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Title: Predictors of hip fractures in Parkinson's Disease

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Introduction:
Behind Alzheimer's disease, Parkinson's disease (PD) is the second most common neurodegenerative disorder. All ethnic groups are affected by PD, as are men and women, with the ratio of PD in men being twice that of women. PD is rare before the age of 40 and the prevalence of PD is as high as 4% of the population in industrialised countries. There are projected to be 9 million diagnoses of PD by 2030 and as such is set to become a huge economic burden.

With hip fractures being common in an elderly population and 97% of all the hip fractures occurring due to a fall, individuals who have received a diagnosis of PD have an increased risk for hip fracture compared to the general population and have more impairment post-fracture, often requiring a higher level of care. Fractures of the hip are also the most common form of fracture resulting from a fall. Hip fractures in PD also carry an increased risk of mortality compared to non PD sufferers.

Aim:
1: To determine the rate of hip fractures in people with Parkinson's disease within New Zealand; 2: To identify predictors of hip fractures for those with Parkinson's disease.

Impact:
Routinely collected data at initial assessment may help identify those patients at high risk for hip fracture who might benefit from further investigation and preventive measures. The development of a clinical risk scale may assist with a more targeted approach for preventing hip fracture compared with current models.

Method:
The participants of this study consisted of 2706 unique individuals who had received a diagnosis of Parkinson's disease and sustained a neck of femur fracture following assessment with the interRAI-HC v9.1.

This study was an analysis of a large national database of clinical assessments of individuals living at home with PD. The assessments utilised the International Resident Assessment Instrument - Home Care (InterRAI-HC) version 9.1 assessment system conducted between 1 July 2012 and 26th January 2016. Encrypted National Health Index numbers were used to link the interRAI-HC data to the individual's hospital admission data enabled us to determine those who had sustained a neck of femur fracture. Statistical analysis of the data was undertaken to identify risk factors for hip fracture.

Results:
Males made up 61% of individuals in this study. 91% were European, 3% Maori and 2% Pacifica. 55% of all particiants experienced at least one fall in the 90 days prior to assessment.

Neck of femur fractures occurred in 112 (4.1%) of individuals with Parkinson's disease post InterRAI assessment.

Underweight individuals were 3.86 times more likely to experience a neck of femur fracture compared to all other BMI groups. Increasing age, particularly those aged between 80 and 89 are 1.68 time more likely to suffer a neck of femur fracture as are females (1.38 times more likely than men), people who can walk between 5 and 99 metres uninterrupted (1.91 time more likely to occur), being of European ethnicity (1.83 time more likely), and those who fell at least once in the 30 days prior to assessment are 1.27 times more likely to have a neck of femur injury. Whilst being aged 60 to 69 and being able to walk between 100 and 999 metres reduces the likelihood of a neck of femur fracture occurring.

Conclusion:
An analysis of the interRAI-HC database of older people within New Zealand who had received a diagnosis of PD revealed neck of femur fractures occur in 4.1% of people with PD and that people who were aged 80 to 89, underweight, female, European, able to walk up to 100 metres without stopping, and those who have a had a recent fall, had a higher risk of a neck of femur fracture. Although those who are aged between 60 and 69 and those who can walk up to 1km uninterrupted have a reduced risk of neck of femur fractures.

This information gives us the ability to stratify people as to the risk a neck of femur fracture occurring to them and as such, individuals could be considered for prevention treatment based on the risk of a fracture occurring. Interventions could be targeted to the individual's specific needs to reduce the risk of fractures. However, most importantly being able to predict the risk of fractures will allow falls prevention programmes to be put in place for those at highest risk.