

Implementation of a Community-based Pharmacist-run Attention Deficit Hyperactivity Disorder Clinic in a College Health Center

Introduction

Pharmacist expertise in the management of chronic health conditions is well-documented. Through the Asheville Project, community pharmacists have been recognized for their ability to implement a diabetes self-management program to decrease chronic disease burden and improve clinical outcomes.¹ The Ten City Challenge went on to prove that the Asheville Project model could be implemented in other parts of the country.² Pharmacists have been able to make interventions in diabetes chronic care management to improve clinical outcomes and decrease overall healthcare costs.^{1,2} Pharmacists can also make meaningful impacts on the health needs of university-based populations at college health centers; for example, one psychiatric clinical pharmacist at a university counseling and mental health services center collaborated with psychiatric nurse practitioners to manage medications and provide patient education.³

According to a recent survey of 67,972 students by the American College Health Association, 8.4% of respondents reported having attention deficit hyperactivity disorder (ADHD), 6% reported that ADHD affected their academic performance and 6.7% reported being diagnosed or treated by a professional for ADHD during the prior 12 months.⁴ Stimulant medications are a mainstay therapy in the treatment and management of ADHD.⁵ Although they are generally effective for most patients, stimulants can result in adverse effects such as appetite suppression, insomnia, and increased blood pressure or heart rate. It is recommended that patients taking stimulant medications have their blood pressure and heart rate monitored at baseline and periodically thereafter.⁵ While managing ADHD, practitioners are likely to encounter other comorbid psychiatric conditions, such as depression, anxiety, and other mood disorders.⁶ The National Comorbidity Survey Replication found that 47.1% and 38.3% of adults with ADHD met the criteria for anxiety and mood disorders, respectively.⁶ Nelson and colleagues identified that patients with ADHD had higher levels of anxiety and depression compared to those without ADHD.⁷ Another study that examined the rates of non-ADHD psychiatric diagnoses among first year college students found a significantly higher rate of comorbidity among those with ADHD.⁸ Fifty-five percent of those students with ADHD exhibited at least one other comorbidity, while only 11.2% of students without ADHD reported a psychiatric comorbidity.⁸ Pharmacists can use their medication expertise in managing side effects and dosage adjustments for these common comorbidities while managing ADHD and optimizing patient outcomes. While there is literature regarding pharmacist-run clinics for a variety of chronic health conditions, to our knowledge, published evidence is lacking to describe the pharmacist's role in managing an ADHD specialty clinic.

The primary objective of this study is to measure the growth of an ADHD clinic in a college health center following the integration of clinical pharmacists. Secondary outcomes are to evaluate adherence to policies and procedures, such as blood pressure and heart rate monitoring, signing of the stimulant medication contract, and assessing for mood and substance use at initial visits before and after pharmacists were integrated as providers into the ADHD clinic.

Campus Health Services, also referred to as Campus Health, is a comprehensive, Joint Commission-accredited medical practice with a mission of helping University of North Carolina (UNC) students and post-docs thrive through patient-centered and inclusive care, including services such as primary care, gynecology, counseling and psychological services (CAPS), sports medicine, physical therapy, nutrition therapy, laboratory services, radiology, student wellness, international travel clinic, and clinical pharmacy services. There are seven pharmacists, including two pharmacy residents, and seven

pharmacy technicians who work at Campus Health Pharmacy and Student Stores Pharmacy. In addition, there is one clinical pharmacist at Campus Health who works in CAPS. Campus Health Pharmacy has been a site for the UNC Eshelman School of Pharmacy PGY-1 Community-based Pharmacy Residency Program since 2017. Campus Health pharmacists are responsible for dispensing, counseling patients, precepting student pharmacists and pharmacy residents, leading and serving on committees, coordinating and operating the travel clinic, and collaborating with and providing continuing education for prescribers and nurses. In addition to those responsibilities, the pharmacy residents are also embedded into various clinics, including ADHD clinic, primary care, gynecology, and sport's medicine. Three pharmacists at Campus Health Pharmacy and one pharmacist working in CAPS are Clinical Pharmacists Practitioners (CPPs) who have the ability to start and change certain medications in collaboration with a supervising physician.

Pharmacists practicing in college health centers have an opportunity to improve the quality of medication management for patients with ADHD by monitoring effectiveness, assessing tolerability, making medication regimen recommendations, and adjusting medication doses. In 2017, a pharmacist-run ADHD clinic was established through collaboration between a pharmacy resident and a psychiatrist, in which a pharmacy resident saw the psychiatrist's patients for initial and follow-up medication management visits for one half-day each week. The next academic year, two pharmacy residents were embedded into the clinic to provide medication management for two half-days per week. Two new pharmacy residents continued providing medication management in the ADHD clinic during the 2019 – 2020 academic year, however, that data is not included in the results as the academic year was not over when data was collected for this study.

Partnering with a psychiatrist in CAPS, the pharmacist(s) conduct collaborative initial visits with a psychiatrist and independently provide medication management follow-up appointments for clinic patients with ADHD and other comorbid psychiatric conditions, such as anxiety and depression. Persons with a diagnosis of ADHD who had a psycho-educational evaluation completed were eligible for inclusion in the ADHD clinic. There are two appointment types: medication evaluations, also called initial appointments, and medication checks, or follow-up appointments. Psychiatrist-run appointments are completed solely by the psychiatrist while pharmacist-run initial appointments are completed using a co-visit model and pharmacist-run follow-up appointments are run independently by the pharmacist. The initial appointment co-visit model starts with the pharmacist independently assessing the patient for the initiation of ADHD treatment followed by a collaborative treatment decision made with the psychiatrist. At the initial appointment, the pharmacy resident reviews the patient's medical history, including any personal or family history of heart-related conditions, measures the patient's blood pressure and heart rate, assesses for co-morbid mental health conditions using the PHQ-9 and GAD-7, and prepares a treatment plan in conjunction with the psychiatrist. The pharmacist and psychiatrist discuss the patient outside of the room and then enter the room together for the psychiatrist to meet the patient, confirm the diagnosis, and assess for any concerns. Before initiating therapy at the initial visit, patients sign a stimulant medication contract, which outlines the laws regarding distributing or selling stimulant medications and the Campus Health Services no replacement policy. The pharmacy resident completes follow-up appointments independently followed by a review of the patient note and sending of the prescriptions by the psychiatrist. At follow-up appointments, the pharmacist monitors blood pressure and heart rate, assesses medication adherence, evaluates for adverse medication effects, assesses for changes in mood, and adjusts the treatment plan, including medications for ADHD as well as anxiety and depression. Follow-up appointments are generally scheduled every two to four weeks until the patient is stabilized on an effective dose, after which follow-up appointments occur every one to three months.

Methods

This study is a retrospective evaluation of data collected from CAPS at UNC Campus Health Services. Data was extracted from eClinicalWorks, the electronic health record and included patients 18 years of age or older with a diagnosis of ADHD (ICD10 codes F90.0, F90.1, F90.2, F90.8, or F90.9) who completed a visit for a medication evaluation (coded “MedEval” or “MedEvalRes”) or a medication follow-up (coded “MedCheck” or “MedCheckRes”) from July 1, 2016 through June 30, 2019. Data was excluded if the visit occurred outside of the specified timeframe, was a visit type other than those listed above, was a visit by a provider not included in ADHD clinic, and if the visit note was classified and unable to be viewed.

Data prior to pharmacist integration (July 1, 2016 through June 30, 2017) was compared to data since pharmacist integration (July 1, 2017 through June 30, 2019). Data collected include: appointment date, appointment type, medication names and doses, blood pressure, heart rate, comorbid psychiatric diagnoses, stimulant medication contract signature date, and whether mood and substance-use were assessed at initial visits. The data is used to compare the number of patients seen for ADHD medication management, the number of documented blood pressure and heart rate recordings, and adherence to stimulant medication contract policy before and after pharmacists were included in the clinic. A chi-squared test was used to determine statistical significance of the differences in blood pressure, heart rate, and stimulant medication contract signature between psychiatrist- and pharmacist-run appointments.

Results and Discussion

After excluding visits with providers not in ADHD clinic and visit types other than “Med Eval”, “Med Check”, “Med Eval Res”, and “Med Check Res”, there were 474 visits. An additional 31 visits were excluded because the notes were “classified” and could not be accessed. 443 visits were remaining and included in the results.

Out of 443 visits, the average age of patients was 24, 56% were female, and 53% had at least one comorbid psychiatric condition. Of the ADHD medication prescribed, 84% were from the amphetamine class, 11% from the methylphenidate class and 3% were non-stimulants. Of the stimulant medication regimens prescribed, 30% were short-acting formulations, 31% were long-acting formulations, and 36% were a combination of short-acting and long-acting formulations. Most patients who are seen at ADHD clinic are in their early-to-mid-twenties and take stimulant medications in the amphetamine class. This finding is consistent with a 2018 meta-analysis that found amphetamines were more effective at reducing ADHD symptoms than methylphenidates, however, amphetamines were also found to be more likely to cause adverse events.⁹ The percentage of appointments in which patients had a comorbid psychiatric condition is in line with previous studies that have shown that 28% and 32% of first-year college students with ADHD also had a diagnosis of anxiety or depression, respectively.^{6,7,8} Fifty-three percent of appointments included patients with a comorbid psychiatric condition, such as generalized anxiety disorder, obsessive-compulsive disorder, depression, adjustment disorder, panic disorder, or bipolar disorder.

Prior to embedding pharmacy residents in the medication management of ADHD at CAPS, the treatment of ADHD was being provided from various psychiatrists and psychiatric nurse practitioners. During the 2017 – 2018 academic year, the first pharmacy resident formed a collaborative relationship with one psychiatrist and began providing medication management for patients with ADHD alongside the

prescriber. We compared the number of appointments for ADHD medication management for that psychiatrist before and after the first pharmacy resident was embedded into the clinic. As shown in Table 1, from July 1st 2016 through June 30th 2017, the psychiatrist (MD) had no initial evaluation appointments and 26 follow-up appointments. From July 1st 2017 through June 30th 2018, the number of appointments between the psychiatrist and pharmacy resident increased to 16 initial evaluation appointments and 114 follow-up appointments. During the 2018 – 2019 academic year, two new pharmacy residents provided ADHD medication management in collaboration with the psychiatrist. From July 1st 2018 through June 30th 2019 between the psychiatrist and two pharmacy residents, there were 26 initial evaluation appointments and 261 follow-up appointments. When pharmacy residents were embedded into the ADHD clinic, a single psychiatrist was able to more than double the total number of patient appointments completed, which allowed for more frequent follow-up and ability to manage more complex cases.

Adherence to blood pressure monitoring, heart rate monitoring, and signature of stimulant medication contracts was assessed and compared between psychiatrist-run and pharmacist-run appointments as shown in Table 2. From July 1st 2016 through June 30th 2019, blood pressure was recorded at 7 of 62 (11%) psychiatrist-run appointments and at 293 of 381 (77%) pharmacist-run appointments ($p < 0.001$) and heart rate was recorded at 4 of 62 (6%) psychiatrist-run appointments and at 285 of 381 (75%) pharmacist-run appointments ($p < 0.001$). During the same time period, a stimulant medication contract was signed and filed at 39 of 61 (64%) psychiatrist-run appointments and at 283 of 378 (75%) pharmacist-run visits ($p = 0.019$). Pharmacists were more adherent to monitoring blood pressure and heart rate, thus increasing quality of care and patient safety. Pharmacists were also more likely following the policy requiring the patient signature of the stimulant medication contract than the psychiatrist.

Assessing substance use and mood at initial appointments is also part of the policy for prescribing ADHD medications at Campus Health and an important step when prescribing stimulant medications for a patient for the first time. During the study time period, only two initial appointments were shown as completed by the psychiatrist. Substance use was not assessed at either of these two appointments, however, mood was assessed at both. Of the 40 initial appointments completed by pharmacy residents, with oversight by the psychiatrist, substance use was assessed at 21 (53%) appointments and mood was assessed at 38 (95%) of appointments. Pharmacists consistently assess mood during initial visits, which is an essential part of a comprehensive ADHD evaluation. Further investigation found that substance use was assessed at 21% of pharmacist-run initial appointments during the 2017 – 2018 academic year and at 69% of pharmacist-run initial appointments during the 2018 – 2019 academic year. This increase in adherence to assessing substance use may have been due to the addition of a substance use section to the template that is used for initial appointments.

Limitations of this study include potentially underrepresenting the number of ADHD appointments completed by the psychiatrist from July 1st 2016 through June 30th 2017 due to potential differences in the coding of visits during that time. This is especially difficult to control for when looking at data retrospectively.

Future studies are needed to determine patient satisfaction of pharmacist-run appointments compared to psychiatrist-run appointments. More data will be available after the completion of the 2019-2020 academic year that should be added to the current data set to further analyze adherence to substance use and mood assessment at medication evaluations. Starting in the 2018 – 2019 academic year, a full time clinical pharmacist practitioner started providing medication management for ADHD and other

psychiatric conditions at CAPS. Data from these visits could add to the current findings and help support the addition of pharmacists to clinics for the management of ADHD.

Conclusion

By allowing pharmacists to conduct collaborative initial visits with psychiatrists and independently provide medication management follow-up appointments, the number of appointments available for patient care at the clinic increased significantly. In addition to growth of the clinic, the quality of care provided and adherence to monitoring improved, as seen by the significantly increased rate of blood pressure and heart rate monitoring by pharmacists. Pharmacists should be utilized to assist psychiatrists or physicians in the medication management of ADHD and associated comorbid conditions, especially in the setting of college health.

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Table 1: Growth of ADHD Clinic

Academic Year	2016-2017	2017-2018	2018-2019
Providers	1 FTE MD	1 FTE MD + 0.1 FTE PharmD	1 FTE MD + 0.2 FTE PharmD
Initial Appointments	0	16	26
Follow-up Appointments	26	114	261
Total Appointments	26	130	287

Table 2: Adherence to ADHD Clinic Policies and Procedures

	Psychiatrist-run Appointments (2016-2019), n (%)	Pharmacist-run Appointments (2017-2019), n (%)	Statistical Significance
Blood Pressure Recorded	7/62 (11%)	293/381 (77%)	$p < 0.001$
Heart Rate Recorded	4/62 (6%)	285/381 (75%)	$p < 0.001$
Stimulant Medication Contract Signed	39/61 (64%)	283/378 (75%)	$p = 0.019$
Substance Use Assessed	Not Available	21/40 (53%)	Not Available
Mood Assessed	Not Available	38/40 (95%)	Not Available