Early experience with aripiprazole tablets with sensor: patient costs from real-world data

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INTRODUCTION

- Affecting nearly 1 in 5 US adults, serious mental illnesses are diagnosable mental, behavioral, or emotional disorders that include major depressive disorder (MDD), bipolar disorder (BD), and the schizophrenia spectrum of disorders.[1]
- These disorders are often difficult to treat,[2,3] and a major driver of relapse is medication nonadherence.[4,5]
- However, it can be difficult for clinicians to discern between poor medication adherence and medication ineffectiveness.[6]
- Aripiprazole tablets with sensor (AS) is an antipsychotic therapy indicated to track medication ingestion among patients diagnosed with MDD, bipolar I disorder, or schizophrenia.[7]

OBJECTIVE

- To describe early experience among individuals initiating AS (cases).

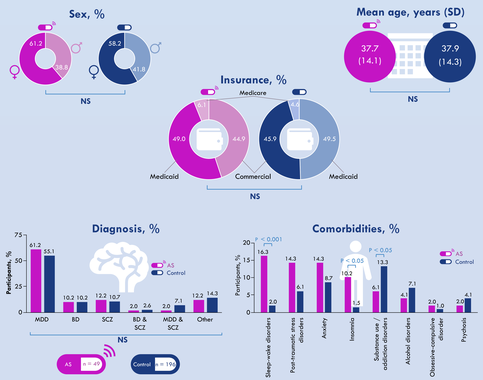
METHODS

- **Study design:** Propensity-score–matched case-control study.
- **Study design:**
  - **Case-finding period**: January 1, 2019, to June 30, 2020, with index defined as AS-initiation date (for cases only). Index for controls was defined as a paid oral antipsychotic claim ± 30 days to the matched-case index date.
  - **Baseline:** 3-month period preceding index.
  - **Follow-up:** 6-month period defined after index.
- **Data source:** Administrative medical and pharmacy claims licensed from Clarivate.[8]
- **Identification and selection of study participants:**
  - Eligible cases:
    - Initiated on AS.
    - Had a paid pharmacy claim for AS from Orsini Specialty Pharmacy or a list of approved prescribers.
    - Were ≥ 18 years of age as of January 1, 2018.
    - Had ≥ 1 paid medical or pharmacy claim in each quarter of the study, beginning with the 3-month baseline period.
  - Potentially eligible controls were identified from individuals who met each of the following criteria:
    - Psychiatric diagnosis, defined as having 2 or more claims for an eligible psychiatric diagnosis in the primary position.
    - Were ≥ 18 years of age as of January 1, 2018.
    - Had an oral antipsychotic paid pharmacy claim ± 30 days to the matched case index date.
    - Had ≥ 1 paid medical or pharmacy claim in each quarter of the study, beginning with the 3-month baseline period (defined after matching).
- **Matching:** From this population, individuals were propensity-score matched to each AS case (4:1) based on age (± 2 years), sex (male/female), disease diagnosis (schizophrenia, MDD, BD, or other), insurance group, baseline paid pharmacy claim for an oral antipsychotic (yes/no), and all-cause healthcare utilization (defined by mean visits per-person-per-year for inpatient, emergency department, office, and other visits; utilization was matched individually).
- **Analysis:**
  - AS cases and controls were compared for demographics, comorbidities, service-utilization changes from baseline to follow-up, and differences in costs from baseline to follow-up.
  - Psychiatric utilization was defined by any F-code in the primary position.
  - 2-Part models (with the first part estimating the likelihood of having an event and the second part estimating pre-to-post change in utilization among individuals who had an event) were used to compare utilization between cases and controls in follow-up.
  - Difference-in-difference regression models were used to compare changes in pharmacy and healthcare utilization outcomes (AS cases vs controls) between the baseline and follow-up periods.
- **Outcomes:** Included service utilization (psychiatric and all-cause) and costs.

RESULTS

- AS cases were 61.2% female, with a mean age of 37.7 years (SD = 14.1 years; **Figure 1**).
- The most common psychiatric condition treated was MDD (61.2%; **Figure 1**).
- There were no significant differences between AS cases and controls with respect to demographic characteristics or psychiatric health conditions at index (**Figure 1**).

Figure 1. Demographic and comorbidity characteristics of AS cases and controls.



AS, aripiprazole tablets with sensor; BD, bipolar disorder; MDD, major depressive disorder; NS, not significant; SCZ, schizophrenia; SD, standard deviation.

- AS cases were more likely than controls to have sleep-wake disorders (16.3% vs 2.0%; $P < 0.001$) and insomnia (10.2% vs 1.5%; $P < 0.05$; **Figure 1**).
- AS cases were less likely than controls to have substance use / addiction disorders (6.1% vs 13.3%; $P < 0.05$) and alcohol use disorder (4.1% vs 7.1%; P = NS; **Figure 1**).
- There were no significant differences in baseline all-cause utilization between cases and controls (**Table 1**).
- At baseline, there were significant differences between psychiatric office visits, other outpatient visits, psychotherapy visits, and community mental health clinic admissions between AS cases and controls. (**Table 1**).
- AS cases were more likely to have psychiatric-specific service utilization (**Table 1**).

Table 1. Baseline all-cause and psychiatric utilization among AS cases and controls.

Parameter	AS Cases (n = 49)		Controls (n = 196)		*P*-value
	Mean	%[a]	Mean	%[a]	
All-cause utilization, PPPM					
Office visits	0.9	73.5	0.6	71.4	NS
Other outpatient visits	2.7	93.9	1.2	71.9	NS
Hospital-based outpatient clinic	0.6	30.6	0.3	25.0	NS
ED visits	0.1	12.2	0.1	29.6	NS
Inpatient admission	0.3	16.3	0.3	26.5	NS
Pharmacy	1.5	40.8	1.4	45.9	NS
Psychiatric utilization, PPPM					
Office visits	0.8	49.0	0.3	18.9	< 0.05
Other outpatient visits	2.0	69.4	0.2	11.7	< 0.05
Hospital-based outpatient clinic	0.4	18.4	0.1	9.2	NS
ED visits	0.0	12.2	0.1	8.2	NS
Inpatient admission	0.2	14.3	0.3	14.3	NS
Psychotherapy	0.7	28.6	0.2	13.8	< 0.05
CMHC	0.2	8.2	0.03	3.1	< 0.05
Pharmacy	0.6	28.6	0.4	21.4	NS

[a]% of population with at least 1 healthcare service event in the baseline period.
AS, aripiprazole tablets with sensor; CMHC, community mental health center; ED, emergency department; NS, not significant; PPPM, per-patient-per-month.

- AS cases had more days' supply of antipsychotics in follow-up than controls (**Table 2**).
- Controls were on significantly more antidepressants and anxiolytics by the follow-up assessment versus baseline ($P < 0.05$; **Table 2**).
- AS cases were more likely to have all-cause office visits, all-cause emergency department visits, all-cause hospital outpatient visits, all-cause other outpatient visits, psychiatric other outpatient visits, community mental health center visits, psychotherapy visits, all-cause pharmacy utilization, and psychiatric utilization as compared to controls (**Table 3**).
- AS cases had 0.80 times fewer all-cause office visits than controls, 0.13 times fewer psychiatric inpatient visits, 1.46 times more psychiatric hospital outpatient visits, 2.42 times more psychotherapy visits, and 0.68 times less all-cause pharmacy utilization than controls (**Table 3**).

Table 2. Treatment patterns at baseline and follow-up for AS cases and controls.

Parameter	AS Cases (n = 49)			Controls (n = 196)		
	Baseline	Follow-Up[a]	*P*-value	Baseline	Follow-Up	*P*-value
Antipsychotic, %			< 0.05			< 0.05
No	75.5	0.0		81.1	0.0	
Yes	24.5	100.0		18.9	100.0	
Aripiprazole (AS only)	27.7	6.1		–	–	
Aripiprazole (AS + generic)	–	85.7		–	–	
Aripiprazole (generic)	–	–		15.3	27.5	
Quetiapine	0.0	0.0		2.0	26.5	
Others	4.1	8.2		1.5	46.0	
LAI antipsychotic	4.1	4.1	NS	0.0	2.6	NS
Antidepressants	22.4	16.3	NS	17.3	56.1	< 0.05
Anxiolytics	4.1	2.0	NS	3.6	18.4	< 0.05
AS days' supply, mean	–	58.1	–	–	–	–
Antipsychotic days' supply, mean (SD)	7.7 (18.7)	149.1 (58.0)	< 0.05	26.0 (41.8)	141.6 (57.2)	< 0.05

[a]In the follow-up period, all AS cases were taking AS (n = 49). A subset was taking AS only; ie, no other antipsychotic (n = 3), or AS and another antipsychotic (n = 4). Another subset was taking AS plus generic aripiprazole (n = 42).
AS, aripiprazole tablets with sensor; LAI, long-acting injectable; NS, not significant; SD, standard deviation.

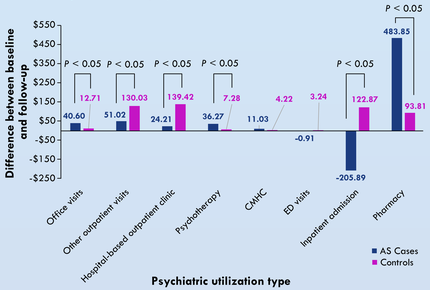
Table 3. Results for the 2-part regression models: part 1 (logistic regression, odds of event); part 2 (among those with an event, the frequency of event) for service-utilization events among AS cases and controls.

Service utilization type	Part 1: Odds of an event		Part 2: Frequency of event	
	Odd ratio[a]	*P*-value	EXP estimate[b]	*P*-value
All-cause office visits	4.78	< 0.1	0.80	< 0.1
Psychiatric office visits	1.28	NS	0.76	NS
All-cause inpatient visits	0.65	NS	1.15	NS
Psychiatric inpatient visits	0.37	NS	0.13	< 0.1
All-cause ED visits	0.73	< 0.1	0.60	NS
Psychiatric ED visits	0.23	NS	1.08	NS
All-cause hospital outpatient visits	1.53	< 0.1	0.45	NS
Psychiatric hospital outpatient visits	0.93	NS	1.46	< 0.1
All-cause other outpatient visits	13.78	< 0.1	1.30	NS
Psychiatric other outpatient visits	4.67	< 0.1	1.15	NS
CMHC visits	1.99	< 0.1	0.73	NS
Psychotherapy visits	1.23	< 0.1	2.42	< 0.1
All-cause pharmacy utilization	1.08	< 0.1	0.68	< 0.1
Psychiatric pharmacy utilization	2.46	< 0.1	1.24	NS

All *P*-values were between 0.05 and 0.1.
[a]Odds ratio and EXP estimate were calculated with the control group as the reference group.
[b]EXP estimate was calculated as the exponentiated beta coefficient.
CMHC, community mental health center; ED, emergency department; EXP, exponentiated beta coefficient; NS, not significant.

- Most costs increased modestly between the 3-month baseline and longer 6-month follow-up periods for both groups, however, compared to controls, costs were lower for the AS cases for other outpatient visits and hospital-based outpatient clinic visits (**Figure 2**).
- AS cases had a greater increase in pharmacy costs compared to controls ($483.85 vs $93.81, respectively); however, they had a large drop in inpatient admission costs ($205.89) whereas inpatient costs increased for controls ($122.87, **Figure 2**).

Figure 2. Baseline and follow-up cost differences for AS cases aand controls (unadjusted PPPM, $).



AS, aripiprazole tablets with sensor; CMHC, community mental health center; ED, emergency department; PPPM, per-patient-per-month.

SUMMARY AND INTERPRETATION

- These results suggest that individuals who used AS increased use of outpatient psychiatric care services and reduced use of acute-care services.
- These results represent the experience of early adopters and should be considered preliminary given the small sample size (n = 49 cases, n = 296 controls).
- Future research should focus on an expanded population of users with longer baseline and follow-up measurements to confirm these results.

References

1. National Institute of Mental Health. Mental Illness. Accessed December 3, 2019. https://www.nimh.nih.gov/health/statistics/mental-illness.shtml
2. Fava M, Kendler KS. *Neuron.* 2000; 28(2):335–341.
3. Griswold KS, Pessar LF. *Am Fam Physician.* 2000; 62(6):1343–1358.
4. Keck PE Jr et al. *Psychopharmacol Bull.* 1997; 33(1):87–91.
5. DiMatteo MR et al. *Arch Intern Med.* 2000;160(14):2101–2107.
6. Martin KB. *Cureus.* 2020;12(12):e11847.
7. Otsuka Pharmaceutical Co. Prescribing Information. ABILIFY MYCITE (aripiprazole tablets with sensors). Published 2020.
8. Clarivate. Real World Data. Accessed March 1, 2022. https://clarivate.com/products/real-world-data/

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