Real-World Adherence, Healthcare Resource Utilization, and Costs Among Patients With Schizophrenia Utilizing Once-Monthly, Once-Every-Three-Months, and Once-Every-Six-Months Paliperidone Palmitate in the United States

Charmi Patel[1], Dominic Pilon[2], Laura Morrison[2], Arthur Voegel[3], Lilian Diaz[2], Kana Yokoji[2], Carmela Benson[1]

[1]Johnson & Johnson, Titusville, NJ, USA; [2]Analysis Group, Inc., Montréal, QC, Canada; [3]Analysis Group, Inc., New York, NY, USA

Background

- Schizophrenia is a chronic and severe mental illness which affects 0.25-1.15% of the adults in the United States (US)[1-3]
- Adherence to antipsychotic (AP) treatment in schizophrenia is important for long-term disease control and reducing the risk of relapse[4]
- Studies show that among patients with schizophrenia, long-acting injectable AP medications can improve clinical outcomes relative to oral APs,[5,6] and early evidence has pointed to an incremental benefit with longer injection intervals[7]
- In August 2021, the US Food and Drug Administration (FDA) approved the once-every-6-months paliperidone palmitate (PP6M) extended-release injectable for patients with schizophrenia who are adequately treated with the once-monthly paliperidone palmitate (PP1M) for ≥4 months or received ≥1 injection cycle of once-every-3-months paliperidone palmitate (PP3M)[8]
- There is limited real-world evidence on the treatment adherence, healthcare resource utilization (HRU) and costs of patients treated with PP6M, and a need to describe outcomes among these patients and those treated with PP1M and PP3M, to inform clinical decision-making

Objective

- To describe treatment adherence to paliperidone palmitate, healthcare resource utilization (HRU), and costs among patients with schizophrenia who were treated with PP1M, PP3M, or PP6M in the US

Methods

Data source

- A retrospective cohort study using Komodo Research Data (KRD) closed insurance claims (01/01/2016-12/31/2023)
- KRD is a comprehensive data source containing closed medical and pharmacy insurance claims data from over 150 Commercial, Medicare, Medicaid, and other payers, representing over 170 million patients
- Data were de-identified and were compliant with the Health Insurance Portability and Accountability Act

Study design and sample selection

- Three cohorts of adult patients with schizophrenia who had ≥4 PP1M claims, ≥1 PP3M claim, or ≥1 PP6M claim (index date defined as the first claim for PP1M, PP3M, or PP6M on or after 08/30/2021 [PP6M date of FDA approval]) were included based on the criteria shown in **Figure 1**
  - Selection criteria for the PP1M and PP3M cohorts were designed to identify patients adequately treated and eligible to initiate PP6M (i.e., ≥4 PP1M claims or ≥1 PP3M claims) following its FDA approval; patients in the PP1M and PP3M cohorts may not have been newly initiated on their index treatment
- Patients were observed until the earliest of end of data availability, continuous insurance eligibility or Medicare/Medicaid eligibility, or death (i.e., follow-up period)

Study outcomes and analyses

- Demographic characteristics were evaluated at the index date and clinical characteristics were evaluated in the 12-month baseline period prior to the index date
- Use of PP1M and PP3M was evaluated over the entire period of continuous insurance eligibility or Medicare/Medicaid eligibility prior to the index date
- Adherence to the index treatment at 6 and 12 months following the index date was evaluated using the proportion of days covered (PDC) ≥80% among patients with ≥6 and ≥12 months of available follow-up, respectively
- Schizophrenia-related HRU was identified based on medical claims with a corresponding schizophrenia diagnosis code and included inpatient (IP) admissions, emergency room (ER) visits, and outpatient (OP) visits during the follow-up period. HRU was descriptively reported per patient per year (PPPY) overall, and in the first 6 months of follow-up, among those with ≥6 months of data availability
- All-cause healthcare costs including medical and pharmacy costs were reported PPPY, inflated to 2023 US dollars; total cost of the first IP stay following the index date was also reported
- Outcomes were described using means and standard deviations for continuous variables and frequencies and proportions for categorical variables

Results

Study sample

- The study included 17,463 patients in the PP1M cohort, 5,348 patients in the PP3M cohort, and 628 patients in the PP6M cohort (**Figure 1**)

Baseline characteristics

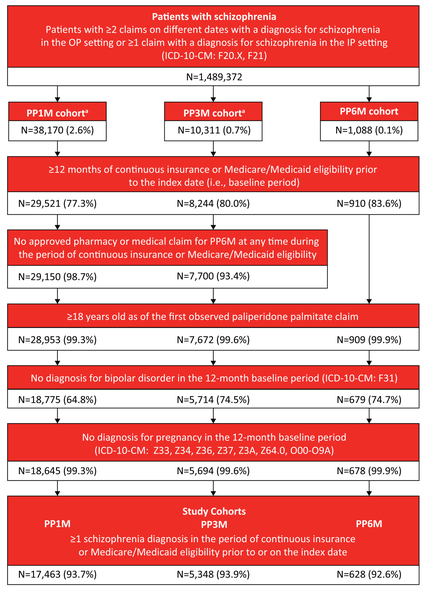
- The mean age was 40.6 years in the PP1M cohort, 41.3 years in the PP3M cohort, and 41.1 years in the PP6M cohort; 24.8-28.2% were female across cohorts (**Table 1**)
- The majority of the sample consisted of Black or African American patients and White patients, and those in sured through Medicaid
- The mean number of baseline mental health diagnoses was highest among patients in the PP1M cohort, followed by the PP3M and PP6M cohorts
- Among the PP6M cohort, 83.3% received PP1M and 71.0% received PP3M any time prior to the initiation of PP6M

Table 1: Baseline demographic and clinical characteristics

Mean ±SD [median] or n (%)	PP1M N=17,463	PP3M N=5,348	PP6M N=628
Length of pre-index observation period (months)	49.0 ± 21.2 [51.1]	51.4 ± 21.3 [55.3]	55.3 ± 23.3 [57.3]
Age at index date (years)	40.6 ± 13.7 [38.0]	41.3 ± 13.1 [39.0]	41.1 ± 12.6 [39.0]
Female	4,926 (28.2)	1,404 (26.3)	156 (24.8)
Race			
Black/African American	5,640 (32.3)	1,684 (31.5)	157 (25.0)
White	5,553 (31.8)	1,761 (32.9)	206 (32.8)
Hispanic	2,822 (16.2)	802 (15.0)	111 (17.7)
Asian/Pacific Islander	874 (5.0)	296 (5.5)	33 (5.3)
Other	1,973 (11.3)	611 (11.4)	90 (14.3)
Unknown	601 (3.4)	194 (3.6)	31 (4.9)
Payer type			
Medicaid	13,436 (76.9)	4,094 (76.6)	470 (74.8)
Medicare Advantage	3,074 (17.6)	967 (18.1)	116 (18.5)
Commercial	754 (4.3)	211 (3.9)	37 (5.9)
Missing	199 (1.1)	76 (1.4)	5 (0.8)
Dual Medicaid/ Medicare coverage	90 (0.5)	28 (0.5)	5 (0.8)
Year of index date			
2021[a]	11,971 (68.6)	3,185 (59.6)	48 (7.6)
2022	4,443 (25.4)	1,466 (27.4)	389 (61.9)
2023[a]	1,049 (6.0)	697 (13.0)	191 (30.4)
Quan-CCI	0.6 ± 1.2 [0.0]	0.5 ± 1.1 [0.0]	0.6 ± 1.2 [0.0]
No. of unique DSM-5 mental health diagnoses	3.0 ± 2.0 [3.0]	2.4 ± 1.8 [2.0]	2.3 ± 1.7 [2.0]
PP1M use prior to index[b]	13,171 (75.4)	4,267 (79.8)	523 (83.3)
Duration of use (months)	27.5 ± 21.0 [22.3]	22.3 ± 20.1 [15.6]	21.9 ± 21.2 [13.5]
PP3M use prior to index[b]	1,378 (7.9)	3,233 (60.5)	446 (71.0)
Duration of use (months)	18.9 ± 17.2 [13.2]	27.6 ± 19.3 [23.0]	27.8 ± 21.5 [21.3]
All-cause healthcare costs (2023 USD)			
Pharmacy and medical	38,241 ± 48,658 [28,463]	38,741 ± 43,569 [30,654]	41,503 ± 39,636 [33,833]
Pharmacy	16,953 ± 17,710 [14,572]	23,175 ± 16,734 [21,935]	26,376 ± 17,366 [24,934]
Medical	21,288 ± 45,364 [8,300]	15,566 ± 39,402 [4,490]	15,126 ± 33,513 [5,094]
IP	11,170 ± 33,444 [0]	6,408 ± 30,835 [0]	5,785 ± 27,559 [0]
ER	2,579 ± 12,875 [261]	1,539 ± 6,882 [0]	1,662 ± 4,904 [0]
OP	7,343 ± 26,428 [2,464]	7,405 ± 22,654 [2,359]	7,422 ± 19,132 [2,699]
Other	196 ± 1,483 [0]	213 ± 1,026 [0]	257 ± 1,147 [0]

DSM-5, Diagnostic and Statistical Manual of Medical Disorders, 5th Edition; ER, emergency room; IP, inpatient; OP, outpatient; PP1M, once-monthly paliperidone palmitate; PP3M, once-every-3-months paliperidone palmitate; PP6M, once-every-6-months paliperidone palmitate; Quan-CCI, Quan-Charlson comorbidity index; SD, standard deviation; USD, United States dollars.
[a]Incomplete years of data included 2021 and 2023, given that PP6M was approved by the Food and Drug Administration on 08/30/2021, and the end of complete data was 06/30/2023, with early view data until 12/31/2023.
[b]Duration of use was defined as the time from the date of initiation of the agent until the last day of supply.

Figure 1: Sample selection

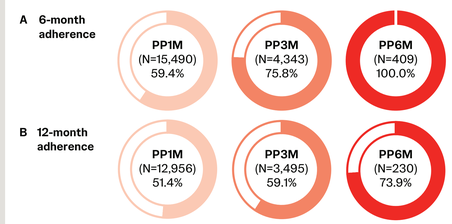


ICD-10-CM, International Classification of Diseases, 10th Revision, Clinical Modification; IP, inpatient; OP, outpatient; PP1M, once-monthly paliperidone palmitate; PP3M, once-every-3-months paliperidone palmitate; PP6M, once-every-6-months paliperidone palmitate; US, United States.
[a]To ensure patients would have been adequately treated with PP1M or PP3M and therefore eligible to initiate PP6M per the US Food and Drug Administration label, ≥4 claims of PP1M or ≥1 claim of PP3M were required.

Adherence to the index treatment

- At 6 months following the index date, among those with available data, 59.4% of the PP1M cohort, 75.8% of the PP3M cohort, and by design, 100% of the PP6M cohort were adherent to their index treatment (**Figure 2**)
- Trends in adherence were consistent at 12 months

Figure 2: Adherence to the index treatment



PP1M, once-monthly paliperidone palmitate; PP3M, once-every-3-months paliperidone palmitate; PP6M, once-every-6-months paliperidone palmitate.

Healthcare resource utilization

- The mean follow-up period was 16.0 months in the PP1M cohort, 14.2 months in the PP3M cohort, and 9.4 months in the PP6M cohort (**Table 2**)
- Mean number of follow-up schizophrenia-related IP days and OP visits were descriptively lower with decreasing paliperidone palmitate dosing frequency (**Figure 3**)
  - More specifically, at 3 months following the index date among those with available data, 5.1% of the PP1M cohort, 2.1% of the PP3M cohort, and 1.8% of the PP6M cohort had a schizophrenia-related IP admission

Healthcare costs

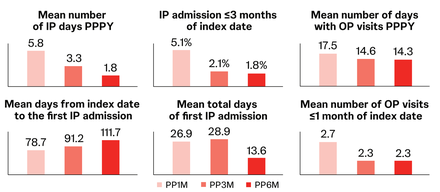
- During the follow-up period, mean all-cause medical costs PPPY were descriptively decreasing with less frequent administration frequency. Specifically, they were $22,116 in the PP1M cohort, $16,030 in the PP3M cohort, and $14,217 in the PP6M cohort (**Figure 4**)
- Mean total all-cause costs PPPY were $49,221, $45,143, and $53,247 in the PP1M, PP3M, and PP6M cohorts, respectively
- PP6M demonstrated the lowest medical to total all-cause cost ratio of 26.7% (PP3M: 35.5%; PP1M: 44.9%)

Table 2: Follow-up schizophrenia-related HRU

Mean ±SD [median] or n (%)	PP1M N=17,463	PP3M N=5,348	PP6M N=628
HRU over the entire follow-up period			
Duration of follow-up period (months)	16.0 ± 6.4 [18.5]	14.2 ± 6.9 [16.0]	9.4 ± 5.8 [8.9]
IP admissions			
No. of IP admissions PPPY	0.3 ± 1.1 [0.0]	0.2 ± 1.0 [0.0]	0.2 ± 1.4 [0.0]
No. of IP days PPPY	5.8 ± 26.5 [0.0]	3.3 ± 20.6 [0.0]	1.8 ± 14.0 [0.0]
≥3 months of continuous insurance eligibility or Medicaid/Medicare eligibility following index	**16,848 (96.5)**	**4,800 (9.8)**	**514 (81.8)**
Had an IP admission ≤3 months of index	866 (5.1)	101 (2.1)	9 (1.8)
ER visits			
No. of days with ER visits PPPY	1.2 ± 6.4 [0.0]	0.8 ± 5.4 [0.0]	1.4 ± 9.6 [0.0]
OP visits			
No. of days with OP visits PPPY	17.5 ± 38.9 [6.2]	14.6 ± 37.8 [4.5]	14.3 ± 37.9 [3.6]
HRU within the first 6 months of follow-up			
Patients with ≥6 months of follow-up[a]	**15,490 (88.7)**	**4,343 (81.2)**	**409 (65.1)**
IP admissions			
Had ≥1 IP admission	1,473 (9.5)	223 (5.1)	22 (5.4)
Days from index to first admission	78.7 ± 53.4 [72.0]	91.2 ± 51.0 [92.0]	111.7 ± 53.1 [121.5]
Total length of the first admission, days	26.9 ± 74.9 [9.0]	28.9 ± 81.5 [8.0]	13.6 ± 28.3 [7.5]
ER visits			
Had ≥1 ER visit	2,423 (15.6)	491 (11.3)	56 (13.7)
Days from index to first ER visit	66.0 ± 55.2 [53.0]	71.4 ± 57.4 [63.0]	77.3 ± 59.3 [80.0]
OP visits			
Had ≥1 OP visit	10,451 (67.5)	2,962 (68.2)	275 (67.2)
No. of visits ≤1 month of index	2.7 ± 4.6 [1.0]	2.3 ± 4.3 [1.0]	2.3 ± 3.9 [1.0]
No. of visits ≤3 months of index	7.3 ± 12.8 [4.0]	6.0 ± 12.3 [2.0]	5.7 ± 10.1 [2.0]
No. of visits ≤6 months of index	14.1 ± 24.6 [7.0]	11.6 ± 23.9 [4.0]	10.6 ± 19.3 [5.0]

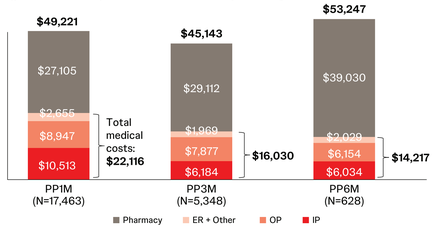
ER, emergency room; HRU, healthcare resource utilization; IP, inpatient; OP, outpatient; PP1M, once-monthly paliperidone palmitate; PP3M, once-every-3-months paliperidone palmitate; PP6M, once-every-6-months paliperidone palmitate; PPPY, per-patient-per-year; SD, standard deviation; USD, United States Dollars.
[a]HRU was evaluated over the first 6 months of continuous insurance eligibility or Medicare/Medicaid eligibility following the index date to reflect the period where patients were on treatment.

Figure 3: Selected follow-up schizophrenia-related HRU[a]



HRU, healthcare resource utilization; IP, inpatient; OP, outpatient; PPPY, per-patient-per-year.
[a]Number of IP days, the proportion of patients with an IP admission ≤3 months of index date, and number of days with OP visits were reported among all patients over the entire follow-up period. Days from index date to the first IP admission, total days of first IP admission, and number of OP visits ≤1 month of index date were reported in the first 6 months of follow-up, among patients with available data.

Figure 4: Follow-up all-cause medical and pharmacy costs[a]



ER, emergency room; IP, inpatient; OP, outpatient; PP1M, once-monthly paliperidone palmitate; PP3M, once-every-3-months paliperidone palmitate; PP6M, once-every-6-months paliperidone palmitate; USD, United States dollars.
[a]Costs for PP1M/3M/6M were adjusted so that only costs corresponding to the number of days covered during the follow-up period were included.

Limitations

- Data analyzed in this study were obtained from administrative claims which may be subject to inaccuracies and omissions
- As with all studies utilizing administrative claims data, prescription fills do not account for whether the medication dispensed was taken as prescribed, potentially overestimating treatment adherence
- Cost data is not always available in KRD; imputation for missing costs was conducted by Komodo and costs may not represent true costs incurred by payers, or capture discounts and rebates applied to treatment
- Patients in the PP6M cohort were newly initiated while those treated with PP1M and PP3M may have previously used the index treatment, which may have differentially impacted outcomes reported in this study
- This study was descriptive in nature and no statistical comparisons between cohorts were performed

Conclusions

- In this real-world descriptive study, patients with schizophrenia using PP3M or PP6M were more adherent, incurred lower medical costs, and a lower proportion had a schizophrenia-related inpatient admission within 3 months of the index date, relative to patients using PP1M
- The results of this study suggest that less frequent paliperidone palmitate formulations may improve real-world outcomes relative to more frequent formulations
- Future work evaluating a larger PP6M cohort with longer follow-up is warranted to further contextualize these findings
- These findings provide valuable insights that warrant consideration in real-world clinical practice to help guide treatment decision-making

Acknowledgments

Medical writing assistance was provided by Loraine Georgy, PhD, MWC, an employee of Analysis Group, Inc.

Disclosures

CP and CB are employees of Johnson & Johnson. DP, LM, AV, LD, and KY are employees of Analysis Group, Inc., a consulting company that has provided paid consulting services to Johnson & Johnson, which funded the development and conduct of this study.

Presented at the International Society for Pharmacoeconomics and Outcomes Research (ISPOR) 2025; May 13-16, 2025; Montréal, Quebec, Canada

References

1. Desai PR et al. *J Pharm Health Serv Res*. 2013;4(4):187-194. 2. Kessler RC, et al. *Biol Psychiatry*. 2005;58(8):668-676. 3. Wu EQ et al. *Psychol Med*. 2006;36(11):1535-1540. 4. American Psychiatric Association. *The American Psychiatric Association practice guideline for the treatment of schizophrenia*. 2020. 5. Lin D et al. *CNS Drugs*. 2021;35(5):469-481. 6. Pilon D et al. *Clin Ther*. 2017;39(10):1972-1985 e1972. 7. Lin D et al. *Curr Med Res Opin*. 2021;37(4):675-683. 8. Johnson & Johnson. Janssen Announces U.S. FDA Approval of INVEGA HAFYERA™ (6-month paliperidone palmitate), First and Only Twice-Yearly Treatment for Adults with Schizophrenia. 2021.

Neuropsychiatry

Scan the QR code

This study was funded by Janssen Scientific Affairs, LLC, a Johnson & Johnson company.