



Research paper

The utilisation of one district hospital emergency department by people with Parkinson's disease



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ABSTRACT

Background: Parkinson's disease (PD) is the second most common neurodegenerative disorder in Australia and the economic burden is more than \$8.3 billion a year and predicted to escalate. However, little is known of the trends and characteristics of people with Parkinson's disease presenting to emergency departments (ED).

Method: The study design was a 12 month retrospective medical record audit. The study was conducted in one metropolitan 300 bed district hospital in an outer suburb of Sydney.

Results: One hundred and twenty nine adult patients (0.4%) with PD presented with a mean age of 79.5 years (SD 7.7); all were over 60 years of age. Of the 129 PD patient cases, there were 260 separate ED episodes of care with the majority (n = 151; 58.1%) of patients living in the community and presenting with falls (n = 108; 41.5%). There was no statistical difference in triage code allocation when comparing PD patients and ED adult patients (over 60years). There was no difference in representation rate when comparing those over 80years (n = 128) with those under 80 years (n = 132). The average length of stay for PD patient episodes was 323 min (SD 225) compared with 193 min (SD 136) for ED patients. Younger adult patient episodes (n = 132; 51.0%) were admitted to hospital more frequently than those aged over 80 years (Pearson's X² test 162.2; df 1; p < 0.001).

Conclusion: We identified in this study that people with PD have a high rate of falls, longer length of stay, high admission rate and represent frequently to the ED. Improved detection, management and a multidisciplinary approach for people with PD along with strict medication regime adherence is likely to improve safety, quality of life, reduce symptom aggravation and ongoing risk of falls.

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Introduction

The national economic burden of Parkinson's disease (PD) in the United States of America (USA) is estimated to exceed US\$14.4 billion in 2010 [1]. A global estimate of the number of people with Parkinson's disease (PD) over the age of 50 years is between 4.1 and 4.6 million [2]. In those 80 years and older PD has a prevalence of 2% [3]. By 2030, this number is expected to double to between 8.7 and 9.3 million people. In Australia 30 people are diagnosed each day with PD [4]. To date the number of Australians with PD is estimated at 80,000 and similarly is predicted to treble to 240,000 by 2033 [5].

PD is the second most common neurodegenerative disorder after Alzheimer's disease. The risk of developing PD increases

with age³ and is characterised by a progressive degeneration of pigmented neurons in the substantia nigra in the mid brain [6]. This causes a deficiency in dopamine, which is responsible for controlled and smooth muscle movement. It is a complex condition with diverse clinical features, neuropsychiatric symptoms and non-motor manifestations, which include autonomic dysfunction, gastrointestinal dysfunction and pain [7]. The cardinal motor features of Parkinson's include, resting tremor, bradykinesia, rigidity and postural instability with the latter occurring later in the disease. A PD diagnosis is made when two of the three cardinal signs, bradykinesia, rigidity and tremor, are evident. The goal of PD treatment is to minimise symptoms and manage medicines side effects.

As a result, for patients who attend specialty clinics where their Parkinson's is managed by a specialist physician or nurse, the key focus is to, maintain independence, maximise medicine compliance and treat medication side effects [8,9]. However, the Emergency Department (ED) presentation is frequently managed by a non-specialist in PD, which may potentially result in suboptimal care

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as their condition can go undetected and unmanaged [6,9,10]. Evidence [9,11,12] suggests that a lack of specialist knowledge and adherence to PD medication regimes can result in worsening clinical outcomes, such as motor symptoms, prolonged recovery, falls, and morbidity. The delay in establishing the patients home medication regime and administering their medications on time places the PD patient at higher risk of adverse events. These adverse events can lead to increased hospital length of stay, representations rates and augmented costs [9,11,13–15].

Over 7.2 million attendances are managed by Australian EDs every year [16]. However, people with PD are a unique older person diagnostic group that present to EDs globally and are dependent on the clinician's assessment and recognition of the complexity of disease management. People with PD who present to the ED will usually have multiple co-morbidities [15] and so prompt identification, and timely and appropriate delivery of care is critical if optimal symptom control is to be achieved.

To date little is known or understood of the Australian ED trends and characteristics of people with PD. Therefore, the aim of this study was to describe the trends and characteristics of older people (60 years and over) with PD presenting to ED.

Methods

The study design was a 12 month retrospective medical record audit.

Site

The study was conducted in one metropolitan 300 bed district hospital in an outer suburb of Sydney, Australia, and the ED is a 22 bed referral centre.

Sample

A purposive sample of people with PD was enrolled in the study. Inclusion criteria required a diagnosis of PD (diagnosis determined by a neurologist and/or geriatrician) identified in the electronic medical record; 60 years of age or older; and living either in the community or in an aged care facility.

Medical record audit

A retrospective medical record audit was conducted between January 1st 2014 to December 31st 2014 of people with PD. Patients were identified using the emergency department computer software program (FirstNet™). FirstNet is an electronic medical record information system that is a repository for all ED patient clinical encounters. At the study site, the ED has embedded a PD icon in Firstnet. Clinicians activate the PD icon for all relevant presentations. Data collected includes patient demographics (age, gender) and ED clinical information (presenting information, time and mode of arrival to the ED, triage code, doctor seen by time, treating doctor, discharge diagnosis and disposition). The ED database was then temporarily cross matched with the Aged Care Services in Emergency Team database. To maximise identification of PD patients the ED data set was cross matched to the ASET database which comprises all PD patients assessed within the ED model.

The New South Wales Ministry of Health initiated a new model of care—Aged Care Services in Emergency Team (ASET) that specialises in the early assessment and treatment of older persons with complex care needs presenting to ED. The ED model of care is supported by aged care medical and nursing specialists who routinely review all patients over 70 years of age or any patient that has a complex aged care need. As part of the ASET model

a service database was established that captured: patient clinical characteristics (age, gender) and clinical information (presenting ED information, time of arrival to the ED, discharge diagnosis and disposition).

Data analysis

Quantitative data were analysed using IBM SPSS v21™. Descriptive statistics (frequency and percentages) were used to summarise the study. Presenting ED diagnoses were grouped into categories. Categories were identified and grouped according to the ED symptom code in Firstnet based on SNOWMED [17]. Descriptive statistics were used to summarise and describe the characteristics of the sample (e.g. age, gender, time of arrival to the ED, triage code, seen by time, diagnosis and disposition from the ED). For normally distributed data, mean and standard deviations are presented. Age was considered a categorical variable. Comparison of groups was done using the Pearson Chi-squared test (gender age and triage category). For the study, statistical significance was set at $p < 0.05$.

Ethics approval

Ethical approval to undertake the study was obtained from the Human Research Ethics Committee of the Local Health District (HREC/LNR/15/HAWKE/252). Access to data was approved to analyse patient medical records and the researchers operated in accordance with the Australian National Health and Medical Research Council guidelines [18]. The ethical conduct of research was maintained during and after the research and data sources were stored in password protected files. To maintain confidentiality and privacy, patients were de-identified and re-coded on data collection. The study was conducted in accordance with the approved protocol and is reported using STROBE guidelines [19].

Results

In 2014, this ED had 37341 patient presentations which consisted of 11122 (29.7%) paediatric and 26219 (70.2%) adult patients. Of the adult population 10490 (28.1%) patients were over the age of 60 years. Patient demographics are described in Table 1. Of the 129 PD patient cases there were 260 separate ED episodes of care with the majority arriving by ambulance. The 260 episodes of care comprised 139 males (53.5%) and 121 females (46.5%). There was a statistical difference with more male presentations (Pearson's X^2 test 4.40; df 1; $p < 0.05$).

The mean time to be seen by ED staff for PD patients was 23 min (SD 26). For those patients arriving between business hours (800 and 1700 h), the mean time to be examined was 20 min (SD 21) compared to after hours, which was 30 min (SD 32). Most PD patients visited the ED on a weekday ($n = 192$; 73.9%). For the episodes of care most were classified as non-urgent and allocated a triage category 4 ($n = 163$, 62.8%) or 5 ($n = 20$; 7.7%) (Table 1). There was no statistical difference in triage code allocation when comparing PD patients and ED adult patients (60 years and over) (Pearson's X^2 test 3.938 df 1 $p < 0.05$).

The most common ED Triage symptom presentation was falls ($n = 118$; 45.4%) (Table 2). Of the 260 episodes of ED care there was no difference in representation rate when comparing age groups, younger than 79 years with those 80 years and over. For all episodes of care there were more presentations originating from the community ($n = 152$; 58.5%) than aged care facilities ($n = 108$; 41.5%) for either age group (Table 2).

There was wide variation in length of stay when comparing aged care facilities and community dwelling residents. Patients from an aged care facility had a longer arrival to discharge time on weekends

Table 1
Characteristics of PD Patients (N = 129).

	N (%)		
Gender			
Male	69	(53.5%)	
Female	60	(47.5%)	
Total	129		
Age (Mean ± 1SD)	79.5 (7.7)		
Number of re-presentation (n = 260)			
Male	139		
Female	121		
Single patient presentation	58		
Two patient presentations	38		
Three patient presentations	20		
Four patient presentations	7		
Five patient presentations	4		
Seven patient presentations	1		
Eleven patient presentations	1		
Mode of arrival for re-presentations			
Ambulance	217	(83.5%)	
Private car	40	(15.4%)	
Walking	3	(1.1%)	
Triage category for re-presentations			
Triage category 1	2	(0.8%)	
Triage category 2	19	(7.3%)	
Triage category 3	56	(21.5%)	
Triage category 4	163	(62.8%)	
Triage category 5	20	(7.7%)	
Triage to "seen by" (minutes)	Mean	SD	N
800am–500pm (mean SD)	20	21	148
Out of hours (mean SD)	30	32	112
mean	23	26	260
Average length of stay (min)	Mean	SD	N
PD patients	323	225	260
All ED Patients	193	136	
Arrival by day			
Weekday	192	(73.9%)	
Weekend	68	(26.1%)	
Monday	36	(13.8%)	
Tuesday	44	(16.9%)	
Wednesday	49	(18.8%)	
Thursday	28	(10.6%)	
Friday	35	(13.5%)	
Saturday	36	(13.8%)	
Sunday	32	(12.3%)	
Arrival time of day			
8:00–500pm	148	(56.9%)	
Out of hours	112	(43.1%)	
Average length of stay (min)	Mean	SD	
PD patients	323	225	
All ED Patients	193	136	
Disposition			
Admitted	162	(62.3%)	
Discharged home	97	(37.3%)	
Left at own risk	1	(0.4%)	

Table 2
Presenting triage symptoms for ED Visit.

	Community	Aged care Facility	Total
Presenting symptom			
Falls	68 (26.1%)	50 (19.2%)	118 (45.4%)
Pain	24 (9.2%)	9 (3.4%)	33 (12.7%)
Infection	15 (5.7%)	14 (5.3%)	29 (11.2%)
Review	7 (2.6%)	9 (3.4%)	16 (6.2%)
Mental health disorder	10 (3.8%)	4 (1.5%)	14 (5.4%)
Neurology	7 (2.6%)	5 (1.9%)	12 (4.6%)
Respiratory disorder	4 (1.5%)	7 (2.6%)	11(4.2%)
Others	3 (1.1%)	7 (2.6%)	10 (3.8%)
Adverse drug events	6 (2.3%)	2 (0.7%)	8 (3.1%)
Gastroenterology	5 (1.9%)	1(0.3%)	6 (2.3%)
Cardiac	3 (1.1%)	0 (0.0%)	3 (1.2%)
Total	152	108	260

between 5pm and 8am (620 min) compared with patients from the community (359 min) for the same period.

The average length of stay for PD patient episodes was 323 min (SD 225) compared with 193 min (SD 136) for ED adult patients (60 years and over). The majority of episodes required the patient to be admitted (n = 162; 62.0%).

Adult patients younger than 80 years (n = 132; 51.0%) were admitted to hospital more frequently than those aged over 80 years (Pearson's X^2 test 162.2; df 1; p = 0.001). There were 98 (38.0%) episodes for which the patient was discharge home or back to an aged care facility. When comparing disposition for those aged over 80 years the majority were discharged (n = 98; 37.7%) back to community (n = 48; 49.0%) or an aged care facility (n = 50; 51.0%). For those aged over 80 years they were more likely to be discharged back to an aged care facility (n = 97; 37.3%).

Discussion

This is the first Australian study that has examined the trends and characteristics of people with PD presenting to an Australian ED. This trend data has demonstrated that people with PD have a high falls injury rate, admission rate, longer ED length of stay, and multiple presentations. EDs need to consider their role beyond episodic care as increasingly vulnerable ageing population groups are presenting repeatedly.

This study identified that of the 129 patients, there were 260 presentations over 12 month period and that 33 patients presented more than three times to the ED. This suggests greater preventative strategies need to be considered especially given that the majority of these patients lived in their own home. Further, early involvement of family and carers and stronger links with specialist clinics as well as primary care, may provide for more optimal safety discharge strategies in the ED [20–22].

This study further supports the evidence that people with Parkinson disease frequently present to an ED with injuries as a result of falls [15]. For people with PD episodes of falls are the result of progressive postural instability, autonomic dysfunction, orthostatic hypotension, and mental health changes that may result in the need for management, diagnostic interventions and hospital admission [15]. Falls are associated with significant adverse events, which can include injury, disability or death [23]. One patient in the study was admitted 11 times for falls and regularly suffered minor head injuries. Falls can be a symptom of PD progression and may also relate to confusion, delirium and/or dementia [8]. Interventions need to be developed to reduce both risk and fear of falling to maximise independence, quality of life and reduce ED representations.

ED presentations and hospitalisations related to falls remain a significant issue for patients with PD [22]. The cost implications to the health sector are extensive as once hospitalised, people with PD are at a greater risk for hospital morbidity and mortality [1,2,14]. The Australian Commission on Safety and Quality in Health Care has developed a National Safety and Quality Health Service Standards [24]. This document, for use in hospitals, residential aged and community care, presents ten Service Standards of which Standard Ten relates to 'Preventing Falls and Harm from Falls'. These guidelines are evidence based and a valuable resource that can be used by ED clinicians when assessing the needs of people with PD [24]. However, the standards do not recommend the use of a national screening tool to assess severity or falls risk for patients. Further research is needed to determine and implement the most appropriate falls screening tool as this may assist with determining appropriate interventions and/or reducing ED representations.

A range of intervention fall strategies have been outlined in a recent systematic review [23] for older adults. For example, a reduc-

tion in falls was identified in older persons who received Vitamin D supplementation, visual acuity assessments and exercise and muscle strengthening encouragement. A comprehensive ED assessment that includes these elements may improve detection and therefore ameliorate the risk of falls in this group. Further, there is evidence that lack of falls awareness and appropriate patient/carer knowledge, competing risks, and patient compliance can also influence fall rates [23]. As a result a range of fall intervention strategies may be needed in EDs to better target these dimensions.

Routine screening procedures for cognitive impairment, in the ED, may assist in the early recognition of deterioration in PD patients [3,25]. Australian EDs manage 1.4 million people aged 60 years and over every year [26]. Of those 60 years and over approximately 26% will have a cognitive impairment [26,27]. In this population, poor medication adherence can give rise to confusion, delirium and agitation, and result in family/carer distress.

The findings of this study highlighted that many people with PD live in the community. To ensure people with PD remain in their own homes independently and safely, ED discharge practices need to be reviewed. However, ED discharge interventions may need to vary depending on disease progression. There is evidence to suggest that a more comprehensive and multidisciplinary approach can lead to safer ED discharge [28–30]. Further, the early involvement of pharmacists and allied health professionals in conjunction with the treating team and nursing staff can facilitate a more personalised care plan [31]. Investigation is needed into other quality of life dimensions, such as those provided by allied health, which may assist to reduce admission and representation rates in this group. To this end, the development of a clinical pathway may assist to improve care and discharge consistency and strengthen multidisciplinary input into the management of PD patients in the ED.

While PD patients are in the ED their reliance on their medication regime to minimise symptoms remains the same as for those in the community. However, EDs traditionally may not stock the required medicines for PD. As a result, subsequent medication delay may be experienced by people with PD, which can jeopardise finely tuned symptom control. The result of non-adherence to medication regimes in the ED can further potentiate risk of falls, which can impact on hospital costs, length of stay and adverse event rates. Therefore, these time critical medicines need to be readily available to ensure prompt and appropriate administration. ED processes need to be implemented to ensure ready access to PD medicines twenty-four hours per day for this vulnerable group.

Mental Health conditions are common in people with PD (30–40%) [4,32]. While there were a small number of patients within the study with mental health conditions, there was no evidence of referral to mental health services. However, within the literature there is mounting evidence that PD patients will often experience depression and anxiety [8,32]. Further consideration needs to be given to appropriate screening and/or referral to mental health services during ED stay or discharge. Therefore, clinicians need to screen for these conditions to ensure independence, quality of life and minimal impact on physical symptoms [4].

This study supports the evidence that people with PD generally have a longer hospital length of stay compared to other patient groups [11,33]. However, with disease progression there is also an increased incidence in cognitive and psychiatric impairment. Consequently, people with PD and dementia are usually hospitalised twice as long compared to non-dementia PD patients [32]. For PD patients with dementia, particular caution and frequent reassessment by a multidisciplinary team is needed to minimise hospital stay and enhance quality of life. With the global prediction of an increase in PD prevalence the longer length of stay in this patient group may pose a future challenge in ED.

To improve the care of older persons presenting to the ED the New South Wales (NSW) Ministry of Health implemented specialised Aged Care Service teams [34] and is known as Aged Care Services in Emergency Team (ASET) [35]. However, like many new health care models that are widely introduced they often have limited funding, which reduces service cover. Not all ASET teams work seven days a week and some are limited to business hours only. As a result delays may be experienced on weekends and after hours. However in this study site the service covers fourteen hours a day seven days a week. New models of care need to profile the targeted service to better match resources to workload demands.

Given the prevalence and expected increase of PD globally, ED education and orientation programs need to include knowledge and care practices specific to the PD patient [11]. Further, evidence based clinical guidelines will assist in the early detection and management of PD presentations [36,37]. Greater collaborative care with allied health, such as pharmacists, to assist with improving medication adherence regimes will avert potential adverse events. When considering ED pharmacy medicine stock, as for other patient conditions, the availability of PD medicines in the ED would ensure timely administration of medications. When a PD presentation is recognised early documentation of medicines regimes and referral to allied health may reduce adverse outcomes and improve emergency care [3,38].

Further research is needed to explore the specific management of people with PD in ED and during hospitalization. There is also a need to explore the quality of care and what is optimal care in the ED. To better support ED discharge processes and safety, different PD models of care based within the community need to be tested [21]. Early warning systems, triggers, need to be developed in ED, to alert services to the presentation of a person with PD. In addition, educational input from specialists in PD need to be incorporated into the ED and inpatient ward education programs to improve management and discharge processes to prevent unnecessary representations and harm.

Limitations

There are a number of key aspects that should be kept in mind when giving consideration to the results of this study. While significant resources were in place to identify people with PD there may be cases which have been missed due to workload and ASET team availability. Further, ED patients that did not wait for treatment or left at own risk may have included PD cases. Patients may have presented to the ED with undetected and or undiagnosed PD and as a result may have been missed. Further communication barriers with patients or aged care facilities may have led to cases being missed in the database. The trends and incidence rate found in the study may not be representative of larger tertiary referral EDs.

Conclusion

This study has identified that people with PD have a high fall rate, longer length of stay, high admission rate and frequently represent to ED. Better detection and management of people with PD on arriving to the ED, along with medication regime adherence, is likely to reduce symptom aggravation and ongoing falls risk.

There is evidence to suggest that early multidisciplinary referral and discharge screening for this vulnerable patient group may improve quality of life and safety by reducing serious injuries from falls. Further, clinical practice guidelines may assist to strengthen multidisciplinary engagement, consistency and improve the quality of ED care for people with PD.

Conflict of interest

Author Margaret Fry is a Deputy Editor of the Australasian Emergency Nursing Journal but had no role in the peer review or editorial decision-making of this manuscript whatsoever.

Provenance

MH and MF conceived the study, design the trial and obtained the research funding. MH and MF oversaw the participating site and managed the quality of data collection. MF provided statistical advice on the study design, sample and analysis of the data. MH and MF were involved in the drafting of this manuscript. MF takes responsibility for the paper as a whole.

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