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Coding accuracy for Parkinson's disease hospital admissions: implications for healthcare planning in the UK



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ABSTRACT

Objectives: Hospital Episode Statistics data are used for healthcare planning and hospital reimbursements. Reliability of these data is dependent on the accuracy of individual hospitals reporting Secondary Uses Service (SUS) which includes hospitalisation. The number and coding accuracy for Parkinson's disease hospital admissions at a tertiary centre in Birmingham was assessed.

Study design: Retrospective, routine-data-based study.

Methods: A retrospective electronic database search for all Parkinson's disease patients admitted to the tertiary hospital over a 4-year period (2009–2013) was performed on the SUS database using International Classification of Disease codes, and on the local inpatient electronic prescription database, Prescription and Information Communications System, using medication prescriptions. Capture-recapture methods were used to estimate the number of patients and admissions missed by both databases.

Results: From the two databases, between July 2009 and June 2013, 1068 patients with Parkinson's disease accounted for 1999 admissions. During these admissions, the Parkinson's disease was coded as a primary or secondary diagnosis. Ninety-one percent of these admissions were recorded on the SUS database. Capture-recapture methods estimated that the number of Parkinson's disease patients admitted during this period was 1127 patients (95% confidence interval: 1107–1146). A supplementary search of both SUS and Prescription and Information Communications System was undertaken using the hospital numbers of these 1068 patients. This identified another 479 admissions. SUS database under-estimated Parkinson's disease admissions by 27% during the study period.

Conclusion: The accuracy of disease coding is critical for healthcare policy planning and must be improved. If the under-reporting of Parkinson's disease admissions on the SUS

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database is repeated nationally, expenditure on Parkinson's disease admissions in England is under-estimated by approximately £61 million per year.

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Introduction

Parkinson's disease is characterized by a progressive motor syndrome, along with non-motor features such as dementia, anxiety, depression and autonomic dysfunction. These symptoms reduce patient quality of life and lead to increased use of healthcare resources.¹ Individuals with the disease have higher hospitalization rates and longer hospital stays than their age-matched counterparts.² The resulting economic burden from Parkinson's disease hospitalization is substantial.³ Low et al., recently evaluated the cost of Parkinson's disease hospitalization using the Hospital Episodes Statistics in England and reported a total National Health Service (NHS) expenditure of £907 million over a four-year period.³ It is crucial that metrics relating to hospital episodes are accurate, since these data are used for hospital reimbursements and healthcare planning.⁴ Chronic conditions are often under-reported during hospital admissions where the condition may not be the primary cause of admission.⁵

In this study, we estimated the number of Parkinson's disease admissions to a large Birmingham hospital and assessed the coding accuracy of the admissions.

Methods

This service evaluation was approved and registered with the University Hospital Birmingham (UHB) audit department. The hospital is a large tertiary centre in the United Kingdom's second largest city with a capacity of 1213 inpatient beds.⁶ Data extraction was performed by the hospital informatics department.

The Secondary Uses Service (SUS) is a database where all data pertaining to health resource use in NHS trusts in England are stored.⁴ We searched SUS for Parkinson's disease admissions during the period 1st July 2009 to 30th June 2013. Admissions where Parkinson's disease was recorded as a primary or secondary diagnosis were identified from this database using the International Classification of Diseases 10 (ICD-10) codes G20 and F02.3 for Parkinson's disease and Parkinson's disease dementia, respectively. The UHB electronic inpatient Prescribing Information and Communications System (PICS) database stores information on medications prescribed during hospital admissions. We searched PICS database for all admissions where Parkinson's disease medications (Table 1) were prescribed during the study period.

We performed a number of quality assurance checks on the data. First, since Parkinson's disease is less prevalent in younger age groups,⁷ we reviewed all patient records for admissions identified from our search of SUS and PICS where the

patient age was under 40 years and excluded those who had diagnoses other than Parkinson's disease. Second, since dopaminergic drugs used for treating Parkinson's disease are also used in other conditions such as restless legs syndrome and dopa-responsive dystonia, we examined all patient case notes for admissions identified from the PICS database where Parkinson's disease medications were prescribed and excluded those with other diagnoses.

For all the admissions identified from the SUS database using the ICD-10 codes, G20 and F02.3, and admissions from the PICS database based on Parkinson's disease medication, patient hospital numbers were obtained. A further (supplementary) search of the two databases was then undertaken using these hospital numbers to identify additional hospital admissions missed by the SUS and PICS criteria, but still occurring in the evaluation period.

We applied capture-recapture methods⁸ to estimate the number of Parkinson's disease patients who were missed by searching both SUS and PICS databases. Capture-recapture is a recognized method for estimating population sizes or completeness of data sources and assumes that the available sources are independent and do not identify the entire population being studied.^{8,9} The original use of this method was in estimating the size of animal populations.^{9,10} The method

Table 1 – Parkinson's disease medication used for the PICS database search for admissions.

a. Levodopa
Madopar – Levodopa/Co-Beneldopa, Madopar CR
Sinemet – levodopa/Co-Careldopa, Sinemet CR
Duodopa
b. Dopamine agonists
Bromocriptine (Parlodel)
Cabergoline (Cabaser)
Quinagolide (Norprolac)
Pergolide (Celance)
Ropinirole (Requip or Adartrel)
Pramipexole (Mirapexin)
Rotigotine (NeuPro)
Apomorphine (Britaject Pen, Apo-go Pen or Apo-go PFS; intermittent – injection)
Apomorphine (Apo-go pump; continuous infusion)
c. Monoamine oxidase B inhibitors
Selegiline (Eldepryl – oral, Zelapar – sub-lingual)
Rasagiline (Azilect)
d. Catechol-O-Methyltransferase inhibitors
Tolcapone (Tasmar)
Entacapone (Comtess)
Stalevo

Abbreviation: PICS, Prescription and Information Communications System; CR, controlled release.

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