A Study of Prescription Trends for ADHD Medications in Japan from 2018 to 2023

RWD120

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INTRODUCTION

Attention-Deficit/Hyperactivity Disorder (ADHD) is characterized by inattention and hyperactivity-impulsivity, with hyperactivity-impulsivity generally being higher in males. The prevalence rate in Japan is 5.8%[1] .Treatment options include methylphenidate (OROS-MPH, launched in December 2007), lisdexamfetamine (LDX, launched in December 2019), atomoxetine (ATX, launched in June 2009),and guanfacine (GXR, launched in May 2017). The first two are central nervous system stimulants subject to distribution control regulations, while the latter two are non-central nervous system stimulants. Stimulants are more effective than non-stimulants.

Unlike guidelines in Europe and the United States, Japanese guidelines[2] recommend the three agents other than LDX as first-line treatments. The prescribing patterns of the four agents after LDX was released, as well as the prescribing patterns of OROS-MPH, ATX, and GXR when used as first-line agents, are unclear. This study investigated the prescribing patterns of ADHD medications in Japan, including the prescribing trends of first-line agents.

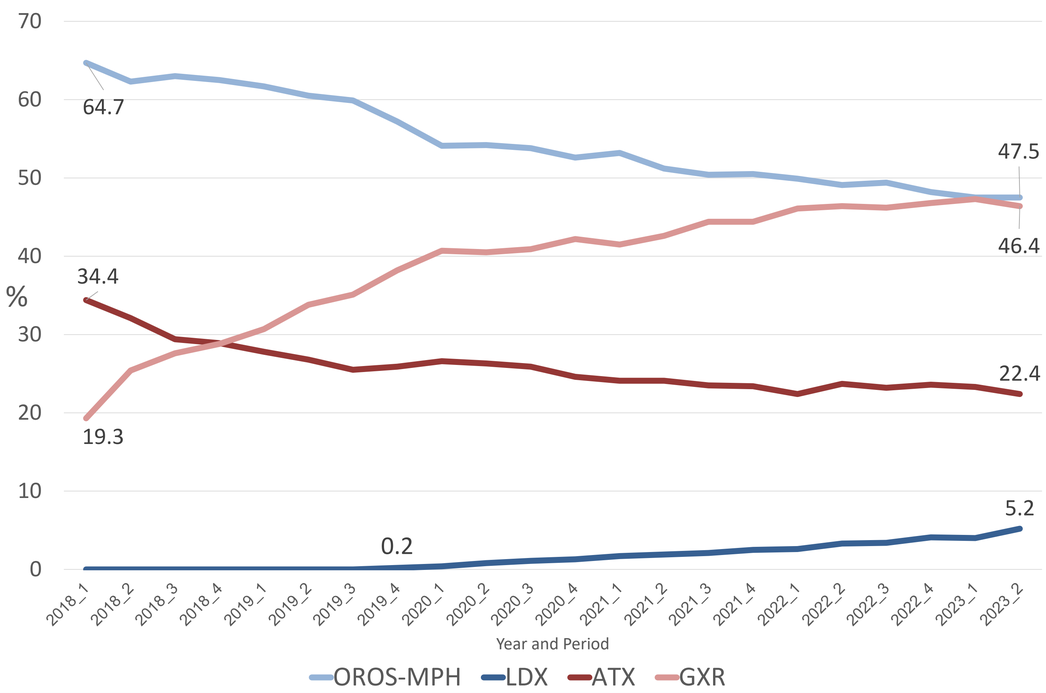
OBJECTIVES

To investigate prescription patterns for ADHD medications in Japan following the market availability of OROS-MPH, LDX, ATX, and GXR.

METHODS

- **Data Source and Study Period:** Analysis of DeSC health insurance claims database (April 2018–August 2023). Study years were defined as April-March periods, subdivided into quarterly periods (Q1: April-June, Q2: July-September, Q3: October-December, Q4: January-March), aligned with the Japanese school calendar.
- **Study Population:** Patients aged 0-17 years diagnosed with ADHD (ICD-10: F90) who received at least one ADHD medication during the analysis period. Age was determined on the first day of each quarterly period.
- **Statistical Analysis:** Prescription patterns analyzed by sex, age, and medical specialty using Jonckheere-Terpstra trend test.

Figure 1. Overall proportion of prescriptions of ADHD medications



RESULTS

- Numbers and characteristics of study participants in each period (Table 1)
- Proportion of prescriptions (Figure 1)

  Rising trend: **GXR** 19.3% → 46.4% (P<0.001) **LDX** 0% → 5.2%

  Declining trend: **OROS-MPH** 64.7% → 47.5% (P<0.001) **ATX** 34.4% → 22.4% (P<0.001)
- GXR became the predominant medication for females after 2021 and for the 6-12 years age group, while OROS-MPH remained dominant in the 13-17 years age group. (Figure 2)
- For new prescriptions, GXR increased from 27.4% to 41.3% (P=0.0021). (Figure 3)
- The OROS-MPH and GXR combination became the most commonly chosen option. (Figure 4)
- In psychiatric departments, GXR emerged as the most prevalent prescription, while OROS-MPH dominated in non-psychiatric settings. (supplemental Appendix A)
- Monotherapy rates declined slightly from 82.3% to 79.6% (P=0.0011) (supplemental Appendix C)

Materials

Table 2.Cost comparison of ADHD medications

Medication	OROS-MPH	LDX	GXR	ATX(bland name/ge)
Specifications and price	18mg:$1.57 27mg:$1.75 36mg:$1.83	20mg:$4.40 30mg:$4.88	1mg:$2.66 3mg:$3.51	5mg:$0.60/$0.30 10mg:$0.72/$0.34 25mg:$0.93/$0.42 40mg:$1.14/$0.43
Drug dosage	18mg-54mg	30-70mg	＜50kg:1-5mg 50kg≦:4-6mg	1.2-1.8mg/kg

Supplemental(QR code)

Appendix A. Comparison of Psychiatric and Non-Psychiatric Prescriptions for ADHD Medications

Appendix B. Characteristics of New Prescription Patients

Appendix C. Trends in Prescription Patterns of ADHD Medications: Single-Agent and Combination Therapy

Table 1. Characteristics of the prescribed patients

Year		2018				2019				2020				2021				2022				2023	
Period[1]	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2
Total	2874	3013	3128	3096	3304	3448	3525	3457	3524	3737	3889	3893	3849	3927	4069	4014	3328	3323	3313	3059	1542	1297
Boys	2385	2499	2597	2565	2723	2826	2878	2835	2893	3042	3138	3133	3083	3147	3237	3193	2618	2600	2595	2421	1209	1025
0-5 years	10	19	24	21	16	17	18	12	9	21	24	23	17	18	24	16	12	16	9	8	4	1
6-12 years	1626	1702	1740	1700	1839	1916	1925	1888	1941	2024	2047	2010	1951	2004	2049	1993	1586	1583	1578	1467	732	594
13-17 years	749	778	833	844	868	893	935	935	943	997	1067	1100	1115	1125	1164	1184	1020	1001	1008	946	473	430
Girls	489	514	531	531	581	622	647	622	631	695	751	760	766	780	832	821	710	723	718	638	333	272
0-5 years	3	3	4	3	1	2	4	1	5	9	7	5	5	5	5	4	6	8	2	4	0	0
6-12 years	307	320	325	314	349	388	393	362	365	407	430	439	428	434	467	464	396	402	400	359	184	141
13-17 years	179	191	202	214	231	232	250	259	261	279	314	316	333	341	360	353	308	313	316	275	149	131

[1]Period 1: April-June, Period 2: July-September, Period 3: October-December, Period 4: January-March

Figure 2(a). Overall prescription proportions for boys

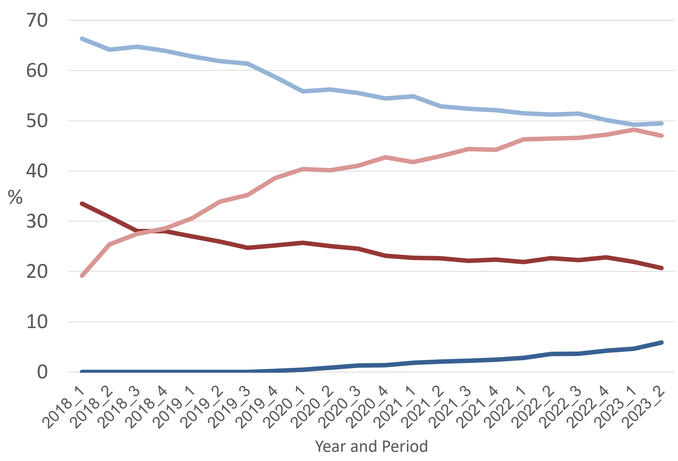


Figure 2(b). Overall prescription proportions for girls

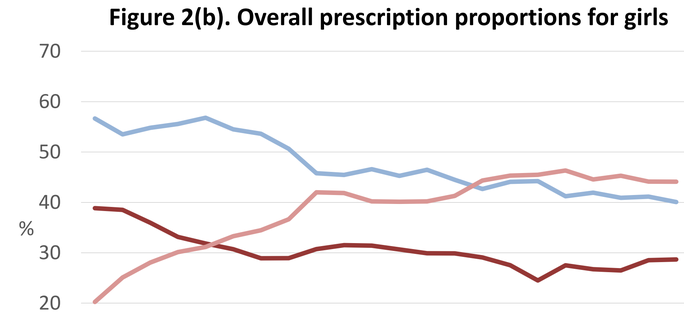


Figure 2(c). Overall prescription proportions for 6– to 12-year-olds

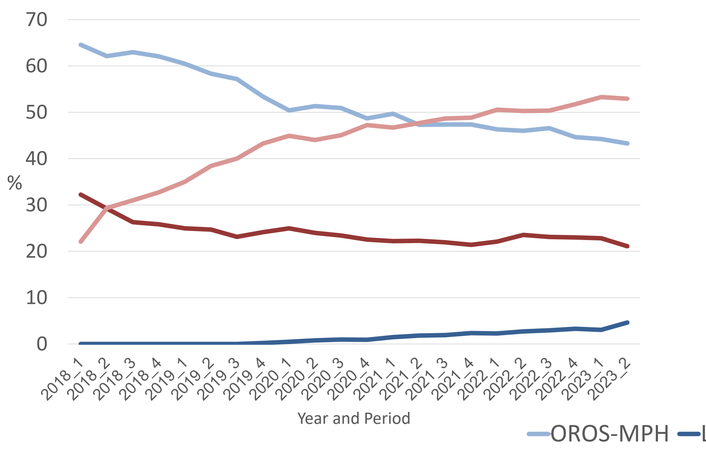


Figure 2(d). Overall prescription proportions for 13–17-year-olds

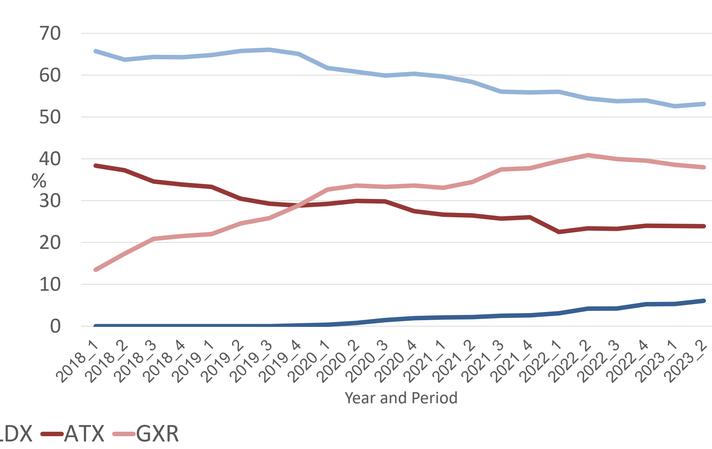


Figure 3. New prescription proportions of ADHD medications

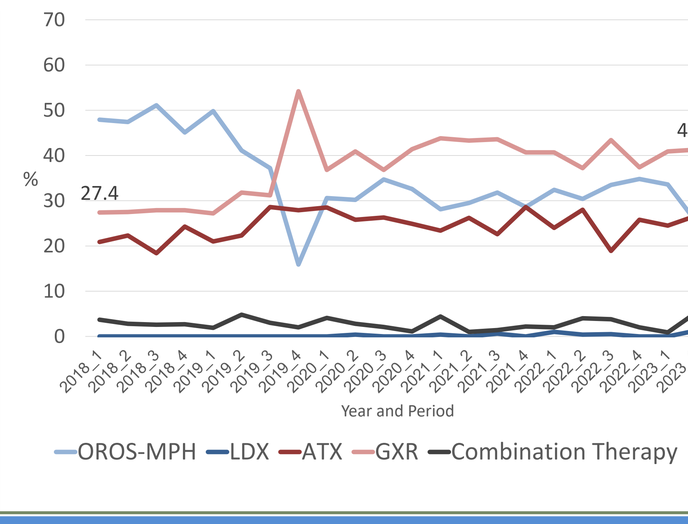
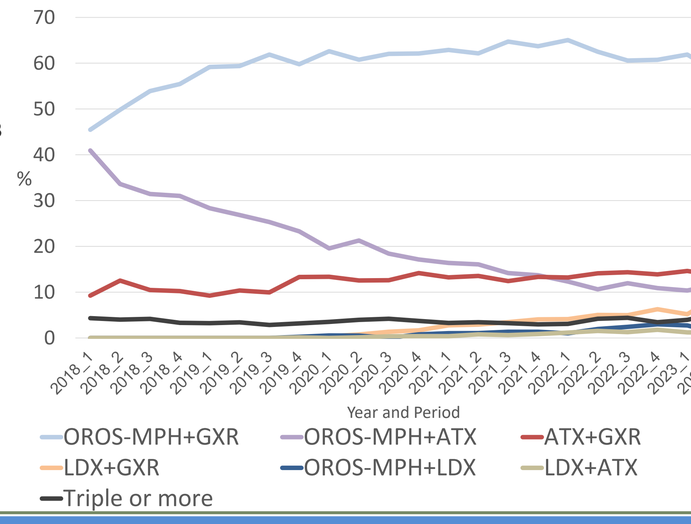


Figure 4. Trends in combination therapy patterns of ADHD medications



DISCUSSION & CONCLUSIONS

- A significant shift toward guanfacine in ADHD treatment occurred in Japan, particularly among females, younger children, and in psychiatric settings.
- This trend may be attributed to several factors. Guanfacine is not subject to distribution control regulations, offers the convenience of once-daily dosing, and acts through a different pharmacological mechanism than the others.
- Despite GXR showing lower efficacy compared to stimulants, its prescription rates are increasing in Japan. Given the substantial cost differences between medications (Table 2), this prescribing trend toward a less efficacious but more expensive medication may lead to increased healthcare expenditures. Further investigation is warranted to examine cost-effectiveness ratios and factors influencing prescribing decisions beyond clinical efficacy.

Reference

1. Nomura, K., Okada, K., Noujima, Y., Kojima, S., Mori, Y., Amano, M., et al. (2014). A clinical study of attention-deficit/hyperactivity disorder in preschool children—Prevalence and differential diagnoses. Brain and Development, 36(9), 778–785.
2. Saito, K., & Iida, J. (2022). *Guidelines for diagnosis and treatment of attention deficit hyperactivity disease* (5th ed.). Jiho.