Doctor shopping for medications used in the treatment of attention deficit hyperactivity disorder: shoppers often pay in cash and cross state lines

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Abstract

Background: Doctor shopping, defined by filling overlapping prescriptions from more than one prescriber at more than two pharmacies, is a way to obtain scheduled medications for diversion or abuse. Little is known about how far attention deficit hyperactivity disorder (ADHD) medication shoppers travel, how often they cross state lines to fill their ADHD prescriptions and how often they pay for their medication in cash, i.e. entirely out of pocket. Objective: We sought to describe the pattern of doctor shopping for ADHD medications: how far shoppers travel, how often they cross state lines to fill their prescriptions, and how often they pay in cash. Methods: Retrospective cohort study using LRx, a large US retail prescription database. We included subjects with any ADHD medication dispensed between 2011 and 2012. Subjects were followed for 18 months. Results: Of a total of 4,402,464 subjects exposed to ADHD medications, 0.4% developed shopping behavior. Women were more likely to become shoppers. Shoppers travelled a median of 91.9 miles and non-shoppers 0.2 miles to fill their ADHD prescriptions. Almost 28% of the shoppers filled prescriptions in a state compared with 4.3% of non-shoppers. Of the shoppers, 27.3% paid at least one prescription in cash compared to 14.4% of the non-shoppers. Conclusions: Shoppers travelled larger distances, visited more states and paid in cash for ADHD medications more often than non-shoppers. Data sharing among prescriptions monitoring programs can improve their effectiveness and drug utilization studies should take account of cash purchases.

Keywords

Abuse, ADHD medications, diversion, shopping behavior

Introduction

Obtaining medications with potential for abuse such as attention deficit hyperactivity disorder (ADHD) drugs or opioids from multiple prescribers, is a way to obtain scheduled medications for diversion or abuse (1,2). This behavior is called doctor shopping.

ADHD shopping behavior has been previously defined as overlapping prescriptions by different prescribers and filled at more than two pharmacies (2). This definition differentiates subjects exposed to ADHD medications from subjects exposed to asthma medications (the behavior is four times more frequent in subjects on ADHD medications than in subjects on asthma medications) and is identical to a definition for opioid shopping behavior, which differentiates subjects exposed to opioids (0.18% meet the definition) from subjects exposed to diuretics (0.03% meet the definition) (1). This definition has also been associated with a diagnosis of opioid abuse and can distinguish between opioids with different risks of abuse (3,4). An inference from these findings would be that the above definition of shopping behavior is a marker for abuse or diversion of ADHD medications.

Information about the patterns of shopping behavior may be useful for the design or improvement of programs to prevent abuse and diversion. For example, prescription monitoring programs collect data on controlled substances such as ADHD medications and opioids dispensed in the state in order to identify and deter drug abuse and shopping behavior (5,6), but these programs are based on statewide electronic databases. Examination of patterns of shopping for opioids indicate that 20% of opioid shoppers in the US cross state lines (7) to purchase opioids, and this has obvious implications for the need to link such registries. In contrast, little is known about how far ADHD medication shoppers travel, how often they cross state lines to fill their ADHD prescriptions and how often they pay for their medication in cash. Establishing that, like shopping for opioids, shopping for ADHD medications frequently crosses state lines would provide further support for sharing prescription monitoring program data across states and thus would increase the effectiveness of these programs for identifying and deterring
doctor shopping and abuse of ADHD medications. The objective of this study was to evaluate these features of ADHD medication shoppers compared with non-shoppers.

Methods
We conducted a retrospective cohort study using an IMS LRx, a large US retail prescription database. This longitudinal database covers 65% of all retail dispensing of prescription medications in the United States and includes all types of pharmacies – chains, food stores, mass merchandisers, and independent stores. The database captures all prescriptions dispensed, regardless of payment type (including cash transactions) from each of the participating pharmacies.

The LRx database contains de-identified data on the subject (i.e. the patient prescribed the medication), the pharmacy and its geographic coordinates, and the prescriber. To uniquely identify a subject who filled prescriptions at multiple pharmacies, a probabilistic multi-level match is performed using a proprietary IMS algorithm based on encrypted, non-identifiable data elements that include gender, date of birth, last name, first name, address, city, state, zip code, and payer.

Inclusion criteria
We included all subjects with dispensing of at least one ADHD medication between 1 February 2011 and 31 January 2012 who had data available for at least 4 months prior to the first dispensing (index date), and whose pharmacies consistently supplied data to the LRx database during the entire study period. The medications included were the ones currently approved by the FDA for the treatment of ADHD: amphetamine, atomoxetine, clonidine, dextmethylphenidate, dextroamphetamine, guanfacine, lisdexamfetamine, methamphetamine, and methylphenidate.

Shopping behavior was defined as a subject filling ADHD prescriptions written by more than one prescriber with at least one day of overlap day of overlap at more than two pharmacies. We also defined heavy shopping behavior as a subject having ≥5 shopping episodes in the 18 months of follow-up. Such a number of shopping behavior episodes represents unusually heavy shopping in that as many as 88% of subjects with ADHD shopping behavior had fewer than 5 shopping episodes (2). We therefore defined three mutually exclusive categories: Non-shoppers, shoppers with 1–4 shopping episodes, and heavy shoppers (with ≥5 shopping episodes). Outcomes assessed in this study were each subject’s distance travelled, the number of states visited to fill ADHD prescriptions, and the type of payment. The sex and age of subjects, and the total number of ADHD-medications dispensed per subject (i.e. the patient prescribed the medication), pharmacy and its geographic coordinates, and the prescriber.

Distance calculation
All pharmacies a given subject visited were calculated the distance travelled. Using the pharmacies’ geographic coordinates, we calculated the total miles travelled by summing the distances between pharmacies. In doing this, we respected the chronological order of the pharmacy visits.

Results
A total of 4,402,464 subjects were dispensed at least one ADHD medication, 0.45% developed any type of shopping behavior (0.4% developed shopping behavior, and 0.05% developed heavy shopping behavior). Women were more likely than men to become shoppers or heavy shoppers, see Table 1.

Either type of shoppers travelled greater distances to fill ADHD prescriptions than non-shoppers. Shoppers travelled a median of 91.9 miles, heavy shoppers a median of 333.2 miles, and non-shoppers a median of 0.2 miles (Table 1).

ADHD medication shoppers were more likely to visit >1 state to fill the ADHD prescriptions. Almost 28% of the shoppers and almost 43% of heavy shoppers visited >1 state to fill ADHD prescriptions compared with only 4.3% of non-shoppers (Table 1).

Of the 18,130 subjects who exhibited ADHD shopping or heavy shopping behavior, 27.3% paid in cash for at least one ADHD medication prescription compared to 14.4% of the non-shoppers ($p < 0.0001$).

Discussion
This population-based study included more than 4 million subjects exposed to ADHD medications. It found that subjects who exhibited shopping behavior more often paid in cash than non-shoppers, travelled greater distances and crossed state lines to obtain ADHD prescriptions more often than non-shoppers. These differences were even more pronounced in heavy shoppers who travelled further and were more likely to visit two or more states to fill their prescriptions.

Because shoppers often filled their opioid prescriptions in multiple states, the effectiveness of prescription monitoring programs would be improved if state programs consistently shared data. Data sharing across states’ prescription monitoring programs, although increasing, remains far from a common practice. In 2011, 11 states exchanged prescription

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Stimulant shoppers use cash, visit many states
data. Three years later, 21 states do so. (8,9).

Table 1. Characteristics of non-shoppers and ADHD medication shoppers, distance travelled and number of states involved in filling opioid prescriptions.

| Subjects, n (row %) | Non-shoppers | Shoppers<sup>a</sup> | Heavy shoppers<sup>b</sup> |
|---------------------|--------------|-----------------------|-----------------------------|
| Subjects            | 4,384,334 (99.6) | 15,996 (0.4) | 2,134 (0.05) |
| Age (mean ± SD), y  | 24.1 ± 16.2 | 26.4 ± 14.7 | 32.8 ± 13.6 |
| Men (%)             | 2,458,312 (56.1) | 8364 (52.3) | 959 (44.9) |
| Women (%)           | 1,926,022 (43.9) | 7632 (47.7) | 1,175 (55.1) |
| Number of ADHD medication dispensings (median [25th–75th]) | 11 (6–17) | 24 (18–32) | 36 (29–44) |
| Distance travelled (median [25th–75th]), miles<sup>g</sup> | 0.2 (0–12.5) | 91.9 (36.2–482.3) | 333.2 (118.9–4146) |
| Number of states visited<sup>g</sup>, n (column %) | 4,197,667 (95.7) | 11,616 (72.6) | 1,220 (57.2) |
| 1                   | 174,055 (4.0) | 3624 (22.7) | 622 (29.1) |
| 2                   | 11,353 (0.3) | 641 (4.0) | 241 (11.3) |
| 3                   | 1052 (0.0) | 91 (0.6) | 45 (2.1) |
| ≥5                  | 207 (0.0) | 24 (0.1) | 6 (0.3) |

SD, standard deviation; *Subjects who filled opioid prescriptions written by more than one prescriber with at least one day of overlap at more than two pharmacies; #Subjects with ≥5 shopping episodes in the 18 months of follow-up; The difference between shoppers and non-shoppers, and the difference between heavy shoppers and non-shoppers is significant, p ≤ 0.0001.

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