Parkinson's disease prevalence and the association with rurality and agricultural determinants: an ecological study of Victoria, Australia

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Summary

Introduction: Increased Parkinson's disease (PD) prevalence is associated with rurality and pesticide exposure. Due to the absence of population-based surveillance of this condition, we have only estimates of total PD prevalence, and its association with risk determinants in rural locations. We aimed to study rurality and associated determinants as risk factors for PD in an entire population of Victoria, Australia.

Methods: An ecological study was conducted to estimate the prevalence of PD in Victoria, which is the second most populous state in Australia (5.3 million; 4.1 M urban, 1.2 M rural) and has diverse land use and industry. Detailed prescribing data of PD medications collected through national supply data, Australian Statistics on Medicines

(ASM) was used to identify PD cases. Census data enabled us to determine population demographics for each Local Government Area of Victoria (LGA; 79 districts). Using these data, PD prevalence was estimated and corrected for median age. We obtained total agricultural production (according to commodity type, corrected for total area; total=48) from the Australian Bureau of Statistics to determine intensity of production in each LGA. This was used as an indicator for farming intensity.

Results: Consistent with previous estimates, state-wide prevalence of PD was 0.51% of the population. The prevalence was greater in rural (0.61%) compared to urban (0.48%) LGAs; but this difference was abolished when we corrected the data for median age. Prevalence of age-adjusted PD varied in rural localities (range 0.06-0.99%) with four of the highest prevalence localities (>1 standard deviation) were clustered in an area northwest of Victoria. After correcting for multiple comparisons, we observed that 5 commodities (barley, chickpeas, faba beans, lentils, and vetches) had increased farming intensity in this region. Except for barley, these commodities were from the pulse family of crops.

Conclusions: To our knowledge, this is the first ecological study of PD prevalence in rural and urban Australia. With a large sample size, we showed that age-adjusted PD prevalence was not different between urban and rural localities, but the rural regions with increased prevalence have greater pulse production. Farming practices associated with this type of commodity production should be investigated for increasing PD risk.