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Addressing Treatment Disparities for Black Children with Neurodevelopmental Disorders

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ABSTRACT

This systematic literature review comprehensively assessed existing literature on diagnosis, screening, and interventions appropriate for Black children and adolescents who present with neurodevelopmental and intellectual disabilities. Four research questions were answered in this project. The first two research questions explored intervention strategies that were most appropriate for school-aged Black children who presented with neurodevelopmental disorders, while the third and fourth research questions explored strategies to help practitioners in preventing misdiagnosis and improving access to evidence-based treatment. The theoretical frameworks were Piaget's and Vygotsky's theories. Research indicated Black children experienced treatment disparities and misdiagnosis yet more effective diagnosis and treatment modalities, such as telehealth delivery and AI-supported mental health screening and psychological testing, may help address these issues. An analysis of the findings and recommendations for future research included exploring the effectiveness of diagnosis and treatment options via telehealth delivery. There were 12 emerging themes analyzed for all research questions. The findings revealed that interventions for Black children should be designed to address various life areas, including spirituality, related to social emotional skills to be deemed effective. Implications for professional practice include developing cultural competence and implementing standard screening assessments as part of providing mental health services and psychological assessment services.

KEYWORDS: Interventions for Black children, screening assessments, Black children, neurodevelopmental disorders

Neurodevelopmental disorders such as Intellectual Disabilities (ID, DSM-5) or Disorders of Intellectual Development according to International Classification of Diseases-11 (11) ICD-nomenclature, Autism Spectrum Disorder (ASD) and Attention-Deficit/Hyperactivity Disorder (ADHD) (Márquez-Caraveo et al., 2021) have a high prevalence in childhood and constitute a large proportion of global disability. ASD is most common among children with ADHD, serving as a co-occurring mental health disorder (Hong et al., 2021). A cohort study by Shi et al. (2021) found within the first year after diagnosis 19.4% of preschool children receive behavioral therapy only. An interesting finding is that a higher percentage of school-aged children (65.6%) were

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prescribed medications and fewer had therapy only (14.4%) or no treatment at all (20%). Additionally, Attention-deficit/hyperactivity disorder (ADHD) is a growing health crisis in the United States (Bozinovic et al., 2021). Black children are more likely to be diagnosed with ADHD or a learning disability. Among children ages 3-10 years, non-Hispanic black children (12.8%) were more likely to be diagnosed with ADHD or a learning disability than non-Hispanic white (10.1%) or Hispanic (10.1%) children (Zablotsky & Alford, 2020, p. 2). Adams et al. (2024) identified Black, Hispanic, and Asian youths were less frequently diagnosed with ADHD during healthcare visits and were somewhat less likely to receive treatment, indicating that minority children may experience underdiagnosis and undertreatment. The aim of this systematic literature review was to examine appropriate diagnosis and interventions for Black children and adolescents presenting with symptoms of neurodevelopmental disorders. The following research questions informed this systematic review of the literature: (1) Which intervention strategies are most appropriate for school-aged Black children who present with neurodevelopmental disorders such as ADHD? (2) Which intervention strategies are most appropriate for school-aged Black children who present with neurodevelopmental disorders such as ASD? (3) How can practitioners working with school-aged Black children who present with neurodevelopmental disorders such as ADHD prevent misdiagnosis and improve the changes of access to evidence-based treatment? (4) How can practitioners working with school-aged Black children who present with neurodevelopmental disorders such as ASD prevent misdiagnosis and improve the changes of access to evidence-based treatment? This research addressed current gaps in the literature related to neurodevelopmental disorders and Black children. Specifically, the research questions focused on providing the field of psychology with insights into screening, diagnostic, and intervention strategies that were most appropriate for school-aged Black children who presented with neurodevelopmental disorders such as ADHD and ASD. The results of this review may inform future clinical practice to reverse disparities for Black children and support evidence-based, culturally competent treatment. Clinicians must interpret and contextualize information obtained from family, caregivers, and educators in order to assign an appropriate diagnosis (Fadus et al., 2020). Both mental health and psychology practitioners may utilize findings from this study to prevent misdiagnosis and ensure evidence-based treatment (Tanner et al., 2022). These findings can benefit practitioners—school psychologists, counselors, applied behavioral analysis (ABA) providers, and others—by supporting licensed professionals in education, mental health, and psychology to implement integrated, holistic treatment approaches for school-aged children's academic, behavioral, and psychological needs.

Theoretical Framework

The theoretical framework that was pivotal to this systematic review is Jean Piaget's theory of cognitive development. Piaget's (1952) seminal work centered on children progressing through four non-age-related, culture transcending stages. These four stages of cognitive development included the sensimotor stage, preoperational stage, operational stage, and formal operational stage (Babakr et al., 2019). The sensorimotor stage, birth to two years old, was the stage where infants and toddlers acquire knowledge through sensory experiences and manipulating objects (Piaget, 1952). The preoperational stage, ages two to seven, was the stage where toddlers, preschoolers, and school-aged children (up to 1st grade) began to think symbolically and learned to use words and pictures to represent objects. This was also the stage where they were egocentric and struggled to see other perspectives (Piaget, 1952). The concrete operational stage, ages seven to 11, was where children began to think logically about concrete events and using inductive logic, while in

the last stage, formal operational stage, ages 12 and up, the adolescent or young adult began to use deductive logic to think abstractly and reason about hypothetical problems (Piaget, 1952).

This theory was important to the proposed study because it focused on *how* students grasped information throughout their lifespan. This theory was vital to learning about neurodevelopmental disorders and cognitive development. Neurodevelopmental disorders affected the brain on the executive functioning skills, that were required to complete daily tasks. Executive functions" (EFs) was an umbrella term for higher cognitive control functions such as working memory, inhibition, and cognitive flexibility (Zink et al., 2021).

A second theoretical framework that supports this systematic view was Lev Vygotsky's theory of learning and development, in particular, his concept of the zone of proximity. Vygotsky's (1978) influential work included addressing the social, historical, and environmental context in which children develop. He believed that children learned when working with others in groups or with a teacher or peer (Vasileva & Balyasnikova, 2019). This theory was important because it focuses on *interaction* as students were learning in groups, socially. Children diagnosed with neurodevelopmental disorders, such as ADHD and ASD, had social issues and needed support in peer settings. This theory linked to language development across environments. Social development required understanding verbal or nonverbal language to connect meaningfully with others.

Additionally, these findings may help parents become more aware of more interventions that can help their child grow in every area of their lives by sparking creativity and addressing biological, psychosocial, behavioral, and academic needs with an integrated, holistic approach to interventions. A third benefit of these findings may help children with selecting interventions that spark their creativity in which can improve their emotional needs as they work on addressing areas of improvement in their behaviors, social skills, and academic knowledge in a variety of settings. ADHD and learning disabilities are the most diagnosed neurodevelopmental disorders in children and often coexist (Zablotsky & Alford, 2020). Furthermore, neurodivergence is the term that refers to individuals who have a neurocognitive profile that diverges from the majority (Cobbaert et al., 2024). Neurodevelopmental disorders such as ADHD, autism, Tourette's syndrome, giftedness, dyslexia, dyscalculia, dyspraxia, and intellectual disability are considered neurodivergence (Cobbaert et al., 2024; Tok & Berk, 2014). According to the National Survey of Children's Health (NSCH, 2020), the nationwide childhood prevalence of ADHD is 8.7%, with 62.1% of diagnosed children receiving medication to address its symptoms. Yet, Black children are more likely to receive a diagnosis of ADHD than white youth (Zablotsky & Alford, 2020). Geographic disparities also exist, with Louisiana, a southern state, having the highest percentage of children (15.7%) diagnosed with ADHD, while California has the lowest percentage (5.6%) (Bozinovic, et al., 2021). Findings by Adams et al. (2024) suggest disparities along racial lines, likely related to underdiagnosis and undertreatment of minority children (Black, Hispanic, and Asian youth). Specifically, both autism spectrum disorder (ASD) and ADHD are neurodevelopmental disorders that begin in childhood and usually persist throughout life. They frequently co-occur in the same individual; they have distinct and overlapping clinical symptoms (Sainsbury et al., 2023). Hence, Children presenting with both ASD and ADHD are often identified at developmental stages distinct from those diagnosed with a single condition. Findings by Sainsbury et al. (2023) suggested children with both conditions often receive an ASD diagnosis later if ADHD appears first, while ADHD tends to be recognized earlier in those with ASD. According to the National Survey of Children's Health (NSCH, 2020), the nationwide childhood prevalence of ADHD is 8.7%, with 62.1% of diagnosed children receiving medication to address its symptoms. Yet, Black children are more likely to receive a diagnosis of ADHD than white youth (Zablotsky & Alford, 2020). Interestingly, Louisiana, a southern state, has the highest percentage of children (15.7%) diagnosed

with ADHD, while California has the lowest percentage (5.6%) (Bozinovic, et al., 2021). Findings by Adams et al. (2024) suggest disparities along racial lines, likely related to underdiagnosis and undertreatment of minority children (Black, Hispanic, and Asian youth) impacting access to treatment. The current standard of practice is to routinely consider a broad differential of comorbid disorders when youth exhibit disruptive symptoms; however, biases may lead clinicians less likely to explore these potential explanations for behavior (Fadus et al., 2020). Misdiagnosis can lead to Black children receiving clinically inappropriate behavioral interventions or even worse, school suspensions based upon infractions related to classroom misbehavior (Moody, 2016; El-Mekki & Morgan, 2024). Black youth with neurodevelopmental disorders face barriers to accessing and using a variety of clinically indicated interventions (Frey, 2020). This places them at risk for serious and long-lasting harmful consequences, including substance abuse, academic failure, negative psychological and psychosocial well-being, lack of employment, and delinquency (Bozinovic et al., 2021; Cummings et al., 2017). Without the proper diagnosis and treatment available to ADHD clients, they will turn to other options to fill that void such as substance use. Young adults with ADHD were also three times more likely to experience an illicit drug disorder (other than cannabis) when compared to their peers without ADHD [18% vs 5%] (Fuller-Thomson et al., 2021). Lack of employment is another impact on their lives. For example, it has been shown that individuals with ADHD perform more poorly at work and quit (200% increase in risk) or have been fired from their job (66% increase in risk) more often than typically developing individuals (Fuermaier et al., 2021). A lack of employment adversely impacts their psychological and psychosocial well-being.

Literature Review

Staff et al. (2021) found that antecedent-based techniques were most effective. However, children who suffer from low visuospatial working memory, low emotional functioning, and/or large numbers of attentional lapses may benefit from interventions that include consequent-based techniques such as token economies (Nizar, 2018). It is important to keep in mind that child neurocognitive functioning does influence the effectiveness of behavioral teacher techniques for children who present with ADHD. Huang et al. (2021) found that effective behavioral interventions reduce ADHD symptoms over six months. Van Langen et al. (2020) found that children with low impulsive negative behavior toward gaining reward improved most during their treatment yet pre-post treatment change was linked to one measure of parent-rated reward sensitivity.

Psychological and Psychosocial Interventions for ASD

Gómez et al. (2021) conducted a study to review empirically supported psychological interventions to treat psychiatric and behavioral disorders in people with intellectual disabilities. Gómez et al. (2021) claim applied behavioral analysis, positive behavior support, cognitive behavioral therapies like mindfulness-based cognitive therapy, and contextual therapies like dialectical behavior therapy are effective. Youth with ASD are at high risk for experiencing clinical anxiety interfering with schoolwork and relationships. Reaven et al. (2022) trained school providers to deliver a 13-session, school-adapted group CBT program for 29 students (ages 8–14) with ASD and anxiety, finding the Facing Your Fears-School-Based Program (FYF-SB) program developmentally appropriate and effective. Also, parents and students reported reduced anxiety, suggesting school-based interventions are effective and easily accessible.

Academic and Behavioral Interventions for ASD

Since 1980, the American Psychiatric Association (APA) created the Diagnostic and Statistical Manual (DSM) III to address diagnosis in humans, especially children and adolescents. Odom et al. (2021) examined school-based interventions for children and youth with autism (1980–2020), identifying themes like adult-led instruction, inclusive education, technology-assisted interventions, and evidence-based practices, suggesting these approaches could shape U.S. educational systems. Secondary students, ages 10 and up, with high incidence disabilities and present with disruptive behaviors struggle to be successful in general education settings (Kumm et al., 2021). Therefore, general education teachers are looking for ways to implement evidence-based interventions to increase engagement and on-task behaviors. Kumm et al. (2021) conducted a single-case withdrawal design (ABAB) to implement self-monitoring in high school general education classrooms who received special education services for a high incidence disability. The iPad application, MoBeGo, was utilized in this study. Data revealed that MoBeGo, when implemented with fidelity, improved students' academic engagement and appropriate behavior. Also, both the teachers and students rated MoBeGo as socially acceptable intervention.

Academic and Behavioral Interventions for ID

As many children with ID gain more freedoms, they are able to engage in more activities resulting in their increased interest in technology such as mobile devices and virtual game programming. Torra Moreno et al. (2021) suggested digital interventions are effective in improving working memory, academic skills, and areas in social skills and behaviors. Blakeley-Smith et al. (2021) found that the CBT group was feasible with 99% of the sessions attended and 19/23 completed treatment. Lastly, significant reductions were noticed in anxiety post-intervention (Blakeley- Smith et al., 2021). Kurtz et al. (2020) recommends that medication should be applied after a functional behavioral assessment has been conducted to identify environmental antecedents and child-caregiver interactions that may be reinforcing the problem behavior.

Pharmacological Interventions for Neurodevelopmental Disorders

The Food and Drug Administration (FDA) in the United States of America (USA) for children ages 5 and older recommends treatment with risperidone and aripiprazole to treat comorbidity for ASD. Alsayouf et al. (2020) revealed that pharmacological intervention should continue to be considered in a comprehensive intervention plan with traditional supportive therapies. Psychotropic medications are prescribed to treat psychiatric symptoms in children, adolescents, and adults with developmental conditions. Cukier and Barrios (2019) claim that few drugs showed efficacy, but risperidone and aripiprazole to treat irritability and Methylphenidate and atomoxetine for hyperactivity and attention deficit. Psychostimulants optimize prefrontal cortex efficiency, through their effect on dopamine and norepinephrine, helping individuals with ADHD manage attention and executive tasks more effectively (Mechler et al., 2022). Cortese (2020) highlights, "Amphetamines and methylphenidate, and less often, nonstimulants such as atomoxetine, clonidine, and guanfacine) are used to treat ADHD" (p. 1050).

Alternative Interventions for Neurodevelopmental Disorders

There are various alternative medicine interventions available for children presenting with neurodevelopmental disorders. Gibbons (2020) claim that child-centered play therapy (CCPT) may

serve as a significant intervention to re-assess trauma versus misdiagnosis of ADHD. CCPT has shown to be highly effective in treating traumatized children, as well as minimizing their symptoms, after receiving CCPT for treatment. Non-pharmacological interventions are recommended for the treatment of challenging behaviors in individuals with intellectual disabilities by clinical guidelines (Bruinsma et al., 2020). Bruinsma et al. (2020) found mindfulness and behavioral non-pharmacological interventions effectively reduced challenging behaviors long-term. Hence, interventions that focus on the holistic child—body, mind, and spirit—should continue to be explored.

Theoretical Frameworks

Piaget's (1952) theory of cognitive development and Lev Vygotsky's (1978) theory of learning and development provided the theoretical framework for this systematic review. This theory was important to the study because it focused on *how* students grasped information throughout their lifespan. Piaget's theory was vital to learning about neurodevelopmental disorders and cognitive development. Neurodevelopmental disorders affected the brain on the executive functioning skills, that were required to complete daily tasks. Vygotsky's theory was important because it focuses on *interaction* as students were learning in groups, socially. Social development requires that students understand nonverbal or verbal language to be able to make meaningful connections to others. Children that presented or have been diagnosed with NDDs had social issues and needed support learning how to work in peer settings.

Method

The research method utilized was the systematic literature review, which allowed for identification and critical appraisal of relevant research studies using pre-specified inclusion criteria (Snyder, 2019). Articles were included in this study if they were published between 2018 and 2023 in peer-reviewed journals since the focus was on recent research regarding appropriate diagnosis and interventions for Black children and adolescents presenting with symptoms of neurodevelopmental disorders. Eligible studies had to be written in English and provide relevant data related to the research topic. Only original research articles, published dissertations, systematic reviews, and meta-analyses were considered, while editorials, commentaries, and conference abstracts were excluded. Studies that focused on Black school-aged children and adolescents, ages 5-18, who have been diagnosed or present with symptoms of neurodevelopmental disorders, including ADHD, Autism, and Intellectual Disability and utilizing a qualitative research approach were prioritized for inclusion. The Preferred Reporting Items for Systematic Reviews and Meta Analyses, PRISMA-2020, Checklist were followed in order to ensure transparency and reliability of this review and appraisal of evidence, thereby minimizing bias and improving the reliability of findings (Moher et al., 2015).

Ethical Considerations

The Institutional Review Board (IRB) reviewed and approved (IRB #070223-41022, date of issuance 2/7/23) this research study to ensure adherence to ethical research standards. The approval process involved submitting a detailed research protocol outlining the study's objectives, methodology, potential risks, and measures to protect participant confidentiality and rights. The IRB conducted a thorough evaluation to ensure compliance with ethical guidelines, including informed consent procedures, conflict of interest, bias, including research and publication bias, and

data protection measures. Only after receiving formal IRB approval was the research initiated, ensuring that all procedures aligned with established ethical standards and regulatory requirements.

Participants

The researcher obtained data from a review of the existing data by evaluating primary and secondary resources such as scholarly publications, research studies, websites, books, academic journals, videos, and online interviews made available publicly in databases on Black school-aged children and adolescents, ages 5-18, who have been diagnosed or present with symptoms of neurodevelopmental disorders, including ADHD, Autism, and Intellectual Disability.

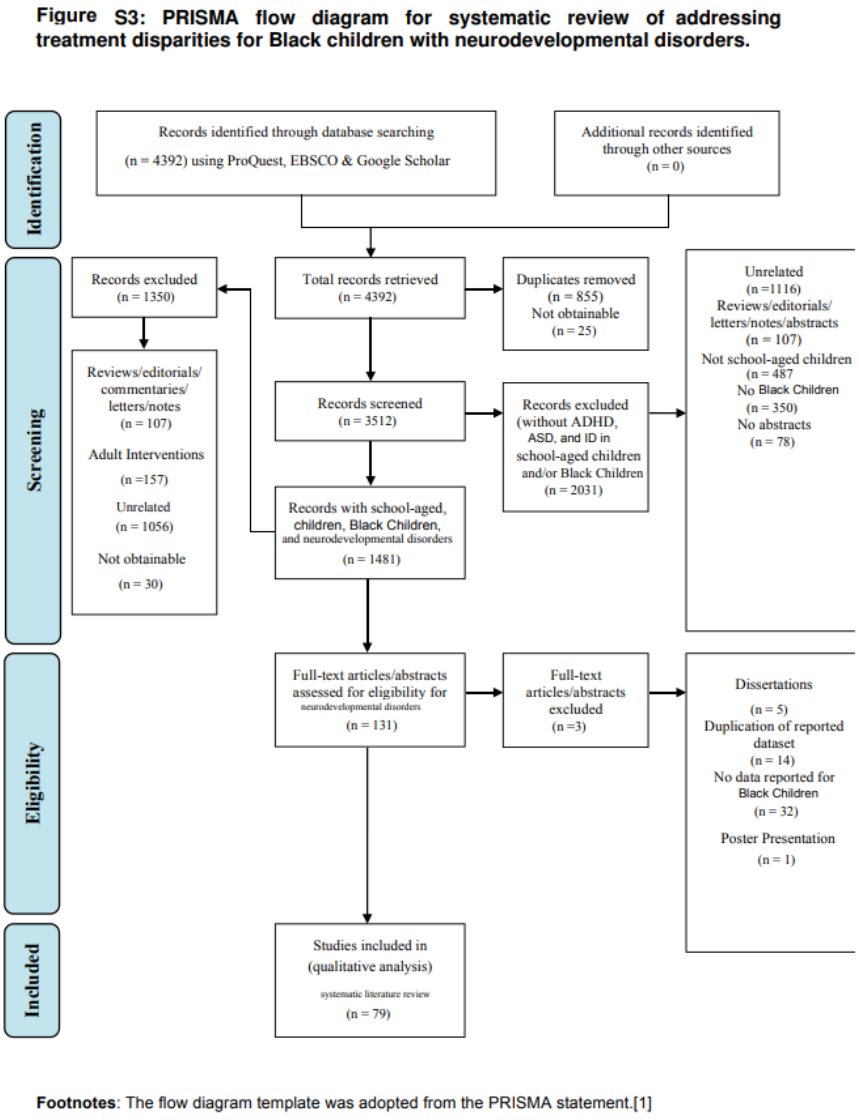
Instrumentation

The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA-2020) was selected as a reporting instrument for this systematic review. Specifically, the researcher used the PRISMA for Protocols 2020 (PRISMA-P). The 2020 PRISMA protocol included a 20-item checklist that was used to help create the research and reporting of the systematic review (Page et al., 2021).

Data Collection

Systematic reviews should be based on well-characterized protocols, which enhance method transparency and the reliability of findings (Moher et al., 2015). The PRISMA Flow Diagram was used to portray the number of total articles reviewed, showing records identified, included, and excluded to support tracking studies and data collection (Moher et al., 2015).

Figure 1
PRISMA 2020 Flow Diagram



Source: Page et al., 2021

In the initial stage of this systematic literature review, potential articles were gathered through database keyword searches, using the PRISMA Flow Diagram to record the number of records retrieved, included, and excluded. Keywords included were neurodevelopmental disorders, ADHD interventions, ASD interventions, ADHD psychological interventions, ADHD psychosocial interventions, ADHD behavioral interventions, ADHD alternative interventions, ASD psychological interventions, ASD psychosocial interventions, ASD behavioral interventions, ASD alternative interventions, ID psychological interventions, ID psychosocial interventions, ID behavioral interventions, and ID alternative interventions. Search engines targeted articles published between 2018 and 2023, though the inclusion of older articles included historical context, using ProQuest, Google Scholar, EBSCOhost, and Psychiatry Online databases. The review

encompassed qualitative, quantitative, and mixed method studies, and data extraction focused on organizing the information to identify major themes relevant to the research questions.

Data Analysis

The researcher used the PRISMA-2020 checklist to systematically guide identification, categorization, and reporting of the themes, including any incongruent findings (Page et al., 2021). Once articles were captured and screened, a thematic analysis informed by qualitative synthesis was employed to identify and align themes for each research question. NVivo software was utilized to help identify and organize codes, themes, and categories. A three-stage process that included line-by-line coding, descriptive theme development, and code comparisons were utilized to create analytical themes (Braun & Clarke, 2006; Thomas & Harden, 2008). This approach allowed the researcher to go beyond the original study content by using both emerging themes and codes to answer the research questions.

Results

Based on the NHIS data in 2019 and 2020, the estimated population of 61.3 million children and adolescents aged over 3–17 years included 5.2 million individuals with ADHD, 1.8 million with ASD, 0.9 million with ID, and 3.9 million with LD (Yang et al., 2022). With the increasing number of individuals affected by neurodevelopmental disorders, focusing on diagnosis, treatment, and interventions to support their psychological well-being is crucial. The analysis of 79 peer-reviewed articles identified key themes to address each research question in this qualitative systematic review. Yang et al. (2022) found that Black, Hispanic, and/or Asian populations with ADHD used fewer medications and had lower overall mental health treatment expenditures than White children, suggesting that interventions targeting treatment access for racial-ethnic minority populations may help close existing care gaps. The aim of RQ1 was to identify specific intervention strategies that would be deemed most appropriate for school-aged Black children with neurodevelopmental disorders such as ADHD. Four key themes emerged regarding intervention strategies, highlighting the need for behavioral support, social skills training, and self-management strategies, as teachers often lack specific knowledge in these areas (de Villiers & Barnard, 2022).

Theme One: Psychosocial Interventions

The first emerging theme focused on psychosocial interventions for Black children in grades K-12, emphasizing socio-emotional competencies such as self-awareness, relationship skills, and responsible decision-making (Sun et al., 2021; Wilkes-Gillan et al., 2022). These interventions could include activities to explore identity, beliefs, spirituality, career paths, relationships, and self-management activities with smartwatch interventions improving organizational skills (Cibrian et al., 2022). Individual parent–child treatments were most effective for ADHD and disruptive behaviors, especially when including parental involvement and training to support behavioral management (Baumel et al., 2021).

Theme Two: Specific Academic Interventions

The second emerging theme focused on specific academic interventions for Black children in grades K-12, emphasizing the importance of teachers modifying support strategies to accommodate each learner and investigating the causes of behaviors and utilize the natural learning

environment to support learning experiences (De Villiers & Barnard, 2022). Specific classroom resources for children with ADHD include therapeutic balls, elastic bands, sensory boxes, and educational games to reduce unwanted movements and increase focus (De Villiers & Barnard, 2022). Auditory stimulation strategies can also help regulate ADHD symptoms like attention, impulsivity, and emotional control (Dursun et al, 2021). For reading instruction, interventions should focus on behavior support outside of reading time. However, During reading time, interventions should target phonological awareness and comprehension in small groups or one-on-one for Grades K–5, while Grades 7–10 receive small-group comprehension and reading instruction (Roberts et al., 2019; Reed, 2023).

Theme Three: Psychoeducation Interventions

The third emerging theme focused on psychoeducational interventions for Black children in grades K-12, specifically those diagnosed with ADHD. Psychoeducation is shown to improve ADHD symptoms, medication adherence, reduce the *frequency* and *intensity* of conflict-related behaviors, and decrease illness severity for both children and adults (Baumel et al., 2021; Lantz et al., 2021). Interventions integrating psychotherapeutic and educational material designed for ages seven to 17, delivered in 1 to 12 sessions ranging from 45 minutes to 180 minutes, including one to two parental knowledge sessions are recommended to inform parents, children, and teachers about ADHD and its treatment (Baumel et al., 2021; Dahl et al., 2020).

Theme Four: Alternative Interventions

The fourth emerging theme focused on alternative interventions for Black children in grades K-12, specifically yoga and mindfulness meditation. These interventions, often combined with social-emotional learning, were found to improve behavioral self-regulation and attentional capacities yet did not significantly affect emotion regulation or oppositional behavior (Sun et al., 2021). Siebelink et al. (2022) conducted a study on a family mindfulness-based intervention for children ages eight to 16 with ADHD and their parents which showed benefits for children, particularly in improving parents' strategies to support their children with ADHD. The treatment included eight weekly 90-minute group sessions, along with assigned homework, with a follow-up session two months later led by a trained mindfulness teacher and co-teacher, while parents worked with another trained mindfulness teacher during the same timeframe.

Results Research Question Two

The aim of RQ2 was to identify specific intervention strategies that would be deemed most appropriate for school-aged Black children with neurodevelopmental disorders such as ASD. Three themes emerged from twelve studies, which were the following: (a) Social Functioning Interventions; (b) Benefits of Reading Interventions; and (c) Benefits of Targeted Interventions in Autism-Specific Public Schools and they are described below.

Theme One: Social Functioning Interventions

The first emerging theme focused on social functioning interventions for Black children in grades K-12, emphasizing psychosocial strategies that develop verbal and nonverbal communication skills to build rapport and support social competencies (Ferguson et al., 2021). Early gesture plays an important role in prelinguistic/emerging linguistic communication, offering

insight into a child's social communication skills before speaking in their home language (De Froy & Rollins, 2023). Previous studies of autistic children have historically been conducted with predominantly White, English-speaking research participants resulting in little data on cross-racial/ethnic differences in gesture rates between autistic children and their parents (De Froy & Rollins, 2023). Additionally, digital interventions like internet therapy, biofeedback, digital games, intervention mapping for gamified therapy, and virtual and augmented reality have been shown to improve sustained attention and social development, especially when combined with parental and therapist support (Reynard et al., 2022; Romero-Ayuso et al., 2021).

Theme Two: Benefits of Reading Interventions

The second emerging theme focused on reading interventions for Black children in grades K-12, emphasizing the need for academic strategies that target reading skills. Research shows that one in three students with ASD struggle with both decoding skills and comprehension. However, in the past decade, reading interventions for students with ASD have been designed to primarily address reading comprehension. Solís et al. (2018) conducted a single-case multiple baseline study to evaluate the effects of the intervention on participants' abilities to read words in isolation demonstrating the effectiveness of word study interventions in improving word recognition for students with low word reading skills (Solís et al., 2018).

Theme Three: Benefits of Targeted Interventions in Autism-Specific Public Schools

The third emerging theme focused on targeted interventions in Autism-Specific Public Schools for Black children in grades K-12. Research showed that Autism-Specific Public Schools provided more therapy services than private schools, but racial inequities in access to communication interventions remain, with 75% of Black children receiving significantly fewer communication interventions compared to their white peers (Erasmus et al., 2019; Pope et al., 2022).

Results Research Question Three

The aim of RQ3 was to identify specific strategies to prevent ADHD misdiagnosis and improve the changes of access to evidence-based treatment for school-aged Black children with neurodevelopmental disorders. Two themes emerged related to strategies to prevent misdiagnosis and improve the changes of access to evidence-based treatment. They are described below.

Theme One: Timely ADHD Identification and Intervention

The first emerging theme focused on implementing timely ADHD screening assessments for accurate diagnosis of ADHD and treatment options for Black children in grades K-12. Studies showed that diagnostic clinicians typically screen for traits such as inattentiveness, impulsiveness, hyperactivity, deficient social communication abilities resulting in only focusing on the symptomatology and patterns of behaviors in patients who present with NDDs (Cahyadi et al., 2022; Raglin Bignall et al., 2022). Additional studies showed that early identification and treatment of ADHD can improve neuroanatomy and function, leading to significant recovery and better overall quality of life (Jacob et al., 2023; Loh et al., 2022). These findings were congruent to another study that also contributed to early treatment of NDDs and how the timely identification of and intervention of ADHD is critical (Baghdadli et al., 2023; Willoughby et al., 2020).

Theme Two: Recommended Clinical and Care Guidelines

The second emerging theme focused on recommended clinical and care guidelines emphasizing the importance of cultural competence and addressing unconscious bias to present misdiagnosis of ADHD in Black children in grades K-12, as clinicians may over pathologize behaviors as disruptive (disobedient, dangerous, aggressive, hostile, and violent) rather than utilizing the DSM-5 criteria to consider other mental health disorders resulting in being diagnosed with disruptive behavior disorders, namely conduct disorder and oppositional defiant disorder (Fadus et al., 2019; Golos et al., 2021; Jungersen & Lonigan, 2021;). Additionally, behavioral therapy is recommended as the first-line treatment, with the use of screening tools like the ACE Questionnaire to assess childhood trauma and its impact on emotional regulation, along with involving children in the assessment process who are competent to complete self-rating scales to improve diagnostic accuracy regarding validity and reliability (Coles et al., 2020; Moran et al., 2019).

Results Research Question Four

The aim of RQ4 was to identify specific strategies to prevent misdiagnosis and improve the changes of access to evidence-based treatment for school-aged Black children with neurodevelopmental disorders, such as ASD. Three themes emerged focusing on strategies to address these issues and enhance treatment access. They are described below.

Theme One: Standard Screening for ASD

The first emerging theme focused on implementing standard screening assessments and shared clinical model for ASD for diagnosing ASD in Black children, using tools like the Modified Checklist for Autism in Toddlers and the Autism Diagnostic Observation Schedule recommended for use (Borkhoff et al., 2022; Dai et al., 2021; Marlow et al., 2019; Tan et al., 2020). It is also recommended that the Child Behavior Checklist 1.5–5 (CBCL 1.5–5) and DSM criteria be used to differentiate ASD from other developmental disorders (Cheng et al., 2022), with diagnoses made only by trained professionals (Brian et al., 2019). Research suggested that misdiagnosis is more likely in educational settings, where Black children are more often evaluated using educational records alone, Research showed that Black children, more often evaluated based on educational records alone, experience delays in ASD diagnosis with restricted and repetitive behaviors underreported, leading to misdiagnosis (Barnard-Brak, 2019; Esler et al., 2023; Tromans et al., 2020). The second approached focused on the shared clinical model in which a clinician has *joint* responsibility with another healthcare provider, such as a clinical psychologist, diagnosing ASD using diagnostic tools, while the *team-based* approach utilized a multidisciplinary team for assessment (Brian et al., 2019).

Theme Two: Systemic Factors Affecting ASD Diagnosis and Treatment

The second emerging theme focused on systemic factors affecting ASD diagnosis and treatment for Black children in grades K-12, including the enormous workload of diagnostic clinicians in the healthcare industry, time constraints in the labor-intensive screening process and the lack of specialized training for diagnosing young children (Borkhoff et al., 2022; Cahyadi et al., 2022; Hendr et al., 2023; Jacob et al., 2023; Loh et al., 2022). Studies showed there was a gap in the literature for diagnostic assessments on Black children in which they were diagnosed later

on average and faced cultural barriers, with parents experiencing a lack of support from both their communities and families, and diagnostic tools such as the ADOS-2 often being biased, specifically for Black children and girls (Cahyadi et al., 2022; Constantino et al., 2020).

Theme Three: Telehealth Autism Diagnostic Assessments

The third emerging theme identified key areas for ASD screening and diagnosis, including social communication, behavioral and emotional problems, sensory regulation, and engagement issues (Cahyadi et al., 2022). During the COVID-19 global pandemic, telehealth-based diagnostic tools like the Autism Diagnostic Interview-Revised and Autism Diagnostic Observation Schedule, Second Edition (ADOS-2) were implemented, with some providers creating ADOS-informed assessment that included a play and conversation (Spain et al., 2022). Despite being able to conduct ASD screening assessments via telehealth, a major concern still existed regarding validity and reliability of assessing social communication under various conditions that would normally be present during in-person appointments (Spain et al., 2022).

Theme Four: Artificial Intelligence (AI) and Autism Diagnostic Assessments

The fourth emerging theme identified there are no diagnostic biomarkers for ASD resulting in patients being diagnosed clinically through a comprehensive assessment process, including caregiver interviews, physical exams, and investigation of co-occurring conditions (Cortese et al., 2025). Research has explored the use of artificial intelligence (AI), such as convolutional neural networks (CNN), for improving ASD diagnosis, with five CNN Models—VGG16, Squeezenet, Resnet 18, Alexnet, and Googlenet. Data revealed that both Googlenet and Squeezenet had average of 90.48% accuracy (Hendr et al., 2023). Lastly, deep learning approaches, such as AutomL are more flexible and intuitive for optimization resulting in higher accuracy rates and minimal user intervention (Jacob et al., 2023).

Discussion

Numerous studies have provided evidence of ADHD interventions for school-aged Black children highlighting four key themes: Psychosocial interventions, specific academic interventions, psychoeducational interventions, and alternative interventions. These strategies include skill-building of socio-emotional problem solving, adaptive emotional regulation, establishing positive social circles, nature-based activities, and dietary interventions to reduce ADHD symptoms, including gut functioning to reduce less constipation, stool consistency, more frequent bowel movements, and improve overall well-being (Armitt et al., 2022; Dahl et al., 2020; Hontelez et al., 2021). Numerous studies have provided evidence of ASD interventions that are appropriate for school aged-Black children identified three key themes: Social functioning interventions, reading interventions, and targeted interventions in Autism-Specific Public Schools. Literature suggested practitioners increase awareness of ASD symptoms and address educational barriers through psychoeducational interventions, including in-person, hybrid, or virtual workshops for families and stakeholders (Erasmus et al., 2019). The most common diagnoses in siblings of ASD children were developmental coordination disorder (15.7%), ADHD (5%), intellectual disability (2.9%), and learning disorders (Baghdadli et al., 2023; PRAM Network, 2022). To address the barriers Black families face, multi-level interventions, including culturally appropriate conceptualizations, and policies in place to fight racism, culturally responsive teaching, and professional development for educators, are imperative to support psychological well-being and academic success (Dwarika &

Braude, 2020; Domsch et al., 2022; Winders Davis et al., 2021). Clay et al. (2024) claim both teachers and therapists highlighted that there is a diminished sense of professional competence when initially confronted with a child's trauma, poverty, or uninvolved parents (p. 76). Early detection and intervention improve the daily lives of children with NDDs, so it is important for screening instruments to be comprehensible and accessible (Chakraborty et al., 2022). However, a one-size fits all multidisciplinary team diagnostic approach is ineffective. They face racial discrimination, limited cultural competence in case conceptualization, and barriers such as missing educational information, scarce resources, and lack of access to Autism communities, all hindering timely, accurate assessments, educational support, and effective interventions crucial to their development and well-being (Brian et al., 2019; Donohue et al., 2019; Hughley & Larwin., 2021).

Conclusions

There is a growing body of evidence indicating that ethnic and racial minority youth, particularly Black children, are more likely to receive a diagnosis of a disruptive behavior disorder and are less likely to receive a diagnosis of ADHD (Fadus et al., 2020). Research indicates that Black children experienced treatment disparities and misdiagnosis, but interventions such as telehealth and AI technology could improve both mental health screening assessments and psychological testing processes. This study highlights diagnostic and treatment strategies supporting developmental milestones and psychological well-being in school-aged Black children.

Limitations and Future Directions

This study had several limitations including publicly available scholarly literature from prior conducted research, the absence of direct contact, and a limited body of previous research studies on neurodevelopmental disorders in Black children, which may warrant expanding the literature to include other minority children's populations (Owens, 2021). Additionally, systematic review depends on other researchers' data which could increase a risk of bias, such as selection or publication bias, due to dependence on previously conducted research. Lastly, this study used the PRISMA guidelines and did not utilize an additional series of checklists such as the Critical Appraisal Skills Programme (CASP) due to time constraints and IRB approval of solely the PRISMA guidelines. A delimitation of the study was its focus on examining screening, diagnosis, and interventions for Black school-aged children ages five to 18 with neurodevelopmental disorders.

The current study offers future researchers many avenues to further explore this topic. First, a qualitative, narrative inquiry research design could explore the lived experiences of Black Children who present with Neurodevelopmental Disorders in public or private schools to understand their perceptions of interventions. Specifically, conducting in-depth interviews with Black children diagnosed with neurodevelopmental disorders to explore their experiences with school interventions, accommodations, and their experience with the multidisciplinary levels of support received in the K-12 school setting. Second, a phenomenological approach could examine the experiences of Black parents and/or caregivers managing their children's diagnoses and treatments. For example, conducting in-depth interviews with parents, caregivers, and community members regarding their lived experiences with the school system and their perception of the educators' cultural competence addressing children's educational, socio-emotional, and behavioral needs. Lastly, further studies could evaluate the effectiveness of diagnosis and treatment options via telehealth delivery using quantitative or mixed methods to inform evidence-based program development. For example, a comparative outcomes analysis could be completed by conducting a

randomized controlled trial (RCT) comparing telehealth-based diagnosis and treatment outcomes with in-person consultations to assess differences in accuracy, patient satisfaction, and clinical effectiveness.

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