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## Pediatric ADHD and Screening for Comorbidities

Colleen Kelly

SIU SOM, colleen62485@yahoo.com

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## Pediatric ADHD and Screening for Comorbidities

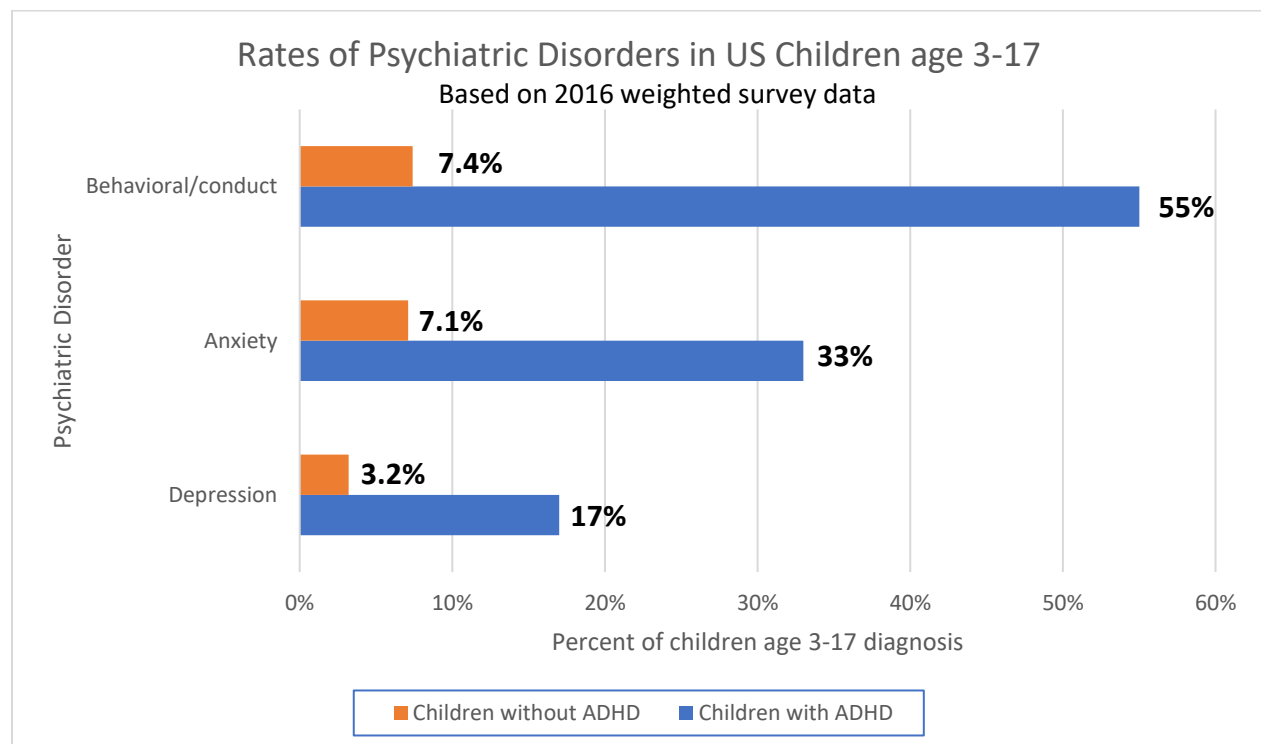
### Cover Page Footnote

I thank the following individuals for their expertise and assistance throughout all aspects of our study and for their help in writing and proofreading this manuscript: Dr. Veronica Savage MD FAAP, Dr. Rachel Terrill PA-C DMSc, and Dr. Allison Paul DNP, RN.

## INTRODUCTION

Attention deficit hyperactivity disorder (ADHD) is the most prevalent psychiatric disorder among children. It affects 9.4% of all children in the United States.<sup>1</sup> Over half of all children with a diagnosis of ADHD also have at least one diagnosis of an additional psychiatric or behavior disorder.<sup>1</sup> Children with ADHD are more likely to experience psychiatric disorders of anxiety, depression, oppositional defiant disorder, and conduct disorder compared to their peers (Figure 1).<sup>1</sup> Many of the diagnostic criteria for ADHD laid out in the Diagnostic and Statistical Manual (DSM-V) are identical to those seen in other pediatric psychiatric disorders; specifically anxiety and depression.<sup>2</sup> There is a known shortage of specialists and a known deficit in education and confidence of primary care providers with regards to pediatric psychiatry.<sup>3</sup> Primary care providers must learn to differentiate among common psychiatric disorders and when to assess for these disorders.

**FIGURE 1**



## METHODS

A review of the literature was performed on PubMed with the following search terms: ADHD and psychiatric comorbidity pediatrics; ADHD pediatrics; ADHD and anxiety pediatrics. With

limits of full-text articles published in the last five years, this search yielded 323, 2692, and 488 results respectively. Articles were then excluded if they included neurological diagnoses, those with autism spectrum disorder (ASD), or did not include ADHD with at least one other pediatric psychiatric disorder.

It is important to note that ASD often co-occurs with other psychiatric diagnoses including ADHD. However, typical screening tools can be difficult to use in the evaluation and diagnosis of psychiatric comorbidities with ASD. For this reason, studies including those with ASD were excluded.

Additionally, many children with neurological disorders (e.g. epilepsy, tic disorder) have co-occurring psychiatric diagnoses. However, polypharmacy and overlapping symptoms between neurological and psychiatric disorders can make the diagnosis and treatment of psychiatric conditions in these children complicated. Therefore, studies with neurological disorder components were excluded.

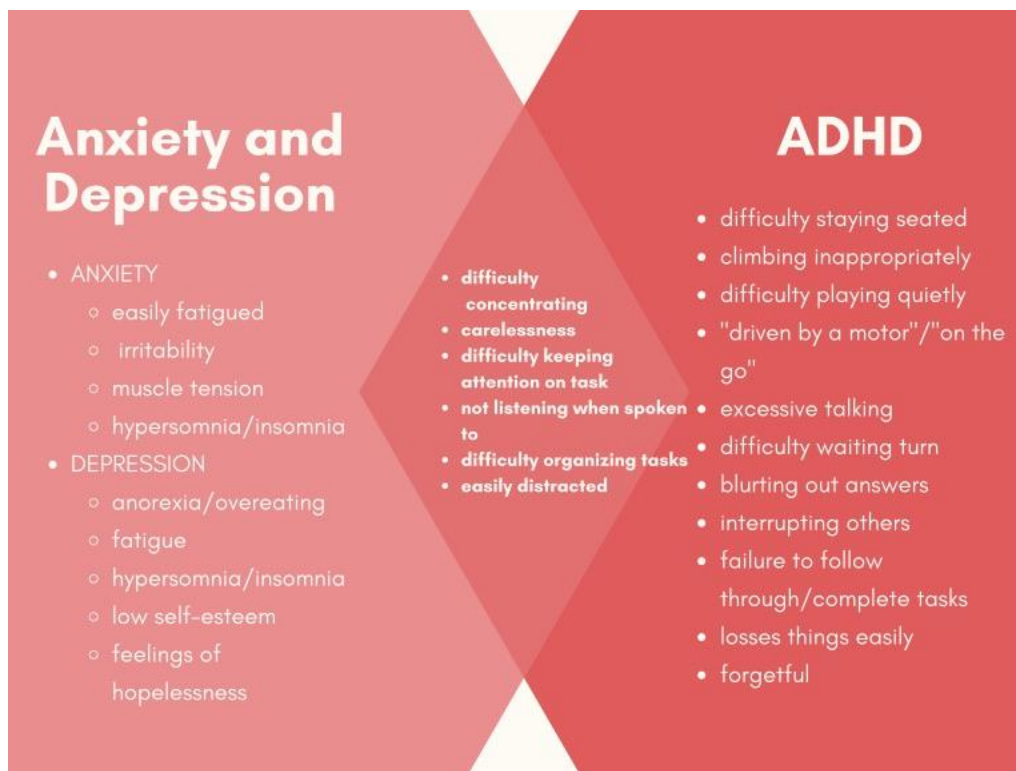
Conclusively, 26 articles met the above criteria and were included in this literature review.

## **RESULTS**

Following the review of the 26 relevant articles, 18 of the articles directly discussed the frequency of comorbid psychiatric conditions in youth and especially with ADHD. Of these 18 articles, nine discussed the need for a comprehensive psychiatric assessment in pediatric patients with suspected or diagnosed behavior and mood disorders. Five of the articles discussed the effects of COVID-19 on mood and behavior disorders in pediatric patients. Three of the relevant articles discussed the need for primary care providers to provide care for patients' psychiatric conditions.

### **The commonality of comorbidities**

Every article confirmed the comorbidity of ADHD symptoms and various psychiatric conditions in pediatric patients (see Figure 2). When examining the diagnostic criteria of ADHD, five of the nine inattention criteria and three of the nine hyperactivity criteria are also consistent with anxiety diagnostic criteria. In relation to depression, at least four of the nine inattention criteria and two of the nine hyperactivity criteria overlap.<sup>4</sup>

**FIGURE 2**Overlapping Diagnostic Criteria of ADHD, Anxiety, and Depression<sup>4</sup>

Within the literature, there was an overwhelming amount of data detailing the increased rate of additional psychiatric disorders in those with ADHD as compared to the general population. When looking at symptomatology, two separate studies showed that those with ADHD demonstrated more externalizing (e.g. yelling, fighting) and internalizing (e.g. anxiety, sadness, loneliness) symptoms compared to peers without ADHD.<sup>5,6</sup> Comparably, a study in the United Kingdom that consisted of 696 children with diagnosed ADHD demonstrated that through comprehensive evaluation, these children also met the criteria for depression (4.2%) and anxiety (6.1%).<sup>7</sup> A recent literature review reports an even higher rate of anxiety in those with ADHD with 23.05% being affected by both.<sup>8</sup> These numbers were further confirmed in a recent meta-analysis looking only at female youth, which reported additionally high rates of anxiety and depression in those with ADHD at 37.7% and 10.9% respectively.<sup>9</sup> The rate of anxiety in the general pediatric population without ADHD is 13.9% while depression is 2.9%.<sup>9</sup>

When looking beyond anxiety and depression, ADHD is even more common with behavioral disorders. As noted previously, the rate of ADHD in US children is 9.4%.<sup>1</sup> This is roughly 5% in European countries.<sup>5</sup> A large study (female n=454; male n=295) throughout

Europe found that youth with a diagnosis of conduct disorder (CD) also had a diagnosis of ADHD at a rate of 30.4% for females and 44.7% for males; exponentially higher than the general pediatric population.<sup>7</sup> These numbers are concerning as those with ADHD and psychiatric comorbidities demonstrate increased problems in areas of sleep difficulty, academic performance, and peer and family relationships.<sup>10</sup>

### **Effect of COVID-19 on mental health**

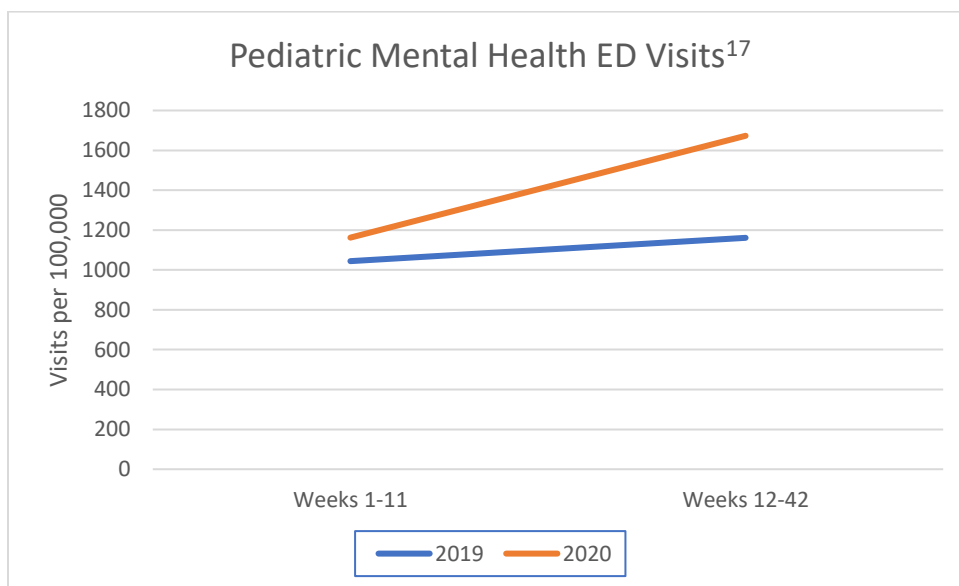
This analysis would not be complete without addressing the effects that the COVID-19 global pandemic has had on the mental health of children. It has been well documented throughout other large disease outbreaks and natural disasters, that children's mental health is negatively affected by these events. Following outbreaks of severe acute respiratory syndrome (SARS), Middle East Respiratory Syndrome, and Ebola, children demonstrated increased feelings of anxiety and anger.<sup>13</sup> The aforementioned outbreaks along with natural disasters (e.g. floods, hurricanes) have led to long-term negative impacts on health and relationships, especially when affected children are under five years of age. In older school-age and adolescent children, these same circumstances lead to social isolation and loneliness that also have negative long-term physiological effects.<sup>13</sup>

When looking specifically at COVID-19, a meta-analysis revealed that globally, children with pre-existing mental health conditions demonstrated more sleep difficulties, aggression, and core ADHD symptoms. Specifically, between 70% and 90% of children studied demonstrated worsening behavior.<sup>14</sup> This affected both quarantined and non-quarantined children.<sup>14</sup> A US study of 238 adolescent children both with and without ADHD revealed that both groups had increased rates of anxiety and depression during the period of stay-at-home orders. Those with ADHD exhibited more externalizing symptoms of anger and defiance compared to those without.<sup>15</sup> The Kaiser Family Foundation published similar information reporting that over 31% of parents surveyed stated their children's mental and emotional health was worse in October 2020 as compared to before the pandemic.<sup>16</sup>

This information is further confirmed by the Morbidity and Mortality Weekly Report noting that though overall emergency department (ED) visits were significantly lower in weeks 1-42 of 2020 compared to 2019, the number of pediatric ED visits for mental health concerns per 100,000 increased. More specifically, in weeks 1-11 (December 30, 2019-March 15, 2020) there

was an 11% increase in pediatric mental health ED visits.<sup>17</sup> Following the beginning of the stay-at-home orders in the US during weeks 12-42 (March 16, 2020-October 18, 2020), these same visits increased by over 31% (Figure 3).<sup>17</sup>

**Figure 3**



Interestingly, during these same periods, parental concerns and pediatric office visits for ADHD and related symptoms decreased.<sup>16</sup> This was found to largely be due to decreased challenges in the home learning environment compared to school.<sup>14</sup> This data further reinforces the need for a comprehensive evaluation of psychiatric symptoms in children.

### **Evidence for comprehensive testing**

Comprehensive evaluation for mental health complaints has long been encouraged by the American Academy of Pediatrics (AAP). As described by the American Medical Association (AMA), pediatric primary care providers create an environment of trust and are often the first place caregivers seek help for mental health concerns.<sup>18</sup> Additionally, there are many more pediatric patients requiring evaluation and treatment of mental health problems than the pediatric psychiatry sub-specialty system can manage.<sup>19</sup> One study looking at comprehensive testing found that in some patients with comorbidities, a psychiatric diagnosis other than ADHD is the

principal diagnosis (e.g. depression, anxiety).<sup>20</sup> This establishes a need for comprehensive evaluation.

Along with learning difficulties, undiagnosed comorbidities often have additional negative effects. Those with multiple mental health issues often experience problems within family relationships, physical safety of themselves and others, and delayed readiness to participate in school and group activities.<sup>21</sup> Without proper diagnosis and treatment of all mental health disorders, patients often experience long-term adverse outcomes in both school and employment.<sup>22</sup> The AAP reports that family members of children with mental health problems often experience significant distress themselves.<sup>21</sup>

The evidence of the need for comprehensive assessment is even stronger as children age and become adolescents. Due to the increasing prevalence of anxiety and depression in adolescents, it is recommended that, at a minimum, patients with an existing psychiatric diagnosis be screened yearly for comorbidities.<sup>23</sup> More specifically, the AAP recommends that screenings include ADHD, anxiety, depression, and substance use disorder (SUD).<sup>24</sup> The Society for Developmental and Behavioral Pediatrics takes this one step further and recommends screenings at every office visit (e.g. new issues, follow-up) and that screenings, including for SUD, start at age 9. Though most 9-11-year-olds are not at risk for SUD, having a psychiatric diagnosis places them at increased risk.<sup>22</sup> This is confirmed by a small study that found that over 50% of adolescent participants presenting for concerns of ADHD had symptoms better explained by SUD and other psychiatric disorders.<sup>25</sup>

## **DISCUSSION**

Roughly 75%-85% of all pediatric psychiatric disorders are diagnosed and treated in the primary care clinic.<sup>26</sup> It is quite apparent that all pediatric patients with suspected or confirmed ADHD need a more comprehensive evaluation. So, why isn't this happening?

A reasonable explanation of why this isn't happening is due to a lack of provider training and confidence. A survey conducted by the AAP noted that 65% of responding pediatricians did not feel they had adequate training to appropriately treat psychiatric disorders and 40% felt they could not appropriately recognize these disorders.<sup>27</sup> These responses were mirrored by a survey of pediatric primary care providers in rural Maryland that noted only 56.9% were "very comfortable" with administering and interpreting mental health screening tools, and only 16.7% were "very comfortable" with prescribing psychiatric medications.<sup>28</sup> It is important to note that



in the Maryland study, the average number of years in practice was 15.<sup>28</sup> What is more troubling, is the survey noted over 82% of these providers stated they could not find a psychiatrist in a timely manner and over 63% stated they could not find a counselor/therapist for their patients promptly.<sup>28</sup>

When reviewing the Maryland survey, this data can be generalized to many urban and rural areas across the country. There is a clear lack of available services in pediatric psychiatry. Additionally, clinicians with many years of experience are lacking confidence in addressing the growing epidemic of pediatric mental health disorders. What's more concerning is that we as a medical community rely on experienced physicians to train resident physicians. Without proper training in mental health evaluation and treatment for both experienced and resident clinicians, we cannot expect to make any improvement in the pediatric mental health epidemic.

## **CONCLUSION**

This literature review has demonstrated that not only is ADHD a common diagnosis in pediatric patients, but that comorbidities are equally as common and require appropriate assessment and treatment as well. Pediatric patients with suspected or known ADHD require regular follow-up and assessment of ADHD. In addition to this, they also require a thorough evaluation of depression and anxiety at a minimum. For patients exhibiting worsening externalizing symptoms, primary care providers should evaluate patients for possible behavior disorders. These evaluations should be done yearly at a minimum. For adolescent patients, this also includes evaluating for SUD regularly as well.

The state of the current mental health system along with the psychiatric effects of COVID-19 are not going to improve unaided. There are numerous screening tools for depression, anxiety, ADHD, and other psychiatric disorders available. Ultimately, clinicians need to educate themselves on how to properly administer and interpret such tools. This needs to be done at regular intervals and as new psychiatric symptoms arise. This is crucial for appropriate diagnosis and treatment of ADHD and comorbidities.

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