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Evaluation of DIRFloortime® on Mother's Depression, Anxiety, and Stress

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Evaluation of DIRFloortime® on Mother's Depression, Anxiety, and Stress

Poor mental health has a significant impact on quality of life and wellbeing of mothers. According to Kingston and Tough (2014) and Stein et al. (2014) (as cited in Bryson et al., 2021), depression, anxiety, and stress influences a mother's ability to provide care, which negatively effects behavior, cognitive ability, and emotional development in their children. Health development is further complicated when a child is diagnosed with a neurodevelopmental disorder such as autism spectrum disorder (ASD) or attention-deficit/hyperactivity disorder (ADHD). Parenting a child with a ASD and ADHD requires giving extra support regarding their physical, social and emotional needs (Fatima et al., 2021). Often, children with ASD and ADHD rely heavily on their mothers to meet those needs (Fatima et al., 2021). Therefore, mothers who have a child diagnosed with ASD and ADHD experience significant parenting stress, which has an impact on anxiety and depression. Mothers of children with neurodevelopmental disorders, such as ASD and ADHD, report depression and anxiety symptoms as prevalent as 68% and 52% respectively (Fatima et al., 2021). Support for mothers and children with ASD and ADHD may reduce caregiver stress and improve a mother's mental health to promote a child's health development.

ASD involves social and communication deficits as well as repetitive behavioral patterns related to movement, patterns, interests, and sensory input (American Psychiatric Association [APA], 2013). Symptoms present early in a child's development and range in severity (APA, 2013). ASD is associated with

delayed language and motor skills, cognitive delays, hyperactivity, echolia, emotional disturbances, altered eating and sleeping patterns, obsessions, anxiety, and repetitive behaviors, challenging the parent-child relationship (Center for Disease Control and Prevention [CDC], 2022b). Research shows mothers can cope with the difficulties of having a child with ASD when they receive higher social support, thus reducing parental depression, anxiety, and stress (Al-Oran & Al-Sargarat, 2016; Gray and Holden, 1992, as cited in Ang & Loh, 2019).

The prevalence of ASD is increasing significantly in the United States (U.S.). Currently in the U.S., of children aged 8 years, one in 44 children have ASD, compared to one in 54 in 2016 (CDC, 2022a; Maenner et al., 2020). Since the prevalence of ASD is increasing, the financial burden can be expected to rise also. The U.S. annual societal costs of ASD are estimated at \$223 billion in 2020 and are expected to rise to \$589 billion in 2030 (Blaxill et al., 2021). To offset future parental and government costs, treatment modalities need to be utilized to help children with ASD feel supported, gain independence and communicate their needs to live meaningful and purposeful lives.

ADHD also appears early in childhood and presents with inattention, hyperactivity and impulsivity (APA, 2013). Often, children with ADHD have more disruptive behavior, causing social difficulties for parents (Cunningham, 2007, as cited in Gokcen et al., 2018). Parents of children with ADHD often report reduced self-esteem and dysfunctional parent-child relationships (Johnston & Mash, 2001, as cited in Gokcen et al., 2018). Disproportionally, mothers perform the role of primary caregivers, which significantly influences earning potential and employment

opportunity (Glynn & Hamm, 2019). By supporting mothers through parenting and coping strategies, thereby reducing psychological distress, mothers can reduce their child's ADHD severity (Breux & Harvey, 2019). Encouraging mothers can improve family synchronicity and functioning (Breux & Harvey, 2019).

ADHD is highly prevalent in the U.S. In 2016, an average of 6.1 million children ages 2-17 years were diagnosed with ADHD (Danielson et al., 2018). The societal costs in healthcare, education, and caregiver for childhood ADHD is significant, with an estimated cost of \$19.4 billion in children and \$13.8 billion in adolescents (Schein et al., 2022). Total costs are approximately \$6,799 per child and \$8,349 per adolescent (Schein et al., 2022). Due to the significant financial and parental stress involved in childhood ADHD and ASD, evidence-based treatment modalities should be utilized.

Recognizing the increase in ASD and ADHD, Minnesota Legislature established the Early Intensive Developmental and Behavioral Intervention (EIDBI) benefit (Connel et al., 2019). The EIDBI program services people under the age 21 who suffer from ASD, ADHD, and other related conditions with treatments such as Developmental, Individual Difference, Relationship-Based (DIR) Floortime® (Connel et al., 2019). DIRFloortime® emphasizes emotional development to improve communication, cognition, and motor skills (Greenspan & Wider, 2006, as cited in Boshoff et al., 2020). Parents are involved in therapy by following their child's engagement in play to promote positive and reciprocal interactions (Liao et al., 2014). Results show the DIRFloortime® approach improves parent-child relationships, child communication, and autism severity (Boshoff et al., 2020).

The purpose of this project is to examine the relationship between DIRFloortime® use in children with ASD and ADHD and Patient Health Questionnaire-8 (PHQ-8) scores for depression, Generalized Anxiety Disorder-7 (GAD-7) scores for anxiety, and Perceived Stress Scale-10 (PSS-10) scores for stress among the children's mothers. Research involving the PHQ-9 will be incorporated into this project due to its commonality and frequency of use, but the suicide aspect will be omitted in this project. The Institute for Healthcare Improvement's (IHI) Model for Change framework will structure this project using the Plan-Do-Study-Act (PDSA) cycle. The aim of this project is to reduce depression, anxiety and perceived stress in mothers of children ages 2-17 with ASD and ADHD in a rural Midwest nonprofit agency by 10%. The primary outcome measures include mother's PHQ-8 scores, GAD-7 scores, and PSS-10 scores. The secondary outcome measure will be mothers' self-perceived impact of the program in qualitative survey responses. The questions for study include: In the mothers of children ages 2-17 years diagnosed with ASD and ADHD engaged in DIRFloortime®,

1. What is the change (if any) in the rate of depression over three to seven months?
2. What is the change (if any) in the rate of anxiety over three to seven months?
3. What is the change (if any) in the rate of perceived stress over three to seven months?
4. What is the self-perceived impact of DIRFloortime® per the children's mothers?

Literature Review

The literature search was conducted using Pubmed, Medline, and CINAHL. Key search terms and phrases included *children with autism, mother, depression, ADHD, and dir/floortime* connected by the Boolean operator AND. All suggested variations of terms and phrases such as *ASD, maternal, and major depressive disorder* were used, connected with the Boolean operator OR. First, the terms *children with autism, mother, depression* and their variations were searched. Next, the terms and variations of *mother, depression, and ADHD* were searched. The terms *dir/floortime AND floortime approach* were searched separately. Additional searches were conducted for *PSS-10 and perceived stress scale, PHQ-9 and patient health questionnaire-9, and GAD-7 and generalized anxiety disorder 7-item scale* connected by the Boolean operator OR. Articles related to the scales were reviewed for terms such as *validity and reliability*. All articles were reviewed to include terms such as *stress, anxiety, and depression* to determine relevancy to this project. These searches initially yielded 3,991 results. The inclusion criteria for this project were articles published between 2017 to 2022, in academic journals, and with subjects ages 0 to 18-years-old. Exclusion criteria included studies prior to 2017 or 2014 and subjects older than 18-years-old. The psychiatric scale articles were not limited to an age group. One article for DIRFloortime® was found using a direct search. After the inclusion and exclusion criteria was applied, 534 articles remained. Abstracts of these articles were reviewed for relevancy. Due to limited information on DIRFloortime® the inclusion criteria dates were expanded to publications from 2014 to 2022. Of these articles, 34 were deemed relevant to the project and 18 articles were selected for this literature review.

Parental Effects of ASD

Many publications observed how ASD can affect parents. Li et al. (2022) performed a cross-sectional study of 683 mother-father dyads who parent children with ASD at the average age of 4.45 years. No control group was used in the study. Li et al. (2022) observed significantly higher depression, anxiety, and stress in mothers with lower-functioning children compared to fathers. The child's social impairment, which causes maternal stress, leading to depression and anxiety (Li et al., 2022). Li et al. (2022) shows the bidirectional relationships between autism severity in a child and parental psychological distress. This trend is also seen in mothers of children with ASD compared to mothers of typically developing children. Although not statistically significant, Alghamdi et al. (2022) showed 143 mothers of children with ASD had higher levels of depression, anxiety, and stress compared to mothers with typically developing children. Unfortunately, higher depression, anxiety, and stress symptoms is correlated to lower perceived social support for these mothers (Alghamdi et al., 2022). Both studies showed higher depression, anxiety, and stress in mothers of children with ASD. Although, different scales were used for these measurements, which makes comparison between studies difficult. Unfortunately, generalizability in both studies is poor due to the cross-sectional designs and how parenting stressors may change throughout time. Despite this, both studies had robust sample sizes.

Recognizing how depression, anxiety, and perceived stress affects mothers of children with ASD is important. Selvakumar and Panicker (2020) studied 30 mothers, a small sample size, using the depression, anxiety and stress scale, World Health Organization Quality of Life Scale, and Coping Orientation to Problems Experienced

Inventory. Of the mothers in the study, 60.4% of mothers reported depression symptoms and 46.2% reported anxiety symptoms, which affected stress and quality of life (Selvakumar & Panicker, 2020). Despite the high reporting of depression, anxiety, and stress, Selvakumar and Panicker (2020) observed active and religious coping, positive reframing, and planning used by mothers. Positive coping shows mothers can learn mechanisms to improve their mental health and quality of life. Family-based treatment should be utilized in healthcare so families can grow together and mothers increase resiliency. Additionally, psychological status of mothers prior to a child's ASD diagnosis and co-morbid diagnoses with ASD should be considered.

Mental health differences also occurs between groups of mothers who have children with ASD. Huang et al. (2019) states mood disorders and disturbances, disruptive night time behavior, and appetite changes were statistically significant in mothers of low-functioning children ASD compared to high-functioning. Additionally, mothers with lower-functioning children reported more parenting stress and increased parent-child dysfunction. The research was conducted in China, so cultural differences could impact maternal stress and how these mothers cope. Although, mothers of children with ASD presenting with depression, anxiety, and stress throughout a variety of countries shows the importance of addressing a global mental health problem. Additionally, the same size was small with 80 mothers, reducing generalizability.

Parental Effects of ADHD

Similar to ASD, mothers of children with ADHD are at greater risk for psychological distress than fathers and parents of neurotypical children. Si et al. (2020) surveyed 314 families of children with ADHD and 308 families of children with typically

developing children in mainland China. Results showed that mothers of children with ADHD had more work-family conflicts and higher levels of parenting stress related to depression and anxiety, ADHD severity, parenting role, somatic symptoms and perceived social support. Therefore, mothers of children with ADHD need resources to improve coping abilities. Charbonnier et al. (2019) discusses how people who are related to a stigmatized person are likely to be stigmatized and negatively judged. Mothers often take a larger responsibility in caring for their child with ADHD, so they report more perceived stigma (Charbonnier et al., 2019). The authors concluded in 159 French mothers that perceived stigma was positively correlated with their anxiety and depression symptoms, and negatively correlated with life enjoyment and self-esteem (Charbonnier et al., 2019). Interestingly, severity and type of child ADHD symptoms impacted affiliated stigma for mothers of male children while severity of symptoms in mothers of females only affected anxiety (Charbonnier et al., 2019). Although, results in both studies were limited due to the cross-sectional design and potentially biased self-administered surveys. Additionally, measuring focused more on severity of symptoms and not types of symptoms. Also, the children could have additional mental disorders but be lacking a formal diagnosis. Observing differences in children with neurodevelopmental disorders should be investigated in the future to determine if clinical management should differ based on gender or specific characteristics in symptoms. This may also help in the treatment of mother's emotional distress.

Treatment

Treatment of children with neurodevelopmental disorders may be the largest way to impact mothers. Gokcen et al. (2018) observed pre- and post-treatment scores of

depression and burnout in mothers. Mother's children with ADHD were treated with methylphenidate, atomoxetine, and risperidone. Mothers' depression and burnout scores significantly decreased. The study only had 21 participants, was over a two-month period, and had no control group. Liao et al. (2014) focused on treatment with therapy. Liao et al. (2014) showed how mothers of children with ASD participating in DIRFloortime® perceived a more positive parent-child relationship while their children improved in emotional regulation, social interactions, and daily functioning. Although the study only included 11 mothers and male children, parenting stress statistically improved. The study could not control for outside services and support the mothers may have had, and the convenience sampling may not reflect how all mothers with ASD children feel. Although both studies were small, both treatment with medication and therapy showed improvements for mothers' mental health as well as their children. Large scale trials need to be conducted to determine the best combination of treatment for children with neurocognitive disorders. More studies need to occur using DIRFloortime® with other neurodevelopmental disorders besides ASD.

Deb et al. (2020) presented similar results for DIRFloortime® effectiveness in a systematic review and meta-analysis. Pajareya and Nopmaneejumrulers (2011) as cited in Deb et al. (2020) found significant improvement in the Functional Emotional Assessment Scale, Childhood Autism Rating Scale, and Functional Emotional Questionnaires. Also, Ho and Lin (2020) concluded children participating in DIRFloortime® compared to a control group had statistically significant improvement in emotional capabilities and caregivers in parenting skills. Pajareya et al. (2019) also used randomized control trials (RCTs) to evaluate DIRFloortime®. The authors achieved

results promoting the benefit of DIRFloortime® to improve persistence, involvement, initiation and attention to activities as well as improved language skills in children with ASD (Pajareya et al., 2019). The study included 48 families with an intervention group and the duration was over four-months. Although, results may be attributed to the increased time spent between caregiver and child instead of the use of an intervention. Overall, all studies were small. Due to the design of the systematic review, comparing methods for parent training is difficult. Future research should consider longer study time and increased screening of children for psychiatric disorders. Direct comparison of therapy modalities for neurodevelopmental improvement and more RCTs are needed.

Screening Tools

Patient Health Questionnaire-8

The Patient Health Questionnaire-8 (PHQ-8), General Anxiety Disorder-7 (GAD-7), and Perceived Stress Scale-10 (PSS-10) are tools that can help determine improvement in mood. A variety of scales are used to measure depression severity including the PHQ-8 and PHQ-9. Ma et al. (2021) tested the PHQ-9's effectiveness compared to the Hamilton Rating Scale for Depression (HAM-D) in a Chinese population. The Cronbach's alpha scores established the reliability of the scales at 0.829, 0.764, and 0.893 for the HAM-D-17, HAM-D-6 and PHQ-9 respectively. Validity analyses showed similarities between the PHQ-9 and HAM-D-17. Although, the PHQ-9 had the highest measurement of accuracy for determining depression severity. Shin et al. (2020) gathered similar data which observed PHQ-9 and the EuroQol-5 Dimension (EQ-5D) use in a larger sample size that was nationally representative of the Korean population. Although their Cronbach's alpha score was lower for the PHQ-9 at 0.79, reliability was established

as well as validity with a correlational coefficient at 0.44. Brattmyr et al. (2022) testing in a Norwegian outpatient population, justified the use of the PHQ-9 and GAD-7 and observed scalar invariance throughout gender, diagnoses and comorbidities. Similarly to Shin et al. (2020), women were determined to have higher mean scores on the PHQ-9. These studies varied in populations and clinical setting, but show the versatility of the PHQ-9 use. Reliability and validity remained consistent throughout the studies, justifying the PHQ-9 use in research. Due to these studies all being cross-sectional in nature, future research needs RCTs and longitudinal studies.

Generalized Anxiety Disorder-7

The GAD-7 is an important tool for identifying anxiety symptoms. Brattmyr et al. (2022) showed an omega hierarchical for the GAD-7 at 0.81. Brattmyr et al. (2022) identifies the somatic factors having poor discriminant validity and raises concerns about using the GAD-7 and PHQ-9 together at risk of too much similarity. Doi et al. (2018) further questions GAD-7 use in Japanese populations with and without self-reported depression and anxiety. Metric and scalar invariance was supported in both groups. Doi et al. (2018) claims validity findings were consistent with previous research conducted in Western cultures. Overall, Doi et al. (2018) and Brattmyr et al. (2022) support the GAD-7 use, which shows cross-cultural validity of the scales. They are both cross-sectional designs, which signifies the need for diversification of research in the future.

Perceived Stress Scale-10

The PSS-10 aims to identify clinical stress. Ruisoto et al. (2020) tested three versions of the PSS scale among a large sample of university students in Ecuador. All versions of the scale showed reliability. The PSS-10 resulted in an Alpha and Omega

coefficient of 0.85 and 0.87, the highest among the three scales (Ruisoto et al., 2020). All three versions of the scale showed no significant difference for convergent validity. Overall, females scored higher than males on the total scale. Reis et al. (2019) had a large sample size of German adults and evaluated a strong measurement invariance despite gender. The authors included RCTs in their testing to find strong temporal invariance, concurrent and predictive validity. Reis et al. (2019) determined the Omega coefficient to be 0.83, which shows similar reliability compared to Ruisoto et al. (2020). Both studies have potential bias self-reported data, RCTs, patient interviews by psychiatric professionals, and biological stress markers may provide important insight in future clinical trials.

Framework

The IHI's Model for Change framework is used throughout this project utilizing the PDSA cycle. The PDSA cycle will break down the research process into manageable steps, which can be repeated. The PDSA cycle is effective for learning about small scale change by testing an idea, gathering data strategically, adjusting to achieve the desired result, and implementing practice change (Melnyk & Fineout-Overholt, 2019; Reed et al., 2016). This project is the second phase of the PDSA cycle. The first cycle occurred from February 2021 to April 2021 and focused on DIRFloortime® use and parental stress using the Autism Parenting Stress Index (APSI). Monthly ASPI scores decreased by an average of six and a half points after the three-month period (Pipitone, 2021). In review, parents of children with ASD and ADHD experience similar difficulties such as depression, anxiety, higher stress, social isolation, and poor quality of life (Chandravanshi et al., 2017, Sapkota et al., 2017, Thabet et al., 2013, as cited in Fatima et

al., 2021). DIRFloortime® has potential to improve child's functional capabilities, social interactions, emotional regulation, thereby reducing parenting stress (Ho & Lin, 2020; Liao et al., 2014). Gaps in literature reduced the available data on DIRFloortime® use, especially regarding use in ADHD treatment. Research with longitudinal studies and larger sample sizes is needed to promote DIRFloortime® as an evidence-based treatment to improve childhood ASD and ADHD, which may improve their mothers' mood. Also, there are many tools to measure depression, anxiety, and stress, standardization of tools may be beneficial in future research. Additionally, not all research investigates depression, anxiety, and stress together. The PDSA cycle will continue to guide improvements to make impactful change in this research.

Method

Design

This quality improvement project was a retrospective record review design across multiple time points. The data was acquired over the eight-month period of August 2022 through March 2023 from mothers of children partaking in DIRFloortime® at a non-profit organization that provides services to children with ASD and ADHD. This project used the PHQ-8, GAD-7, and PSS-10 to observe maternal depression, anxiety, and stress over this four-month time period.

Setting

This project will occur in a small, rural Minnesota community of 3,500 people. Data was collected from a non-profit, which services children who have neurocognitive developmental disorders. The non-profit has been in operation since 2017. The organization's team comprised of fifteen full-time members. These members included but

are not limited to an executive director, a general manager, a program coordinator, a social worker who is the early intensive developmental and behavioral intervention program coordinator, a licensed marriage and family therapist, an educator, and a special education specialist acting as a program specialist.

Sample

This convenience and purposive sample consisted of four child-mother dyads. The participants included mothers of children ages 4-14 who participated in DIRFloortime® therapy to aid symptoms of autism or attention-deficit/hyperactivity disorder. The sample excluded children ages 18 or older and their parent, typically developing children, and those not partaking in DIRFloortime® therapy.

Approval Process

Approval was granted from the non-profit agency where the project took place, which did not have an Institutional Review Board (IRB). Additionally, approval was obtained from the graduate program in nursing director, dean, committee chair, and the IRB of University of Missouri-St. Louis. There were no conflicts of interest or ethical concerns within this project. Open communication and input from the support team aided in the approval process.

Data Collection and Analyses

The agency's executive director administered the PHQ-8, GAD-7, and PSS-10 to the mothers, ensured the mothers complete them, and created a file to share the results to the primary investigator (PI). The scales were administered to mothers prior to the start of DIRFloortime® then at the end of each month. Data was observed over an eight-month period. Data was labeled month one through eight according to the time of collection. All

files were password protected by both the executive director and the PI. All identifying information was removed from the data prior to the PI accessing it. Each mother's quantitative and qualitative questionnaires and demographic data was assigned a number to track their responses. Total scores of the data from the PHQ-8, GAD-7, and PSS-10 was recorded. Qualitative and demographical data was collected at the start of the project. A qualitative questionnaire was also be collected at the completion of the project. The demographic questionnaire included questions about race, marital status, education level, employment, financial stability and support, owning a home and vehicle, and general health. The pre-intervention qualitative questionnaire included questions on home life, family relations and support, and thoughts about therapy. The post-intervention qualitative questionnaire included topics on change in life style, stressors, challenges, mood, communication style, skills and the behavior of the child seen after DIRFloortime® use.

Procedures

The executive director at the non-profit agency was notified about the opportunity for a second cycle of a previous PDSA project. The agency responded with interest. The executive director and PI collaborated on the needs of the agency. The stakeholders expressed interest in a qualitative aspect of research. Observation of depression, anxiety, and stress levels in mothers was discussed, which created excitement in the agency. To assess this quantitative aspect of mother's mental health the PHQ-8, GAD-7, and PSS-10 was assessed monthly. This was done by the executive director dispensing the PHQ-8, GAD-7, and PSS-10 on site to mothers each month. A qualitative and demographics

questionnaire was administered before the intervention and a second qualitative questionnaire was administered at the end of the four month period.

Results

Demographics

There was a total of four ($N = 4$) participants. Of the participants, 75% ($n = 3$) were biological mothers and 25% ($n = 1$) was a grandmother. Of the participant's children or grandchild, 100% ($n = 4$) were identified as male and none as female. Age ranges of children were as follows, 50% ($n = 2$) were aged one through four-years-old and 50% ($n = 2$) were aged 9-14 years. All participants identified as Caucasian ($n = 4$). The children's diagnoses included 25% ($n = 1$) with autism, 25% ($n = 1$) with ADHD and GAD, 25% ($n = 1$) with other disorder of psychological development, and 25% ($n = 1$) with other specified anxiety disorder. Of the mothers and grandmother's marital status, 50% ($n = 2$) are married, 25% ($n = 1$) is widowed, and 25% ($n = 1$) is divorced. Seventy-five percent ($n = 3$) of the participants had a college education while 25% ($n = 1$) have attended 12th grade or less. Fifty percent ($n = 2$) are employed and 50% are not employed. Seventy-five percent ($n = 3$) have only one income source while 25% ($n = 1$) have more than one. Seventy-five percent ($n = 3$) receive some source of financial assistance and 25% ($n = 1$) do not. One hundred percent ($n = 4$) of participants own a home. Seventy-five percent ($n = 3$) own a vehicle and 25% ($n = 1$) does not. Seventy-five percent ($n = 3$) have a mental or physical health diagnosis while 25% ($n = 1$) promotes good health (Appendix C).

Scale scores

A paired t-test was completed (Appendix B), which showed there was no statistical significance between the means of pre- and post-scoring for the PHQ-9, GAD-7, and PSS-10. Average total monthly PHQ-8, GAD-7, and PSS-10 scores did not have a consistent trend (Appendix D). For the PHQ-8 total scores, two mother's scores increased while two decrease. For the GAD-7 total scores, two mothers' scores increased, one decreased, and one remained the same. For the PSS-10, two mothers' scores increased while two decreased.

Table 1

Paired T-test

Scale	<i>p</i> -value
PHQ-8	0.50
GAD-7	0.59
PSS-10	0.71

Note. All values are rounded to the second decimal place, $N = 4$.

Qualitative Questionnaires

All qualitative questionnaires were analyzed using content analysis. For the pre-intervention questionnaires, mothers expressed excitement for DIRFloortime® use and their children to be challenged in a supportive, fun environment providing peer engagement and learning through play and interests. Those with counseling or telehealth experience with their children had poor experience. Participating in therapy themselves, and speech and occupational therapy use in children was a positive experience for mothers. Most mothers report maintaining a consistent daily routine including playtime and scheduled bedtime. Although, mothers may find routine and chore completion difficult depending on the temperament of their child. Many families attempt to divide responsibilities evenly in the home but mothers often encompass the caregiver role and maintain the home.

Despite this, mothers describe a loving, close family that overcome difficult challenges together. Common stressors for mothers include difficult behaviors and overstimulation in their children, task completion, and financial stress. Mothers cope with stressors by distracting their children, taking breaks and having alone time. Additionally, most promote a support system including family and friends.

After analysis, several themes presented after DIRFloortime® use, if mothers reported daily routine changes, it involved incorporating daily and weekly schedules, which was reported to make daily life easier. Mothers state they are more likely to take a break when needed. Mother and children have gained abilities to recognize triggers and redirect their children, better communicate and positively reinforce, and mothers can better help their child in moments of need. Children have improved language skills, self-awareness, and self-expression. DIRFloortime® use helped families do more activities outside of the home and express more affection. Of mothers who report improved mood, they attribute this to having a new, realistic expectations for their child and family. Mothers have confidence since they know their children are getting the help they need.

Discussion

This quality improvement project found there was no statistically significant reduction in mother's PHQ-8, GAD-7, and PSS-10 scores over a three to seven-month period when their child participated in DIRFloortime®. Although, in qualitative assessments mothers promoted improvements in their child's behavior, language skills, and their own ability to determine the need for a break.

Limitations of this project included a small sample size so there it is less likely to be significance in the data. Additionally, the project occurred over a short timeframe and

not all children were involved in DIRFloortime® for the same duration. For the participants, biological mothers, grandmothers, and a foster mother were included, which may have altered how they responded to scales. Also, not all mothers were involved in therapy sessions, which may have affected how much benefit the child received from therapy outside of the home and therefore scale responses. Mothers varied in their financial and marital status, work, mental and physical health diagnoses, which may have affected their responses. One parent answered the PHQ-8, GAD-7, and PSS-10 based on her child's symptoms and not on her own, so her data could not be used. Qualitative questions were not completed fully by all participants and data was missing on one post-treatment qualitative questionnaire. Recommendations for further PSDA cycles include larger sample sizes for a longer duration of time. Further recommendations include completing a focus group or individual interviews with mothers instead of qualitative questionnaires.

Conclusion

Monitoring depression, anxiety and stress in mothers with children who have neurocognitive disorders is important. Poor mental health in mothers may worsen a child's ability to improve their symptoms in therapies such as DIRFloortime®. This is the second PSDA cycle. Prior to monitoring for PHQ-8, GAD-7, and PSS-10 scores, mothers completed the APSI tool and showed reduction in parental stress levels. This may suggest the APSI is better equipped to monitor stress in this population of mothers and children using DIRFloortime®.

With rising prevalence of neurocognitive disorders such as ADHD and ASD, providers must be aware of the needs of the family unit. Monitoring and addressing

mother's mental health along with their child's may help improve outcomes for the dyad and promote success. Creating discussion can help reduce stigma in mental health to identify these vulnerable populations and make necessary care accessible and affordable.

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Appendix A

Figure 1

Data Collection Instrument

Personal Health Questionnaire Depression Scale (PHQ-8)

Over the **last 2 weeks**, how often have you been bothered by any of the following problems? (*circle one number on each line*)

How often during the past 2 weeks were you bothered by...	Not at all	Several days	More than half the days	Nearly every day
1. Little interest or pleasure in doing things	0	1	2	3
2. Feeling down, depressed, or hopeless	0	1	2	3
3. Trouble falling or staying asleep, or sleeping too much	0	1	2	3
4. Feeling tired or having little energy	0	1	2	3
5. Poor appetite or overeating	0	1	2	3
6. Feeling bad about yourself, or that you are a failure, or have let yourself or your family down	0	1	2	3
7. Trouble concentrating on things, such as reading the newspaper or watching television	0	1	2	3
8. Moving or speaking so slowly that other people could have noticed. Or the opposite – being so fidgety or restless that you have been moving around a lot more than usual	0	1	2	3

Scoring

If two consecutive numbers are circled, score the higher (more distress) number. If the numbers are not consecutive, do not score the item. Score is the sum of the 8 items. If more than 1 item missing, set the value of the scale to missing. A score of 10 or greater is considered major depression, 20 or more is severe major depression.

Characteristics

Tested on 1165 subjects with chronic conditions.

No. of Items	Observed Range	Mean	Standard Deviation	Internal Consistency Reliability	Test-Retest Reliability
8	0-24	6.63	5.52	.86	NA

Note. PHQ-8 tool was retrieved from the Self-Management Resource Center, n.d.

Figure 2

Data Collection Instrument

GAD-7 Anxiety

Over the <u>last two weeks</u> , how often have you been bothered by the following problems?	Not at all	Several days	More than half the days	Nearly every day
1. Feeling nervous, anxious, or on edge	0	1	2	3
2. Not being able to stop or control worrying	0	1	2	3
3. Worrying too much about different things	0	1	2	3
4. Trouble relaxing	0	1	2	3
5. Being so restless that it is hard to sit still	0	1	2	3
6. Becoming easily annoyed or irritable	0	1	2	3
7. Feeling afraid, as if something awful might happen	0	1	2	3

Column totals ____ + ____ + ____ + ____ =
 Total score ____

If you checked any problems, how difficult have they made it for you to do your work, take care of things at home, or get along with other people?			
Not difficult at all	Somewhat difficult	Very difficult	Extremely difficult
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Source: Primary Care Evaluation of Mental Disorders Patient Health Questionnaire (PRIME-MD-PHQ). The PHQ was developed by Drs. Robert L. Spitzer, Janet B.W. Williams, Kurt Kroenke, and colleagues. For research information, contact Dr. Spitzer at rs8@columbia.edu. PRIME-MD® is a trademark of Pfizer Inc. Copyright© 1999 Pfizer Inc. All rights reserved. Reproduced with permission

Scoring GAD-7 Anxiety Severity

This is calculated by assigning scores of 0, 1, 2, and 3 to the response categories, respectively, of "not at all," "several days," "more than half the days," and "nearly every day."
 GAD-7 total score for the seven items ranges from 0 to 21.

- 0–4: minimal anxiety
- 5–9: mild anxiety
- 10–14: moderate anxiety
- 15–21: severe anxiety

Note. PHQ-8 tool was retrieved from the Anxiety Disorders Association of America, n.d.

Figure 3

Data Collection Instrument

Perceived Stress Scale

A more precise measure of personal stress can be determined by using a variety of instruments that have been designed to help measure individual stress levels. The first of these is called the **Perceived Stress Scale**.

The Perceived Stress Scale (PSS) is a classic stress assessment instrument. The tool, while originally developed in 1983, remains a popular choice for helping us understand how different situations affect our feelings and our perceived stress. The questions in this scale ask about your feelings and thoughts during the last month. In each case, you will be asked to indicate how often you felt or thought a certain way. Although some of the questions are similar, there are differences between them and you should treat each one as a separate question. The best approach is to answer fairly quickly. That is, don't try to count up the number of times you felt a particular way; rather indicate the alternative that seems like a reasonable estimate.

For each question choose from the following alternatives:

0 - never 1 - almost never 2 - sometimes 3 - fairly often 4 - very often

- _____ 1. In the last month, how often have you been upset because of something that happened unexpectedly?
- _____ 2. In the last month, how often have you felt that you were unable to control the important things in your life?
- _____ 3. In the last month, how often have you felt nervous and stressed?
- _____ 4. In the last month, how often have you felt confident about your ability to handle your personal problems?
- _____ 5. In the last month, how often have you felt that things were going your way?
- _____ 6. In the last month, how often have you found that you could not cope with all the things that you had to do?
- _____ 7. In the last month, how often have you been able to control irritations in your life?
- _____ 8. In the last month, how often have you felt that you were on top of things?
- _____ 9. In the last month, how often have you been angered because of things that happened that were outside of your control?
- _____ 10. In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?

Note. PHQ-8 tool was retrieved from New Hampshire Department of Administrative Services, n.d.

Appendix B**Table 1***Paired T-test*

Scale	P-value
PHQ-8	0.50
GAD-7	0.59
PSS-10	0.71

Note. All values are rounded to the second decimal place.

Appendix C

Table 2

Demographic Data ($N=4$)

Demographics	Number (n)	Percentage (%)
Age of child		
1-4	2	50%
5-8	0	0%
9-14	2	50%
Child's gender		
Female	0	0%
Male	4	100%
Race		
Black	0	0%
Caucasian	4	100%
Diagnosis		
Autism	1	25%
ADHD, GAD	1	25%
Other disorder of psychological development	1	25%
Other specified anxiety disorder	1	25%
Parent's marital status		
Married	2	50%
Divorced	1	25%
Widowed	1	25%
Education		
12 th grade or less	1	25%
High school graduate or GED		
Some college/AA degree/technical school training	3	75%
Graduate school	0	0%
Financial Assistance	2	50%
Yes	2	50%
No		
Own a home	4	100%
Yes	0	0%
No		
Own a vehicle	3	75%
Yes	1	25%
No		
Mental or Physical Health Diagnosis	3	75%
Yes	1	25%

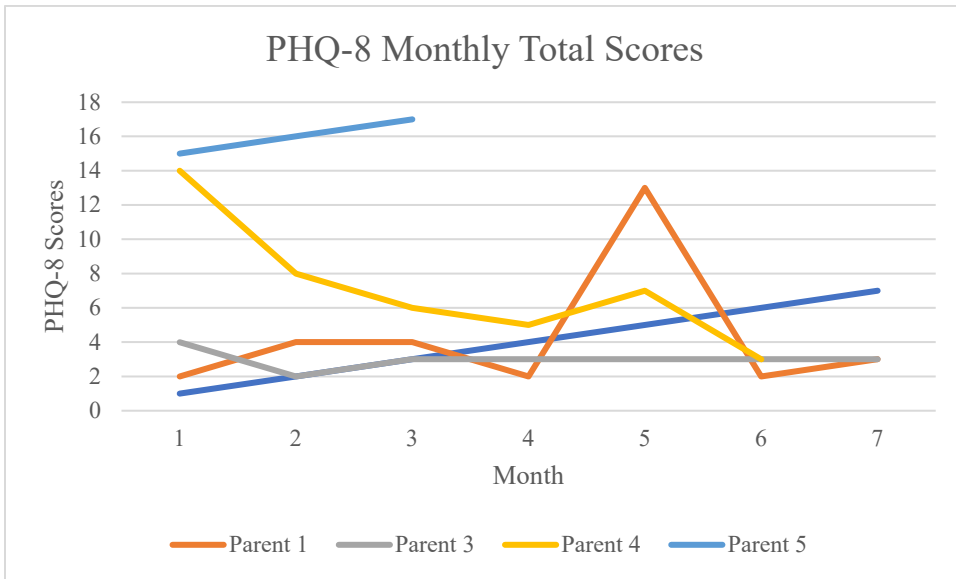
No

Note. Age is measured in years.

Appendix D

Figure 1

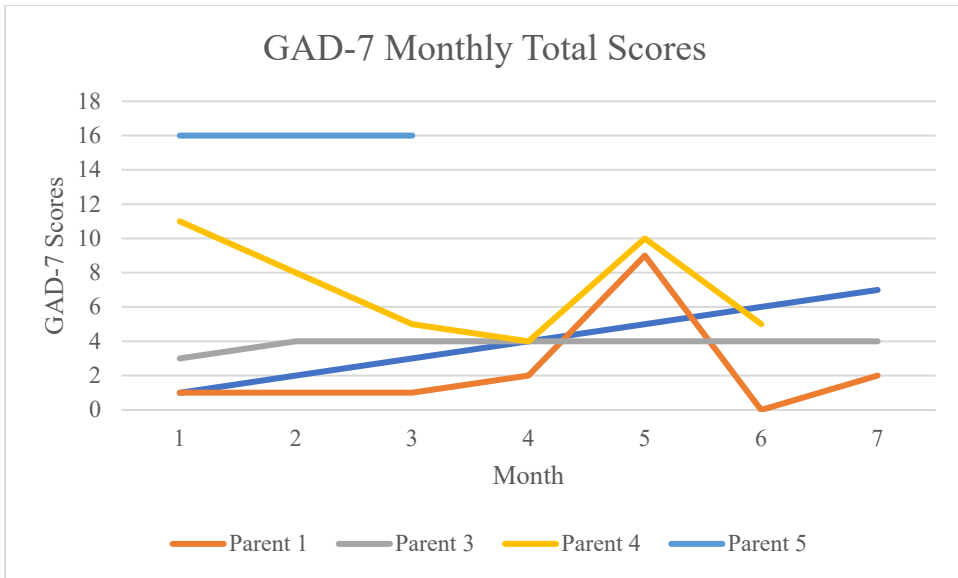
Average Monthly PHQ-8 scores (N = 4)



Note. PHQ-8 scores over a three to seven-month period.

Figure 2

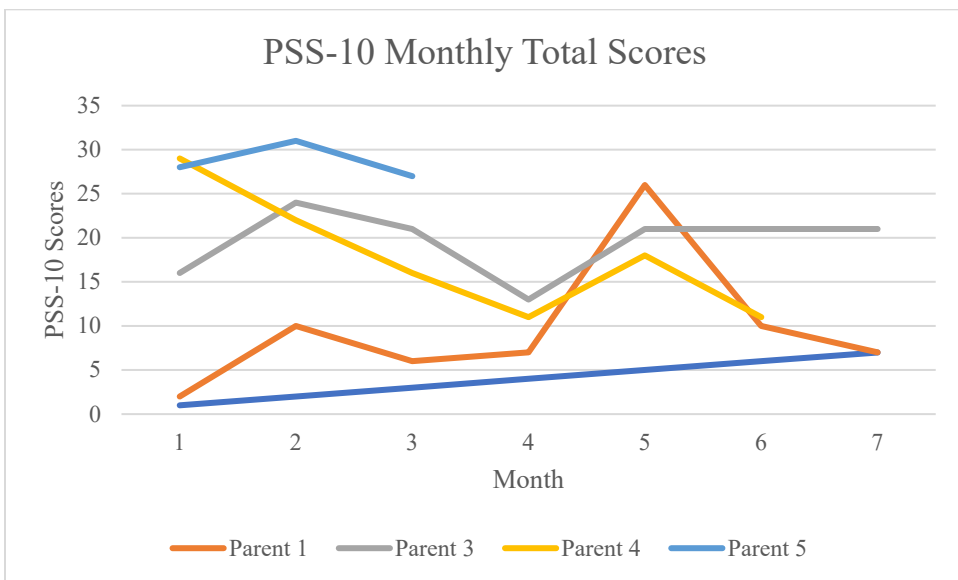
Average Monthly GAD-7 scores (N = 4)



Note. GAD-7 scores over a three to seven-month period.

Figure 3

Average Monthly PSS-10 scores (N = 4)



Note. PSS-10 scores over a three to seven-month period.