Patients Treated with Pimavanserin or Quetiapine for Parkinson's Disease Psychosis: Analysis of Health Resource Utilization Patterns Among Medicare Beneficiaries

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BACKGROUND

- Approximately 25%-40% of patients with Parkinson's disease (PD) may develop PD psychosis (PDP), commonly characterized by symptoms of hallucinations and delusions [1-3].
- The care associated with psychotic symptoms in PDP patients impose a significant healthcare utilization and cost burden as well as adding a tremendous burden to caregivers and family members [4].

OBJECTIVE

- To examine differences in health care resource utilization (HCRU) patterns among Medicare beneficiaries in the United States with PDP treated with pimavanserin (PIM) or quetiapine (QUE).

METHODS

Study Design and Data Source

- A retrospective database cohort analysis of treatment naïve patients with PDP were identified based on medical claims for a PD diagnosis (ICD-9: 332.0, ICD-10: G20) plus ≥1 concurrent psychosis related diagnostic claims for: psychotic disorder with hallucination/delusions, psychosis, delusion disorder, visual disturbances, hallucinations. The study was conducted using data from 100% sample of CMS Medicare fee-for-service (FFS) beneficiaries.

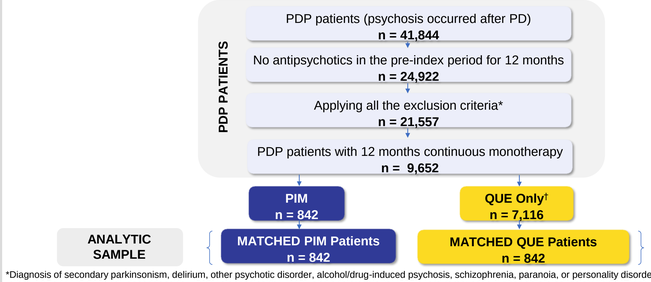
Study Population and Cohorts

- Patients with PDP who were started on PIM or QUE monotherapy (index date) for ≥12 months continuously (post-index) between 01/01/14-12/31/18 formed the study sample.
- Patients newly initiating (no antipsychotic prescription for 12 months prior PDP date) PIM or QUE were 1:1 propensity score matched on 31 variables (age, sex, race, region, and 27 Elixhauser comorbidities) for inclusion in the analysis. Baseline variables were identified for 12 months prior PDP date (pre-index).

Exclusion Criteria

- Patients with a pre-index diagnosis of secondary parkinsonism, delirium, other psychotic disorders, alcohol/drug-induced psychosis, schizophrenia, paranoia, or personality disorders were excluded from the analysis.

Figure 1. Patient Disposition Flow Chart



*Diagnosis of secondary parkinsonism, delirium, other psychotic disorder, alcohol/drug-induced psychosis, schizophrenia, paranoia, or personality disorders; †Patients treated with other-AAPs (n = 8,810) i.e., risperidone (n = 913), olanzapine (n = 446), and aripiprazole (n =335) were removed to further obtain patients with QUE only (n=7,116).

PD, Parkinson's Disease; PDP, Parkinson's Disease Psychosis; PIM, pimavanserin

Study Measures and Outcomes

- **Baseline Demographics (12 months pre-index)**: Age, sex, race, geographic region, and comorbidities
- **Outcomes (12 months post-index):** All-cause and psychiatric-related inpatient hospitalization, ER visits, outpatient hospitalizations and health care provider office encounters (office visits).
- Inpatient hospitalizations are further categorized into three types of admissions based on provider type/facility characteristics (i.e., facilities characterized by allowable length of stay): 1) short-term stay (ST-stay); 2) long-term care stay (LTC-stay); 3) skilled nursing facility stay (SNF-stay).

METHODS

Statistical Methods

- Descriptive statistics: Frequencies and percentages for categorical variables; mean, median, and range for continuous variables. Additionally, chi-square tests (categorical measures), t-tests, and Wilcoxon-rank Sum tests (continuous measures) were used to describe differences for matched cohorts.
- Adjusted rates for all-cause and psychiatric-related inpatient and outpatient hospitalizations, ER visits, and office visits, between PIM and QUE cohorts were analysed using generalized linear models while controlling for patient demographic, clinical characteristics, and comorbidities including baseline dementia and insomnia. Relative risk (RR) and 95% confidence intervals (95% CI) are reported. Covariate balance were assessed using standardized mean differences (SMDs) value of <0.1 between PIM vs. QUE.

RESULTS

- Of the 9,652 patients who initiated continuous monotherapy for ≥ 12 months, 7,958 eligible patients with PDP met our study inclusion and exclusion criteria. Of these, 842 patients were newly treated with PIM and 7,116 newly treated with QUE were included further analysis. After 1:1 propensity score matching, there were 842 PIM patients matched to 842 QUE patients (Figure 1).
- The average age of our matched study sample was 77.4 years for both PIM and QUE (Table 1).

Table 1. Patient Demographics, PIM vs. QUE (Matched to PIM) Cohort

Characteristics	PIM (n = 842)	QUE (n = 842)	SMD
Age (in years)			
Mean (SD)	77.4 (7.2)	77.4 (7.1)	0.005
Median (IQR)	77 (73, 82)	77 (73, 82)	
Minimum, Maximum	53, 98	53, 96	
Female, n (%)	396 (47.03%)	371 (44.06%)	0.060
Select Comorbid Conditions, n (%)			
Insomnia	246 (29.21%)	296 (35.15%)	-
Dementia	600 (71.26%)	715 (84.92%)	-

PIM, pimavanserin; QUE, quetiapine; SD, standard deviation; IQR, interquartile range; SMD, standardized mean difference; -, not applicable

Table 2. Baseline Comorbidities in Post Matched Cohorts

	PIM (n = 842)	QUE (n = 842)	SMD
Comorbidities n (%)			
Cardiac Arrhythmia	114 (13.54%)	136 (16.15%)	0.074
Chronic Pulmonary Disease	53 (6.29%)	47 (5.58%)	0.030
Coagulopathy	27 (3.21%)	24 (2.85%)	0.021
Congestive Heart Failure	59 (7.01%)	69 (8.19%)	0.045
Deficiency Anemia	42 (4.99%)	53 (6.29%)	0.057
Depression	187 (22.21%)	196 (23.28%)	0.026
Diabetes Complicated	71 (8.43%)	53 (6.29%)	0.082
Diabetes Uncomplicated	108 (12.83%)	128 (15.20%)	0.068
Fluid and Electrolyte Disorders	102 (12.11%)	105 (12.47%)	0.011
Hypertension Complicated	70 (8.31%)	58 (6.89%)	0.054
Hypertension Uncomplicated	350 (41.57%)	355 (42.16%)	0.012
Hypothyroidism	102 (12.11%)	113 (13.42%)	0.039
Obesity	26 (3.09%)	37 (4.39%)	0.069
Other Neurological Disorders	534 (63.42%)	531 (63.06%)	0.007
Peripheral Vascular Disease	116 (13.78%)	108 (12.83%)	0.028
Pulmonary Circulation Disorder	17 (2.02%)	15 (1.78%)	0.017
Renal Failure	68 (8.08%)	60 (7.13%)	0.036
Rheumatoid Arthritis	16 (1.90%)	15 (1.78%)	0.009
Solid Tumors without Metastasis	37 (4.39%)	38 (4.51%)	0.006
Valvular Disease	50 (5.94%)	61 (7.24%)	0.053
Weight Loss	41 (4.87%)	59 (7.01%)	0.091

PIM, pimavanserin; QUE, quetiapine; SMD, standardized mean difference

RESULTS

- Patient characteristics for PIM vs QUE cohort before and after matching are described in Table 2. Cohorts were unbalanced before the propensity score matching, however, were balanced after matching.
- In the matched sample, patients on PIM relative to QUE displayed significantly lower relative risk (Figure 2a) for all-cause inpatient hospitalizations [RR = 0.78 (95 CI%: 0.70-0.87)], all-cause short-term stays [RR = 0.75 (95% CI: 0.66-0.84)], all-cause SNF stays [RR = 0.64 (95% CI: 0.54-0.76)], and all-cause ER visits [RR = 0.91 (95% CI: 0.84-0.97)].

Figure 2. Relative Risk of all-cause and psychiatric HCRU, among matched PIM vs. QUE

Figure 2a. ≥ 1 All-Cause HCRU among PIM vs. QUE

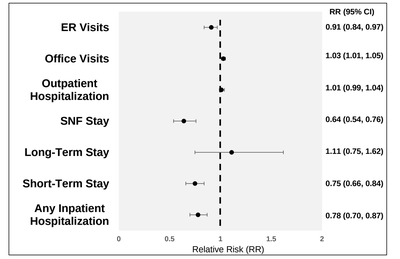
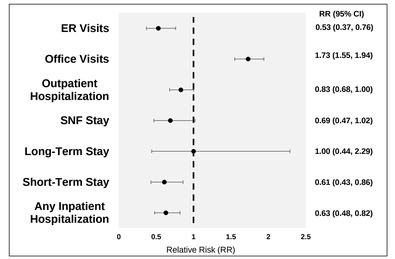


Figure 2b. ≥ 1 Psychiatric HCRU among PIM vs. QUE



HCRU, healthcare resource utilization; PIM, Pimavanserin; QUE, Quetiapine; SNF, skilled nursing facility; ER, emergency room; RR, relative risk

- Patients with PIM had significantly lower rates (Figure 2b) of psychiatric-related inpatient hospitalizations [RR = 0.63 (95% CI: 0.48-0.82)], psychiatric-related short-term stays [RR = 0.61 (95% CI: 0.43-0.86)], and psychiatric-related ER visits [RR = 0.53 (95% CI: 0.37-0.76)].
- Rates of all-cause and psychiatric-related office visits, however, were significantly higher in the PIM group compared to QUE, [RR = 1.03 (95% CI: 1.01-1.05)] and [RR = 1.73 (95% CI: 1.55-1.94)], respectively.

LIMITATIONS

- As with any administrative claims data analysis, this study may contain coding errors, missed claims, and potential biases introduced by data omissions.
- Identification of psychosis was based on a diagnosis of psychosis-related hallucinations and delusions – currently, there is no diagnostic code for PDP, thus, it is likely that PDP diagnosis may be underestimated.
- Potential for residual confounding may exist despite matching and covariate adjustment in modeling.

CONCLUSIONS

- In this real-world analysis, patients newly treated with PIM were nearly 22% and 37% less likely to have all-cause and psychiatric-related inpatient hospitalizations versus QUE.
- There was significantly higher incidence of outpatient office visits among PIM treated patients compared to QUE patients. PIM patients were 9% and 47% less likely to have all-cause and psychiatric related ER visits compared to QUE, respectively.

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