

ABSTRACT

An examination of the rates of antipsychotic medication prescription among foster youth in the United States: A systematic review

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Federal and state initiatives to monitor appropriate prescribing of psychotropic medications to youth in the child welfare system have been implemented to varying degrees across the United States, yet antipsychotic prescribing trends remain a concern for foster youth. This systematic review explores the prevalence of antipsychotic use among foster youth in the U.S. by examining peer-reviewed studies (n=7) published between 2012 and 2018. Results demonstrate that antipsychotic use among foster youth generally plateaued around 2008 after a large increase in the early 2000s. Despite the plateau, indications of overuse and off-label prescribing, as well as findings that monitoring services are not being utilized by the majority, leave much room for concern for this vulnerable population. Future research should address ways to educate primary care physicians in the area of pediatric mental health, evaluate more recent Medicaid claims data regarding antipsychotics as they are released, and assess the long-term implications of off-label antipsychotic prescribing.

AN EXAMINATION OF THE RATES OF ANTIPSYCHOTIC MEDICATION
PRESCRIPTION AMONG FOSTER YOUTH IN THE UNITED STATES: A
SYSTEMATIC REVIEW

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CHAPTER ONE

Literature Review

In the last decade, an estimated 392,000 to 437,000 youth were in the United States foster care system (U.S. Department of Health and Human Services, Administration for Children and Families, 2020). Youth in care typically enter the foster care system due to the presence of abuse, neglect, or abandonment by their parents or other caregivers, and all have experienced trauma and loss to some extent (Adopt US Kids, n.d.). Foster youth are eligible to receive Medicaid health care coverage via the IV-E eligibility pathway of the Social Security Act of 1935, as amended in 1980 (Child Welfare Information Gateway, 2015). While broad health care coverage is provided through Medicaid for youth in care, problems exist within that same system with regard to the prescription of antipsychotic medications.

Antipsychotics are a type of psychotropic medication, a category that also encompasses a broad range of drugs including antidepressants, stimulants, anti-anxiety medications, and mood stabilizers (Land, 2021). Studies by Harman et al. (2000) and dosReis et al. (2001), and more recently by Zito et al. (2008) have shown that the prevalence of psychotropic medications is 3 to 10 times greater for youth in the foster care system than other Medicaid-insured youth eligible because of low family income. A Medicaid-sponsored study examined the prevalence of psychoactive drug use for youth in foster care in Texas. Data showed that 34.7% of foster youth (ages 0-17) received psychoactive medication in 2005; adolescents were prescribed psychoactive medications at the highest rate (age 13-17; 66.5%), followed by school age (age 6-12; 55.3%),

preschool age (age 4-5; 32.6%), three-year olds (19.3%), and infants (age 0-2; 3.9%) (Texas Health and Human Services Commission, 2006). At the same time, it is important to consider that youth in foster care experience a higher prevalence of mental health disorders than youth in the general population. A study by dosReis and colleagues (2001) found “the prevalence of mental disorders among youth enrolled in foster care (57%) was twice that of youth receiving Supplemental Security Income (SSI; 26%) and nearly 15 times that of other youth receiving other types of aid (4%)” (p. 1094).

Use of Antipsychotic Medications

Of particular interest in this study is the prevalence of antipsychotic prescriptions. A review of the relevant literature suggests that there are two types of antipsychotics referenced in studies: first-generation antipsychotics and second-generation antipsychotics. First-generation antipsychotics, also recognized as typical antipsychotics, were developed in the 1950s, while second-generation antipsychotics, also known as atypical antipsychotics, were developed in the 1980s (Abou-Setta et al., 2012). Prior research has demonstrated the increase in antipsychotic prescriptions among children and adolescents (Olfson et al., 2006; Olfson et al., 2010). Pathak et al. (2010) showed that use of second-generation antipsychotics in a state Medicaid population more than doubled from 2001 to 2005, and over 40% of the youth had no diagnosis for which antipsychotic medication treatment was supported. Moreover, the side effects vary for the two antipsychotic categories: first-generation antipsychotics come with a higher risk of neurological side effects, while second-generation antipsychotics are linked to higher risk of metabolic side effects (Guzman, n.d.). Particular metabolic concerns for children and

adolescents referenced in the literature include increased risks of weight gain and hyperglycemia (Allaire et al., 2016; Correll, 2008; Maayan & Correll, 2011; Matone et al., 2015), which may lead to the development of diabetes mellitus later in life (Cleveland Clinic, 2020; Mayo Clinic, 2020). Gastrointestinal and respiratory effects due to antipsychotic medication usage were also observed across various studies (Loy et al., 2017).

In addition to the increased prevalence of second-generation antipsychotics, off-label prescribing of antipsychotic medications has also become widespread and remains a concern (Carton et al., 2015). Among children enrolled in Texas Medicaid in 2016 who were prescribed at least one antipsychotic, 59.8% of use was off-label (Chen et al., 2021). Off-label prescribing involves the prescription of a known drug for a purpose not approved by the Food and Drug Administration (FDA) (Agency for Healthcare Research and Quality, 2010). While physicians and psychiatrists remain in their legal bounds by prescribing off-label, greater risks and concerns are posed (Matone et al., 2015). The FDA has approved the use of antipsychotic agents for certain severe behavioral and emotional disorders among children, including schizophrenia, Tourette's disorder, bipolar disorder, and irritability associated with autism spectrum disorder (Education Medicaid Integrity Contractor, 2015). However, antipsychotic medications are used for purposes that are not FDA approved; these include ADHD, aggressive behavior, conduct disorder, anxiety, and depression (Crystal et al., 2009). Moreover, according to research done by the Centers for Medicare and Medicaid Services, an agency of the U.S. Department of Health and Human Services, in 2015, more than three-fourths of Medicaid-enrolled youth taking an antipsychotic were prescribed the medication for an unapproved purpose

(Education Medicaid Integrity Contractor, 2015). There is also great variation among states with their rates of antipsychotic prescriptions to children in foster care. Matone et al. (2015) found that from 2002 to 2007 across the United States, the prevalence of antipsychotic use ranged from 3% to 22%, with the median being 12.8%. Efforts have been made at the federal and state levels to address the problem of over-prescribing antipsychotics to youth in care, yet the issue remains an ongoing concern.

Explanations for the Prevalence of Antipsychotics Among Youth

Possible explanations theorized for the increasing pervasiveness of antipsychotics in children are the increased acceptability of psychotropic medication use in children holistically, limited access to non-pharmacologic treatments, the demand for quick and affordable treatments, inadequate provider time, and the limited treatment options for vulnerable populations, which include foster care youth (Harrison et al., 2012). Additionally, for children in foster care, there is limited clinical expertise among child welfare caseworkers and other stakeholders about the proper use of psychotropic medications (Allen, 2015). In 2013, the American Academy of Pediatrics conducted a survey in which 65% of pediatricians indicated a “lack of training in the treatment of children/adolescents with mental health problems with counseling or medications” (Horwitz et al., 2015). This statistic becomes especially problematic when it is added that there is a widespread shortage of child and adolescent psychiatrists nationwide. In 2015, 43 states were classified as having a “severe shortage” of child and adolescent psychiatrists (Tyler et al., 2017). Thus, parents or guardians have had to turn to primary care physicians and pediatricians when presented with concerns or questions about their

children's mental health (Tyler et al., 2017). The shortage of qualified practitioners also means that there are long wait times between a caregiver's first call and the time of the appointment. A study across five major U.S. cities found that the time until the first available appointment averaged 12.7 days for a primary care pediatrician and 42.9 days for a pediatric psychiatrist (Cama et al., 2017). Moreover, patients with Medicaid coverage were less likely to obtain an appointment than patients who held private insurance or paid out of pocket (Cama et al., 2017).

Implementation of Monitoring and Oversight Programs and Policies

Various policies have been put in place to monitor the prescription rates of antipsychotic medications among foster youth. For example, in 2011, the Centers for Medicare and Medicaid Services, the Substance Abuse and Mental Health Services Administration, and the Administration for Children and Families addressed their concerns to state Medicaid directors about the prevalence of psychotropic medications among children in foster care (Administration for Children and Families, 2012). States were directed to investigate psychotropic medication use and were aided by the Center for Health Care Strategies in establishing oversight and monitoring programs (Allen, 2015). Through this initiative, five states improved their psychotropic monitoring programs through, for example, standardizing and strengthening consent processes, tracking outcomes, and drawing attention to issues in need of future follow-up (Center for Health Care Strategies, 2018). The state of Texas developed a multimodal managed care intervention for Medicaid-insured foster children in 2008 called STAR Health that reduced psychotropic medication prescription by 30% and increased the prevalence of

follow-up care appointments (“STAR health overview,” n.d.). The development of STAR Health was also accompanied with the launch of Health Passport, which provides authorized caregivers, caseworkers, and healthcare providers with a comprehensive health record for individuals in foster care (“Benefits and features,” n.d.). This multimodal approach significantly reduced the frequency of off-label antipsychotic prescriptions (Mackie et al., 2020). Moreover, a review by Mackie et al. (2021) showed the implementation of prior authorization programs reduced the prevalence of antipsychotic medication prescriptions. Other states including California, Illinois, New Jersey, Oregon, Rhode Island, and Vermont implemented similar laws or programs (California Department of Social Services and Department of Health Care Services, n.d.; Center for Health Care Strategies, 2018). However, more research is needed to determine the effectiveness of various interventions on the prevalence of antipsychotic medications for children and adolescents, particularly those whose primary coverage is Medicaid.

Purpose of the Current Paper

The purpose of this review is to systematically analyze the use of antipsychotic medications among foster youth in the United States. While Mackie and colleagues (2021) explored various system-wide interventions that have been employed to regulate and monitor antipsychotic usage, a comprehensive review examining the pervasiveness of antipsychotics among foster youth has not been undertaken. Additionally, efforts have been made to regulate antipsychotic usage, yet there remains a need to bring awareness to the issue of antipsychotic medications and their place in the lives of foster children across

the U.S. Nevertheless, this review moves beyond the work in this area by providing additional clarity on the state of antipsychotic utilization among foster youth.

CHAPTER TWO

Methods

We conducted this systematic review in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) 2020 checklist (Page et al., 2021). In addition, we consulted the process outlined by Boland and colleagues (2017).

Search Strategy

We reviewed electronic databases to gather peer-reviewed literature on the use of antipsychotics within foster care. To do this, we systematically searched APA PsycINFO, Academic Search Complete, Medline, Psychology and Behavioral Sciences Collection, Science Direct, Web of Science, Psychology Collection, JSTOR, and Google Scholar for articles published between 2000 and 2021. We chose this timeframe because of the dramatic increase in the use of antipsychotics in the early 2000s (Matone et al., 2015). The search terms we used encompassed the population of interest (i.e., Medicaid, foster care), age of interest (i.e., child, adolescent, teen, youth, young adult), and the health topic of interest (i.e., antipsychotic).

Table 1

Keywords and Phrases Used in Electronic Databases

- (1) foster care OR Medicaid
 - (2) child* OR adolescen* OR teen* OR youth OR young adult*
 - (3) antipsychotic*
 - (4) NOT polypharmacy
-

Eligibility Criteria

Five criteria were used to determine which peer-reviewed articles would be included in the review: 1) data were collected in the U.S., 2) the study had a publication date of 2000 or later, 3) the study was published in English, 4) the population of focus in the study was children in the foster care system, ages 0-21, but could also include other Medicaid-eligible youth (i.e., SSI, TANF, SCHIP)¹ as a comparison, and 5) the article's focus was on the usage of antipsychotic medication. We excluded articles that did not meet these inclusion criteria. In addition, we excluded articles having a strong indication that the primary research focus was the interaction or combination of an antipsychotic with another medication type, including another antipsychotic (i.e., polypharmacy).

Article Selection

We used Zotero reference management software to organize imported articles. A total of 1,295 articles were initially identified in the database search (see Table 2), then narrowed down to 845 when duplicates were removed. Articles were then screened by title and abstract, resulting in 41 articles. Per the process outlined by Boland and colleagues (2017), titles and abstracts were assessed to determine whether the articles discovered pertained to the use of antipsychotic medications within the foster care system. During this step, 804 articles were excluded. The 41 articles that passed title and abstract screening qualified for a full-text review in which they were critically assessed using pre-determined criteria. The full-text review included articles whose titles and

¹ Those enrolled in Supplemental Security Income (SSI), Temporary Assistance for Needy Families (TANF), and State Children's Health Insurance Program (SCHIP) may receive Medicaid benefits. SCHIP is now more commonly known as CHIP (Children's Health Insurance Program).

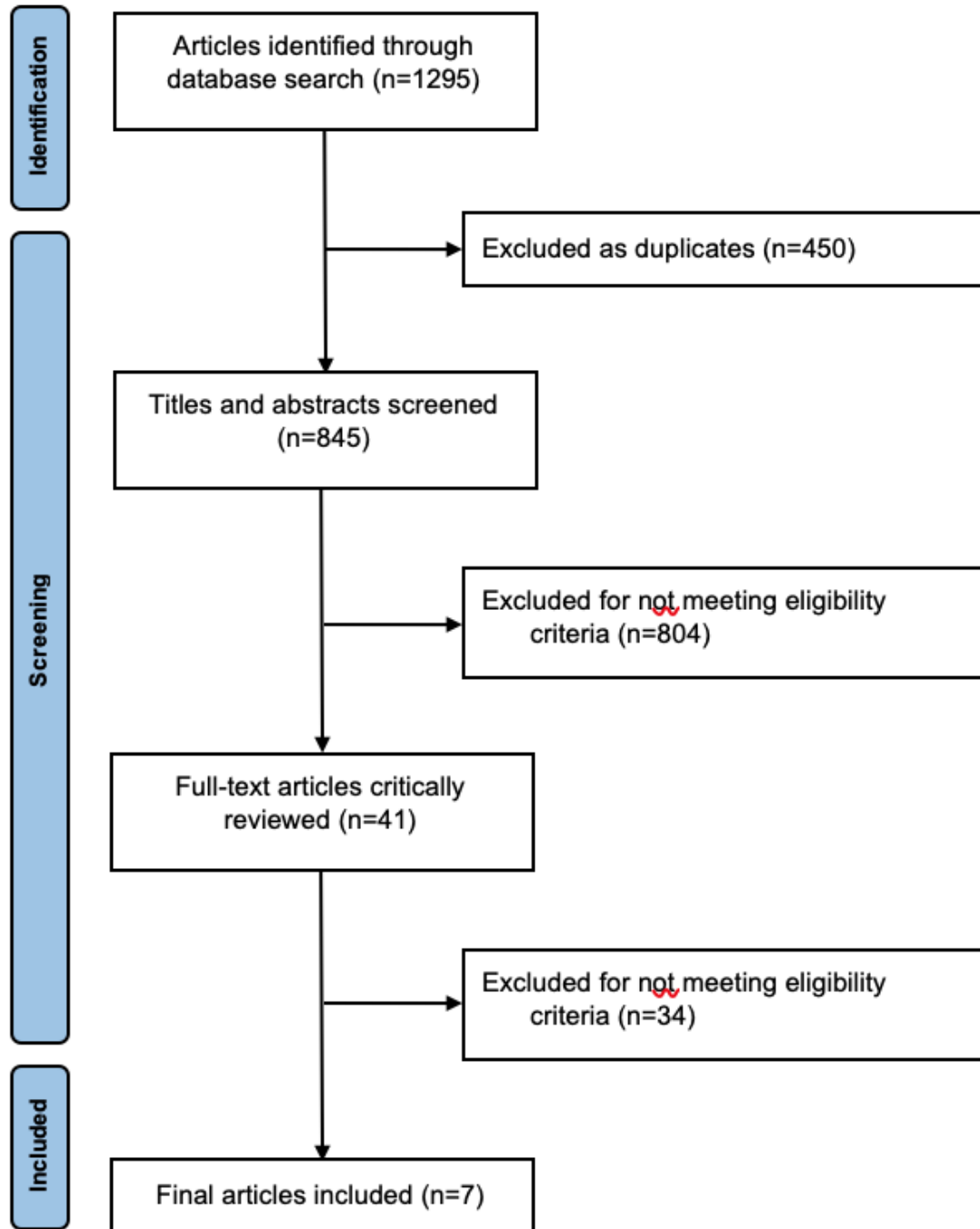
abstracts did not provide enough information to determine whether the article met eligibility criteria for review in the previous step. Ultimately, after thorough appraisal, seven articles met the criteria for inclusion in this review. Each article was assessed with regard to findings related to antipsychotic medication prescriptions among foster youth, using a comparison group of other Medicaid-eligible youth when possible. See Figure 1 for the PRISMA diagram showing the article selection process.

Table 2

Database Search Results

Database Searched	First Search
APA PyscInfo	170
Academic Search Complete	120
Medline	270
Psychology and Behavioral Sciences Collection	16
Science Direct	190
Web of Science	175
Psychology Collection	109
JSTOR	145
Google Scholar	100
Total	1295

Figure 1
PRISMA Diagram



CHAPTER THREE

Results

The seven papers analyzed in this review utilized quantitative methods and were peer-reviewed publications in reputable scholarly journals. All of the studies covered used administrative claims data gathered by state Medicaid agencies. Six of the seven studies (i.e., Burcu et al., 2014; Crystal et al., 2016; Goddard et al., 2016; Leckman-Westin et al., 2018; Vanderwerker et al., 2014; Zito et al., 2013) evaluated the effect of Medicaid eligibility group on the use of antipsychotics while the other study assessed antipsychotic use and psychotropic polypharmacy within a population of Medicaid-enrolled foster youth (i.e., Rubin et al., 2012). Furthermore, six of the studies included in this review (i.e., Burcu et al., 2014; Crystal et al., 2016; Goddard et al., 2016; Rubin et al., 2012; Vanderwerker et al., 2014; Zito et al., 2013) examined antipsychotic use in combination with an externalizing disorder(s) variable. Publication years ranged from 2012 to 2018, and all samples were drawn from the United States. Three of the studies evaluated claims data from one state (i.e., Burcu et al., 2014; Goddard et al., 2016; Zito et al., 2013), while the other four papers compiled Medicaid records from 10 or more states (i.e., Crystal et al., 2016; Leckman-Westin et al., 2018; Rubin et al., 2012; Vanderwerker et al., 2014).

The following section details the themes discussed in this review, which include prominent prescribing trends at both state and national levels, indications of overuse among foster youth, utilization of services designed to monitor youth taking antipsychotics, and the frequency of off-label prescribing.

Trends in Antipsychotic Use

Several studies reported a range of statistics regarding antipsychotic use within foster care. For example, Goddard and colleagues (2016) reported the antipsychotic utilization rate to be between 13% and 18% for youth in foster care in Indiana. Rubin and colleagues (2012) reported the same statistic, finding that the median absolute antipsychotic usage percentage for foster children was 12.8% across 47 states and the District of Columbia.

Several articles pointed to the plateauing or decelerating curve of antipsychotic prevalence. In particular, around 2007 or 2008, the plateau or decelerating curve for antipsychotic medication distribution becomes evident (i.e., Crystal et al., 2016; Goddard et al., 2016; Rubin et al., 2012). Goddard and colleagues (2016) pointed to the increasing trend of antipsychotics among an Indiana Medicaid population from 2004 to 2008, followed by a leveling out from 2008 to 2012. Similarly, Rubin and colleagues (2012) found that in 2003, 42 states experienced an increase in second-generation antipsychotic use with the prior year serving as the baseline. However, by 2007, this number had declined to 13 states. Crystal and colleagues (2016) describe the “new normal” (p. 978) or plateaued prescription rate as being significantly higher than before the spike of the early 2000s. While state oversight, specialized care programs, and policy changes have all likely contributed to the stabilization, concern for youth in foster care remains (Crystal et al., 2016). Antipsychotic utilization rates remain high for foster youth despite the various efforts being made to curb usage (Crystal et al., 2016).

Indications of Antipsychotic Overuse Among Foster Youth

The most prevalent theme identified across the seven studies was the concern for foster youth and the accompanying need for monitoring in regards to antipsychotic prescription trends. The various studies addressed indicators of overuse within the foster care population. Youth in foster care or those receiving SSI were twice as likely than youth enrolled in Medicaid via income to receive higher-than-recommended doses of antipsychotics, even when mental health diagnosis was controlled for (Leckman-Westin et al., 2018). Foster youth also had a more than double odds ratio for antipsychotic use compared to those in Medicaid, although not in foster care, when demographics and diagnoses were controlling factors (Vanderwerker et al., 2014). Zito and colleagues (2013) found that the adjusted odds ratio for antipsychotic use in 2006 versus 1997 was greatest for youth enrolled in Medicaid by SCHIP, followed by youth enrolled through foster care. Vanderwerker and colleagues (2014) established that the rate of antipsychotic use was highest among foster youth as compared to Medicaid eligibility by disability (i.e., SSI) or income (i.e., TANF and SCHIP). Foster youth were also subjected to using antipsychotics for a longer duration than other Medicaid-eligible youth (Burcu et al., 2014). Across childhood and adolescence, ADHD-diagnosed foster youth were on antipsychotic medication for over 100 days more than ADHD-diagnosed youth enrolled in Medicaid through income, even when sociodemographic and clinical characteristics were controlled for (Burcu et al., 2014). ADHD, depression, or anxiety-diagnosed foster youth were almost twice as likely to be prescribed an antipsychotic compared to nonfoster care youth with the same diagnoses (Crystal, et al., 2016). Crystal and colleagues (2016) found that youth in foster care made up 15.3% of antipsychotic users

within the holistic Medicaid population, despite constituting only 3% of that population. Across several of the studies, the high utilization rates of antipsychotics for foster youth are not explained by a higher prevalence of psychiatric diagnoses within that population as that factor is controlled for, resulting in further concern.

Utilization of Services

Amidst the concern for youth in foster care, several studies pointed to the utilization of interventions by Medicaid-enrolled youth holistically, both within and outside of foster care. Interventions ranged from the provision of psychosocial services to metabolic monitoring. These studies found that youth in foster care were more likely to benefit from such services. Leckman-Westin and colleagues (2018) reported significantly higher odds of foster youth being provided a psychosocial service as well as a follow-up visit with a prescriber as compared to Medicaid-eligible youth by income. In a review of data from 2011, Crystal and colleagues (2016) found similar results: Medicaid-enrolled foster children were more likely to receive psychosocial interventions than other Medicaid-insured youth. Specifically, nearly two-thirds of foster children received services while fewer than one-third of nonfoster Medicaid youth received the same services. Moreover, despite being rare amongst all groups, the use of glucose and lipid monitoring was most common for youth in the foster care group (Leckman-Westin et al., 2018). Crystal and colleagues (2016) found that 18.01% of other Medicaid-eligible youth received glucose and cholesterol metabolic monitoring in 2011 compared to 28.09% of the foster children studied. While the studies assert the increased chances of receiving some type of intervention in combination with the use of an antipsychotic for those in

foster care, they emphasize that gaps in intervention persist, and there remain considerable areas for improvement among all Medicaid groups.

Assessing the Commonality of Off-Label Prescribing

Another theme noted across the articles was the breakdown of the various psychiatric disorders or conditions that were being treated with antipsychotic medications. Crystal and colleagues (2016) did not find evidence of antipsychotic prescription expansion for diagnostic categories with weaker indications. As described by Salmasian and colleagues (2015), “Medications are prescribed to treat or prevent different signs, symptoms, diseases, or conditions, which are collectively known as indications” (p. 1261). Specifically, Crystal and colleagues (2016) found that antipsychotic use for foster and non-foster youth increased from 2005 to 2010 for bipolar diagnoses (strong indication) while remaining stable for ADHD, anxiety, and depression disorders (weak indications). In other words, off-label prescribing did not become more common for foster or non-foster youth diagnosed with ADHD, depression, and anxiety disorders. Two studies reported statistics about the prevalence of off-label prescribing. Nearly 63% of youth enrolled in Medicaid who were treated with an antipsychotic in 2006 were diagnosed with ADHD, disruptive disorder, or bipolar disorder (Zito et al., 2013). Similarly, approximately 50% of the antipsychotic-treated youth were diagnosed with a disruptive disorder or ADHD, while only 18.7% of the Medicaid-insured youth were being treated for strong indicators of schizophrenia or bipolar disorder (Burcu et al., 2014).

Table 3*Characteristics of the 7 studies meeting eligibility criteria*

Study	Location	Date of Data	Population	Data Source	Main Findings
Burcu et al. (2014)	Mid-Atlantic state	2006	266,590 youth aged 2–17 who were continuously enrolled in a mid-Atlantic state Medicaid program in 2006	Computerized Medicaid administrative claims data	Foster youth were exposed to atypical antipsychotic medications for the longest median duration (240 days), followed by youth receiving SSI (210 days), CHIP (172 days), and TANF (125 days). ADHD-diagnosed foster youth had >100 days of additional exposure to atypical antipsychotics than ADHD-diagnosed youth enrolled in income-eligible Medicaid categories.

Table 3 (Continued)

Study	Location	Date of Data	Population	Data Source	Main Findings
Crystal et al. (2016)	20+ states	2005-2013	Individuals aged 0-17 enrolled in Medicaid between 2005 and 2013	Computerized Medicaid administrative claims data, Medicaid data provided directly by three states, and data for privately insured children from Truven Health Analytics MarketScan Commercial Claims Databases	The pattern of rising antipsychotic use plateaued around 2008. In 2010, the 3.0% of Medicaid-insured children in foster care accounted for 15.3% of antipsychotic usage among all youth enrolled in Medicaid. Among foster children, antipsychotic usage fluctuated from 8.73% in 2005 to 9.26% in 2008 to 8.92% in 2010. Among youth being treated with an antipsychotic medication, 65.47% of foster youth received psychosocial interventions as compared to 29.01% of non-foster youth enrolled Medicaid.

Table 3 (Continued)

Study	Location	Date of Data	Population	Data Source	Main Findings
Goddard et al. (2016)	Indiana	2004-2012	Children enrolled in Medicaid for at least one month during 2004-2012 (N=683,716–793,637)	Computerized Medicaid administrative claims data	Second-generation antipsychotic use leveled out around 2008 in Indiana. Annual utilization rates for antipsychotics among foster children were 4-5 times higher than among non-foster children enrolled in Medicaid. Foster children were approximately twice as likely to be administered antipsychotics than Medicaid-enrollees with the same psychiatric diagnosis (i.e. ADHD, mood disorders) who were not in foster care.
Leckman-Westin et al. (2018)	10 states	2008	144,200 Medicaid enrollees aged < 21 years who received antipsychotics	Computerized Medicaid administrative claims data	Children receiving SSI and in foster care were twice as likely to receive higher-than-recommended doses of antipsychotics as income-eligible Medicaid youth. Children receiving SSI and in foster care were more likely to have appropriate management through psychosocial interventions and metabolic monitoring, despite shortfalls in management being present across all Medicaid groups.

Table 3 (Continued)

Study	Location	Date of Data	Population	Data Source	Main Findings
Rubin et al. (2012)	47 states and the District of Columbia	2002-2007	Average of 686,080 children annually aged 3–18 years with foster care Medicaid eligibility	Computerized Medicaid administrative claims data	Second generation antipsychotic use increased from 2002-2007 among foster youth, with signs of deceleration beginning around 2005. State-specific rates for use of any antipsychotic varied significantly.
Vanderwerker et al. (2014)	44 states	2009	301,894 Medicaid-enrolled youth in foster care and 5,092,574 Medicaid-enrolled youth not in foster care were analyzed	Computerized Medicaid administrative claims data	Being in foster care was a significant predictor of antipsychotic use after controlling for demographic and diagnostic factors. Foster children had a more than double odds ratio of antipsychotic use compared to nonfoster youth. High rates of psychiatric diagnoses among foster children only partially accounted for increased levels of antipsychotic use.

Table 3 (Continued)

Study	Location	Date of Data	Population	Data Source	Main Findings
Zito et al. (2013)	Mid-Atlantic state	1997, 2006	456,315 youth 2-17 years of age who were continuously enrolled in Medicaid in 1997 (N=159,171) and 2006 (N=297,144)	Computerized Medicaid administrative claims data	Overall, antipsychotic use more than doubled from 1997 to 2006 across all children receiving Medicaid, including those in foster care. In 2006, the odds of antipsychotic use were greatest among youths enrolled in SCHIP (AOR=5.9), followed by youths enrolled in foster care (AOR=4.1), TANF (AOR=3.6), and SSI (AOR=2.8).

CHAPTER FOUR

Discussion

Goal of the Current Paper

The purpose of this review was to analyze the prevalence of antipsychotic medications among foster youth in the United States. Seven studies met the final inclusion criteria for this analysis and were included in this review. Several patterns were revealed in the studies examined: 1) antipsychotic prevalence appeared to plateau around 2008 among Medicaid-insured children with the new level being higher than the pre-spike prevalence of the late 1990s and early 2000s, 2) there were indications of foster youth being overprescribed antipsychotics, 3) foster youth generally utilized psychosocial and metabolic services to a higher extent than other Medicaid-enrolled children, and 4) there were signs of off-label prescribing of antipsychotics. The results gathered in this systematic review are consistent with previous findings; however, this review also provides additional clarity on the state of antipsychotic utilization in this vulnerable population. While this systematic review demonstrates that concern should be extended to the population of focus, foster youth, regarding its receipt of antipsychotic medications, the findings of this review suggest that this concern should be expanded to include youth enrolled in Medicaid via SSI, TANF, or SCHIP as well. Our systematic search of the literature indicates that Medicaid-insured youth not in foster care also exemplify inappropriate antipsychotic medication prescribing trends.

Analysis of Plateau Finding

Several articles in this review pointed to the plateauing effect of antipsychotic use broadly around 2008. While the new level of antipsychotic usage should remain a concern, the slowing of antipsychotic prescription patterns was likely a repercussion of policy changes and monitoring programs that have been implemented across the United States. On a national level, the Fostering Connections to Success and Increasing Adoptions Act (FCSIAA) of 2008 required state plans to coordinate and oversee health care services for foster youth (U.S. Congress, 2008). The FCSIAA of 2008 was built upon in 2011 through the Child and Family Services Improvement and Innovation Act, which required states to develop tools to monitor appropriate use of psychotropic medications (U.S. Congress, 2011). At the state level, initiatives to regulate antipsychotic distribution among youth became widespread from 2005 to 2012. By 2013, 45 of the 50 states and the District of Columbia had implemented at least one program or strategy to monitor foster youth's appropriate receipt of psychotropic medications (Mackie et al., 2017). In a systematic review by Mackie and colleagues (2021), various monitoring programs were assessed. While the evidence basis did not allow specific conclusions to be drawn, varying degrees of success were observed. Nonetheless, the most robust evidence of their review revealed that prior authorization programs were associated with significant reductions in Medicaid antipsychotic treatment across age groups. Some researchers note that the decreasing use of antipsychotics in itself does not indicate a shift towards overall better practices, however (Findling et al., 2011; Scotto Rosato et al., 2012). Antipsychotic medications have been approved by the FDA to treat various conditions (Education Medicaid Integrity Contractor, 2015), and thus, Mackie and

colleagues (2021) suggest that a reduction in antipsychotic prescriptions could result in suboptimal treatment. Nevertheless, caution must be exercised when analyzing the effectiveness of interventions aimed at curbing antipsychotic prevalence among Medicaid youth.

Potential Reasoning for Overuse Indications

An additional theme noted across the articles pointed to the high utilization rates of antipsychotics among foster youth despite diagnostic and demographic criteria being controlled for. While foster children were diagnosed with behavioral and mental health disorders to a greater extent, the use of antipsychotics appeared to outweigh the increased prevalence of diagnoses. The issue of inappropriate antipsychotic prescribing trends to foster youth is complex and does not have a single solution. The following considerations are not an exhaustive list but rather should be considered components of a greater issue. First, as mentioned previously, a majority of states have experienced an ongoing shortage of pediatric and adolescent psychiatrists (Tyler et al., 2017). Moreover, there is evidence that many physicians do not feel qualified in the area of mental health (Horwitz et al., 2015). Rettew and colleagues (2015) found that antipsychotic prescribing patterns follow best practice guidelines only half of the time and that psychiatrists were more likely to follow best practice guidelines than non-psychiatrists. The shortage of equipped pediatricians and psychiatrists, as well as mental and behavioral health specialists, may also limit the time a provider is able to spend with each patient. It is possible that the antipsychotic prescription trends detailed in this review exist, in part, due to a lack of

medical expertise and insufficient time by those in the pediatric and adolescent mental health realm.

Second, prescription medication use as a primary treatment option was broad and extensive in the U.S. in the late 1990s and 2000s. Between 1987 and 1996, there was a dramatic increase in the use of psychotropic medications for children (Olfson et al., 2002). Moreover, medication use holistically became more accepted as television advertisements for pharmaceuticals increased. Exposure to pharmaceutical advertising increased from 2003 to 2007 and then declined 43% by 2011. Despite the decline, in 2011, households were being exposed to an average of 1,334 pharmaceutical advertisements annually (Kornfield et al., 2015). Because medications became increasingly popular and accepted on a national scale, the transition to using antipsychotics within vulnerable populations likely did not involve significant mindset or societal changes. American medical and consumer society gradually shifted in a direction that was more accepting of widespread medication use, as evidenced by Kantor and colleagues (2015), who found that prescription drug use by adults in the U.S. increased from 51% in 1999-2000 to 59% in 2011-2012. Similarly, evidence began to emerge that some medications, specifically antipsychotics, resulted in positive effects for users. Biederman et al. (2005) and Findling et al. (2004) discussed the positive impact antipsychotics, and particularly risperidone, had on young patients with bipolar and disruptive disorders. Thus, there was greater familiarity with medications generally but also greater clinical evidence for the use of medications in the late 1990s and early 2000s, potentially contributing to the rise of antipsychotics among those in child welfare.

Third, similarly to the shortage of both primary care physicians and psychiatrists, the United States has experienced an ongoing scarcity of mental health professionals. The U.S. Health Resources and Services Administration projects that by 2030, shortages will be present among psychiatrists and addiction counselors, assuming utilization rates will remain comparable (U.S. Department of Health and Human Services, Health Resources and Services Administration, 2020). Hodgkinson and colleagues (2017) noted that children and families living in poverty are very likely to need mental health services at some point, yet they often have the least access to such services. Because there appears to be a deficiency in non-pharmacological, therapy-based treatment options for mental health needs, guardians may be turning to the quicker and easier solution of pharmaceuticals to treat their children's mental and behavioral conditions.

Underscoring the Importance of Health Monitoring

Having access to and utilizing services in combination with antipsychotic medication treatment is particularly important considering the broad existence of off-label prescribing. In the articles included in this review, foster youth were more likely to have psychosocial services or metabolic monitoring compared to other Medicaid-eligible groups. However, it was noted that employment of services was low across all Medicaid-insured youth. Giving antipsychotic medications to foster youth for diagnoses not approved by the FDA increases their risk of negative side effects as well as exposes their developing brains to medications in which long-term studies have not been undertaken (Kelleher et al 2020). As mentioned previously, there are known adverse side effects of antipsychotic medications for FDA-approved conditions. Largely unknown, however, are

the long-term effects of antipsychotics when used for unapproved conditions. Off-label prescriptions are less likely to go through robust clinical trials for conditions or illnesses that have not been approved by the FDA (Bodie, 2021). The medication is more likely to have gone through the FDA approval process for a different medical purpose. Metabolic testing before, during, and after receipt of such medications is necessary to ensure proper health.

Limitations

Several limitations warrant mention. First, the number of studies included in this review is small. Our systematic search of the literature excluded papers that did not focus primarily on antipsychotic dispersal to foster youth. A broader literature search may reveal additional publications that critically assess multiple psychotropic medications or study psychotropic medications within a larger population. Second, while the publication dates of the articles included in this review are all relatively recent, the years in which data were collected across the U.S. occurred in some cases several years prior to publication and should be understood within that context.

Implications, Future Direction, and Conclusion

Through our systematic search of the literature and synthesis of findings, we aimed to assess the severity of antipsychotic medication prescribing trends in the U.S. for youth in foster care. Analysis of the literature, however, revealed that the problem of inappropriate antipsychotic prescribing is not limited to youth in foster care. Youth enrolled in Medicaid through SSI, TANF, and CHIP were also improperly prescribed

antipsychotics. We sought to propose areas where additional research is needed and, where enough evidence was available, to guide policymakers, social workers, and physicians in their efforts to promote best practices regarding the prescription of antipsychotic medications for youth in the U.S. foster care system, as well as other Medicaid-insured youth generally.

There are a number of avenues for further research that should be explored. First, future studies should examine more recent trends regarding antipsychotic medication prescription among foster youth as Medicaid data becomes available. As policymakers, social workers, and medical professionals become more aware and knowledgeable of antipsychotic medications and their implications among foster youth, antipsychotic prescription trends should become more closely aligned to best practice standards. Second, further education for primary care doctors that focuses on mental health diagnoses and treatment should be employed throughout the U.S., particularly in settings that serve a large number of foster youth. Research should examine how to best educate clinicians for the long-term health betterment of this vulnerable population group. Third, more research is needed to assess the effects of antipsychotics on youth being treated for ADHD, depression, anxiety, conduct disorder, etc. As off-label prescribing has grown and remains a common phenomenon, particularly in treating externalizing disorders, understanding the effects of using antipsychotics for such unapproved purposes is necessary.

Antipsychotic medication prescription trends, around and following the usage spike of the early 2000s, leave much room for concern, particularly for youth in care. While policy changes and monitoring programs have been established with varying

success, attention and best care practices must still be implemented and maintained to America's vulnerable foster care population.

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