physical activity.

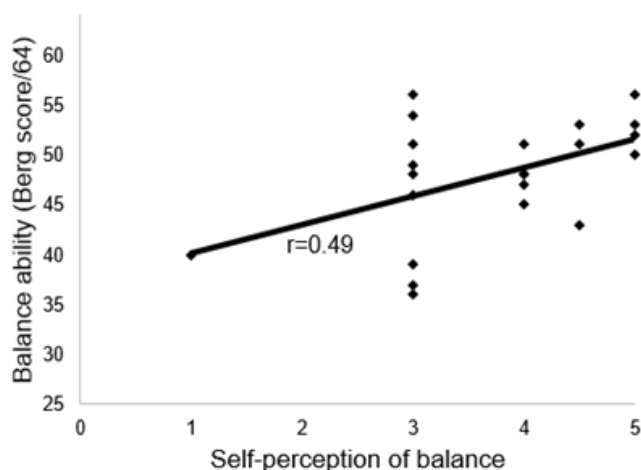


Figure 1: Relationship of between measured balance (Berg balance score) and self-perception of balance (Neuroqol)

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