Hospitalisation and comorbidities in Parkinson's disease: A large Australian retrospect study

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3.0 CHAPTER 3 – DEVELOPMENT OF THE RESEARCH PROJECT

3.1 Introduction

This research project was devised in response to the neuro-epidemiological research into Parkinson’s disease that was part of my Medical Research Honours Project at The University of Notre Dame, Australia in 2011. This prompted the development of a larger scale study investigating the health related issues associated with Parkinson’s disease hospitalisation. Given the increasing prevalence of Parkinson’s disease within Australia that is due to the ageing of the population, it was of concern that there was not a well-developed understanding of the reasons for hospitalisation in Parkinson’s disease in Australia, nor about the comorbidities that are associated with admission.

My experience of clinical practice within the Neurology Department at St Vincent’s Hospital in Sydney, as an Intern and later as a Basic Physician Trainee, provided further exposure to patients with Parkinson’s disease and gave me insight into the complexities of managing hospitalised patients with Parkinson’s disease. This exposure led me to develop a greater research interest into improving the characterisation of the nature of Parkinson’s disease patient hospitalisations, investigating differences in patients admitted purely for management of their Parkinson’s disease compared with those admitted with Parkinson’s disease as a comorbidity, in general, and with regards to patient outcomes.

A working relationship was fostered in early 2013 between myself, Dr Stephen Tisch, consultant neurologist and staff specialist, who co-ordinates the Movement Disorder clinic at St Vincent’s Hospital, and Associate Professor Louise Rushworth, medical epidemiologist from The University of Notre Dame. Together we developed a strategy to undertake a comprehensive analysis of hospitalised patients with Parkinson’s disease in NSW. A literature review investigating the determinants and demographics of Parkinson’s disease in Australia was completed. This highlighted the problem of a paucity of local and national knowledge in this area. This, in turn, informed the objectives of our study. Subsequently, negotiations began with the NSW Ministry of Health to formulate appropriate inclusion and
exclusion criteria for the extraction of a study sample and comparison group from the State
data collection on hospital admissions.

Ethical approval from Human Research and Ethics Committees from the University of Notre
Dame was obtained prior to undertaking the study. This required the completion of a low-risk
application form because the data was non-identifiable and had already been collated for
funding and resource allocation purposes by the NSW Ministry of Health. The Ethics
Application Form to the University of Notre Dame in detail is attached in Appendix 1.

3.2 Aims And Objectives

This project had three aims. They were:

1. To examine Parkinson’s disease patient hospitalisations in New South Wales over a 5
year period and to describe the patient demographics, reasons for admission (for both
principal and secondary diagnoses), aspects relating to clinical management and
services accessed during an inpatient admission and to compare these patient
characteristics with a sample of patients admitted to NSW hospitals without a
diagnosis of Parkinson’s disease, weighted according to the age and sex distribution
of Parkinson’s disease patients in the general population.

2. To examine associations between co-morbidities and clinical aspects of Parkinson’s
disease management.

3. To estimate the frequency of inpatient mortality in hospitalised Parkinson’s disease
patients.
3.3 Hypothesis

1. Patients with Parkinson’s disease present with problems related to their chronic neurological illness that are likely to directly influence their health outcomes during hospitalisation.

2. Demographics, co-morbidities and clinical management are likely to differ between Parkinson’s disease patients and a comparison group.

3. Patients with higher numbers of co-morbidities relating to their diagnosis of Parkinson’s disease are likely to have a prolonged and complicated admission, possibly with a higher incidence of in-hospital mortality than control patients.

4. Co-morbidities not related to Parkinson’s disease are likely to result in complicated inpatient management and increase the patient’s length of stay and may be reflected in higher rates of in-hospital mortality than control patients.

3.4 Learning Experiences and Challenges

During the course of the research project many new learning experiences and challenges arose which shaped and directed the project. The development of the research focus continued on from experiences that I had had through my Honours research, investigating regional and urban differences in the Quality of Life (QoL), clinical management as well as allied health utilisation of Parkinson’s disease patients. A subsequent publication focusing on clinically important differences between the genders in the same cohort provided a greater in-depth understanding of outpatient clinical management of Parkinson’s disease.

The Master’s research focus was thus directed at studying the effects of inpatient management to provide a more comprehensive understanding of the complexity of medical care involved with the management of Parkinson’s disease. Particular focus on the investigation of the causes of hospitalisation, in addition to the distribution of comorbidities of Parkinson’s disease patient presentations, was performed. A literature review evaluating a variety of clinical inpatient management implications for Parkinson’s disease gave rise to a presentation
at the University’s Research Symposium in 2013, focusing on strategies to improve Parkinson’s disease inpatient care.

Further learning experiences included close collaboration with the NSW Ministry of Health to develop acceptable criteria for data extraction. Mr John Agland, manager of Performance Reporting Health System Information and Performance Reporting Branch NSW Ministry of Health was instrumental in fostering a close working relationship with his analyst, Mr Jithendra Uppalapati to facilitate data extraction. The Ministry of Health did not undertake any data analysis or selection of subsamples for analysis, with only raw tabulated data being provided for the project, (see Chapter 5 – Methods). The handling of this vast dataset proved to be quite a challenging task, as multiple databases had to be generated and integrated to provide a dataset on all public and private Parkinson’s disease hospitalisations over the 5 year study period. Data acquisition could only be obtained after completion and clearance from the University’s Human Research and Ethics Committee.

Several of the most significant challenges of this project included the functional integration and analysis of thousands of individual data points in Excel and SPSS. With an initial database comprising more than 14,000 patient admissions, prior to applying exclusion and inclusion criteria, significant database construction and programming were required. However the most challenging aspect of the project was the transformation and collation of the vastly differing diagnostic and procedural codes that required clustering into workable categories. This analytical work required the input of a senior analyst, Mihovil Matic. Subsequently, varying ICD-10 codes (59) were later recoded into clinically appropriate domains relating to Parkinson’s disease, as referred to in the journal publication – Tables 3 and 4.

Significant consideration was given to selecting a representative sample of Parkinson’s disease patients. Difficulties arose when applying exclusions to different types of admissions including those to an inpatient psychiatric, rehabilitation or dialysis ward, as the study was focused on admissions for general issues in this patient group. The same exclusions were applied to the comparison group. After these exclusions, it was found that there were more short stay admissions, for a variety of day procedures in the comparison sample. A critical
analysis of the study groups and the design of the project are further explained in Chapter 6 – Discussion.

Finally, the definition and extraction of an appropriate comparison group was another technical challenge. There were many difficulties in preparing this dataset due to the separation of the NSW Ministry of Health’s public hospital and private hospital databases. As multiple inclusion/exclusion criteria needed to be applied, only one year’s (2008) admissions were extracted to constitute the comparison group for the analysis. This, however, provided a sufficiently robust comparison group with which to compare the Parkinson’s disease population. The structure of the comparison group has also been described in the journal article, which forms Chapter 4 of this thesis.

3.5 Major Accomplishments

The greatest accomplishment of the research project was its ability to report on an analysis of a large number of Parkinson’s disease admissions throughout NSW over a 5-year timeframe. This type of study has not been done in Australia for Parkinson’s disease patients before now.

The most significant results of the project relate to the newly identified differences that were found between Parkinson’s disease patients and the comparison group with regards to the reasons for hospitalisation. The results demonstrated that Parkinson’s disease patients were five times more likely to be treated for delirium, three times more likely to experience an adverse drug event and syncope, more than twice as likely to require management of falls/fractures, dementia, gastrointestinal complications, genitourinary infections, reduced mobility and other trauma but half as likely to require hospitalisation for chronic airways disease and neoplasia, including melanoma, compared to patients without Parkinson’s disease.
Further, another notable accomplishment achieved during the project was the acceptance and presentation of a poster at the 2014 Movement Disorder Society of Australia conference in Queenstown, New Zealand. This received the 1st prize for the poster presentations, which was a great honour. Further, an abstract was also accepted in the International Movement Disorder Congress in Stockholm, 2014. Importantly, it also fostered a further interest in pursuing a career in Neurology, preparing me for subsequent clinically directed research, which I hope to continue throughout Neurology Advanced Training. Lastly, the successful publication of the study within the Journal of Neurology, Neurosurgery and Psychiatry (JNNP) with an impact factor: 4.924, was a highly rewarding accomplishment for all the researchers involved.

As per the journal’s disclosure: The JNNP’s ambition is to publish the most ground-breaking and cutting-edge research from around the world. Encompassing the entire genre of neurological sciences, our focus is on the common disorders (stroke, multiple sclerosis, Parkinson’s disease, epilepsy, peripheral neuropathy, subarachnoid haemorrhage and neuropsychiatry), but with a keen interest in the Gordian knots that present themselves in the field, such as ALS. With early online publication, regular podcasts and an immense archive collection (with the longest half-life of any journal in clinical neuroscience), JNNP is a trailblazer and not a follower.