I. Introduction

Attention-deficit/hyperactivity disorder (ADHD) is a highly prevalent disorder that poses substantial public health concerns. Children with this disorder are at high risk for school failure and drop out, psychopathology, injury, and serious health problems. Evidence-based interventions for children with ADHD may be relatively ineffective with families residing in low-income, urban settings, who are disproportionately represented among ethnic minority groups. Families from these settings often face significant barriers to care that make it difficult for them to become engaged in treatment and sustain their involvement throughout the duration of intervention. This 3-year intervention study builds upon our research demonstrating the effectiveness of collaborative care for children with ADHD that involves integrating the family, school, and health systems. Unique features of the collaborative care approach used in this study, which is known as Partnering to Achieve School Success (PASS) are that it: (a) is based in a primary care center; (b) serves primarily low-income families residing in a large urban setting; (c) targets children with ADHD early in their schooling (kindergarten through grade four) as a method of providing early intervention; (d) has a primary focus on engaging and re-engaging families in intervention by linking families with an advocate (i.e., a community health partner); (e) directly addresses barriers to care; and (f) provides components of treatment in response to a family’s readiness, willingness, and ability to receive care.

This study was designed to develop and evaluate the feasibility and effectiveness of PASS, which consists of multiple components, including family therapy, consultation about school problems, medication consultation, and crisis counseling. In addition, PASS includes strategies to promote family engagement and reduce barriers to care. After a 6-month period of refinement, the intervention was evaluated using a quasi-experimental design. Participating families were served through four urban primary care centers affiliated with a pediatric teaching hospital. Families were assigned to receive PASS or a comparison intervention consisting of four family education sessions with concurrent groups for children with ADHD and their siblings. Outcomes were assessed at mid-treatment (about 3 months after baseline) and post-treatment (about 6 months after baseline) across three domains: beliefs about service use, parenting practices, and child behavior.

II. Review of the Literature

Children with ADHD from low income, urban settings face unique challenges when compared to their peers with ADHD from more advantaged environments. Poverty confers upon these children enormous risk, including stress related to parental psychopathology, single parenting, violence, and health problems. These factors, in turn, are associated with disrupted parent-child attachments and ineffective parenting practices (Wahler & Dumas, 1989). Further, children with ADHD from urban communities often attend schools that are under-resourced and stressed. A high percentage of children with behavioral health disorders, including ADHD, who live in low-income settings do not receive any services. Children from low-income communities who belong to racial/ethnic minority groups and who are uninsured are especially at risk for not receiving care (Kataoka, Zhang, & Wells, 2002). In addition, young children and those who are female often fail to have their mental health needs addressed.

Primary care practices have many assets for delivering services. Primary care providers (PCPs) often have longstanding relationships with children and families, affording them a helpful perspective on child development and opportunities to build a trusting relationship. In addition, although PCPs devote much of their time to treating sick children, they have a strong orientation to prevent illness and intervene when signs of risk emerge (Brown, 2004). In addition, the prevailing model of care in an increasing proportion of primary care practices is the medical home, which promotes strong...
attachments between provider and family, coordination of services among health providers, and collaboration across systems of care.

The medical home model is congruent with models of collaborative intervention that promote strong connections across the family, school, and primary care health systems (Power, DuPaul, Shapiro, & Kazak, 2003). This model provides a mechanism for promoting collaboration among systems to develop, implement, and evaluate multimodal interventions required for the effective treatment of ADHD.

Although a collaborative model of care is necessary for the effective treatment of ADHD, it is not sufficient. Families of children with ADHD, particularly those from low-income urban settings, often have difficulty becoming engaged and staying engaged in intervention. Research (Eiraldi, Mazzuca, Clarke, & Power, 2006) suggests that lack of engagement in intervention is due to both access factors (e.g., insurance and financial status, availability of transportation, and scheduling flexibility) and beliefs about mental health conditions, their treatment, and the professionals who provide services (e.g., stigmatizing effects of mental health labels, beliefs in one’s ability to be successful in accessing systems for the family, and trust in health providers).

A problem with service delivery for children with behavioral health problems, including ADHD, is that it often does not account for a family’s readiness, willingness, and ability to engage in treatment (Dishion & Stormshak, 2007). Families may be provided services that are not consistent with their beliefs about appropriate care for their children or that fail to consider their readiness for intervention. In these cases, families may fail to initiate treatment or drop out prematurely, placing limits on treatment effectiveness and the sustainability of change.

An effective approach to care involves providing evidence-based interventions that are culturally effective and respond to a family’s readiness for treatment. Such an approach requires the use of evidence-based components of treatment for children with ADHD, including strategies to: (a) strengthen parent-child attachments, (b) improve children’s self-regulation skills, (c) develop family-school partnerships, (d) develop problem-solving partnerships between families and PCPs, and (e) provide medication, when indicated (Power, Mautone et al., in press). In addition, inventions based in urban settings that serve low-come families need to include a focus on: (a) forming and sustaining strong partnerships with families, (b) developing care plans with professionals in a manner that is highly responsive to the values and priorities of families, (c) implementing care plans in a sequence that is responsive to a family’s readiness to commit to the treatment, and (d) reviewing progress with families and modifying care plans as needed (Dishion & Stormshak, 2007).

III. Study Design and Method
Participants and Group Assignment

Participating children were enrolled in kindergarten through grade 4 and met criteria for one of the ADHD subtypes, as assessed by the NICHD Vanderbilt Scale rated by parents and the Schedule for Affective Disorders and Schizophrenia for School-Age Children – DSM IV (K-SADS- P IVR) administered to parents. Participants were recruited from the four urban practices affiliated with a pediatric hospital situated in a large metropolitan area in the Northeast region of the U.S. Across the practices, approximately 65% of patients are eligible for public health insurance and 90% are African American.

Referrals were made by PCPs across the sites. A member of the research team contacted referred families by telephone and conducted a screening for eligibility. Families who met screening criteria were scheduled for an evaluation conducted by a psychologist or advanced psychology graduate student supervised by a psychologist. Families who met eligibility criteria were invited to offer formal consent to participate in the study. Subsequently, efforts were made to obtain school approval to participate in the study.
In making group assignments, there was a planned effort to assign all participants served in a practice during a given year to the same group. In general, participants in a practice were assigned initially to the control group; the introduction of PASS was staggered across practices in an effort to equate the groups with regard to demographic variables. In Year 1, participants in Sites A and B received the control intervention. In Year 2, participants in Sites A and C received PASS and those at Site B received the control intervention. In addition, scheduling concerns resulted in four families from Site C being assigned to the control group. In Year 3, participants in Sites A, B, and C received PASS and those at Site 4 received the control intervention.

**Interventions**

Partnering to Achieve School Success (PASS). PASS is a primary-care based psychosocial intervention designed to provide culturally effective, individualized, family centered care for children with ADHD (see Power, Lavin, Mautone, & Blum, 2010). The program focuses on building positive parent child relationships and linking systems of care (i.e., family, school, health system) for children and families coping with ADHD. The core components of PASS include (a) strategies to enlist and maintain family engagement, (b) brief family behavior therapy, (c) family-school consultation, (d) crisis intervention, when necessary, and (e) collaborative care in managing medication.

Thirty-three families consented to participate in PASS (Year 2 = 18, Year 3 = 15), and 29 attended at least one session. Four clinicians (i.e., post doctoral fellows in psychology) served as PASS therapists, and each was assigned 11, 3, 5, and 10 families respectively. A community health partner, that is a resident of the community with extensive background in health education and family advocacy, assisted the clinicians in providing services to each family. Specifically, the community partner worked closely with PASS therapists to support families in collaborating with school staff and identifying community-based resources available to families of children with ADHD (e.g., summer camps, after school programming, school-based supports). The community partner attended face-to-face sessions with families whenever possible and had regular contact (i.e., weekly or every other week) with each participating family by telephone or email. Eleven teachers participated in the intervention by either attending a family-school session (N = 8) or meeting with the therapist separately (N = 3).

Comparison group. The comparison group received treatment as usual and supplemental education and support for families designed to increase family engagement with the study team. Families met in groups for 90 minutes with a group leader (i.e., parent of a child with ADHD and resident of the community) to learn about ADHD (e.g., diagnostic issues, developmental course of ADHD, overview educational law), ask questions, and provide support to each other. The group leader did not provide instruction related to behavioral intervention strategies or family-school collaboration.

In this study, 8 education and support groups were conducted (Year 1 = 4, Year 2 = 3, Year 3 = 1). The number of families per group ranged from 3 to 5, with an average of 4. Two clinicians conducted these groups: the first clinician conducted 6 groups (21 families) and the second clinician led 2 groups (9 families). The second also served as the community partner for PASS. Both clinicians were African American and had over 10 years experience providing education and advocacy services to families.

**Outcome Measures**

Measures of barriers to care and intervention acceptability. The Barriers to Care Scale (BCQ; Yeh, McCabe, Hough, Dupuis, & Hazen, 2003) was used to measure parental report of barriers to mental health care. The Helpfulness of Services, Provider Characteristics, and Accessibility subscales were administered to parents during interviews conducted by research assistants. Alpha coefficients for all three factors have been reported in the acceptable range (.60-.78; Yeh et al., 2003), and in the current study, alphas ranged from .61 to .73.

The Treatment Evaluation Inventory, Short Form (TEI-SF) was used to evaluate parents’ view regarding the acceptability of the psychosocial intervention. The TEI-SF has demonstrated sound
psychometric properties (Kelley, Heffer, Gresham, & Elliott, 1989), and the coefficient alpha for the TEI-SF in the present study was .85. In addition, the Medication Acceptability subscale of the Treatment Acceptability Questionnaire (TAQ) was used to evaluate parent perceptions of medication as a treatment for ADHD. The TAQ has shown very high internal consistency (alpha = .97; Krain, Kendall, & Power, 2005), and the coefficient alpha in the present study was .95.

**Measures of parenting behavior.** Parent-child interactions were assessed at baseline and post treatment using the Dyadic Parent-Child Interaction Coding System (DPICS 3rd ed.; Eyberg, Nelson, Duke, & Boggs, 2004). Frequencies of parent and child behaviors were continuously coded during child-led play and parent-led (i.e., cleanup) tasks. Each DPICS session was videotaped and numbered using a random number generator to ensure that coders were blind to treatment group and data collection period. Coders were graduate and undergraduate research assistants trained in accordance with the DPICS manual (Eyberg et al., 2004). Training consisted of studying the manual, meeting as a team to review behavioral categories, and partnering with the lead trainer to practice and review difficult examples. Coders were required to reach 80% agreement with a standard criterion video before coding participant videos. Reliability checks and booster trainings were conducted periodically to reduce drift throughout the study. To evaluate interrater reliability, the lead trainer double-coded 21 (27%) of both the play and cleanup sessions. Percent agreement ranged from 95% to 100%.

**Measures of child behavior at home.** Parent ratings on the IOWA Conners (Loney & Milich, 1982) were used to assess ADHD and ODD symptoms in the home. Scores were obtained by calculating the mean item score for the total scale. In the present study, the alpha coefficient for the entire scale was .83. Also, the Impairment Rating Scale (IRS; Fabiano et al., 2006) was completed by parents to evaluate the severity of children’s difficulties across a range of functional domains. Previous research has shown the IRS to be reliable and valid measure for children with ADHD (Fabiano et al., 2006). A mean item score was calculated to represent global impairment. Cronbach’s alpha was adequate in the present study (.79).

**Measure of family-school relationship.** The Quality of the Parent-Teacher Relationship factor from the Parent-Teacher Involvement Questionnaire (PTIQ; Kohl, Lengua, McMahon, & Conduct Problems Prevention Research Group, 2000) was used to assess parent perceptions of the quality of the family-school relationship. Internal consistency in the present sample was high (alpha = .92).

**IV. Detailed Findings**

A total of 192 children from all four primary care centers were referred to the study team. Of those referrals, 170 were eligible to continue through the screening process. Children were considered ineligible at the time of referral if they were outside of the study age range or if the medical record indicated evidence of an autism spectrum disorder or cognitive disability. The study team was able to reach 146 referred families (86% of eligible referrals) by telephone to complete the screening process, and 118 of the families met screening criteria and were scheduled to complete a diagnostic evaluation to determine study eligibility. Of the 92 families who completed the diagnostic evaluation, 72 (78%) were eligible for the study and provided study consent. Consented families were assigned to PASS or the comparison intervention using a quasi-experimental design described above; 33 families were assigned to PASS, and 39 were assigned to the comparison condition. The research team was able to collect outcome measures during two or more data collection periods for 22 participants in PASS and 24 in the comparison condition. See Figure 1 (below) for a flow chart depicting the screening, referral, and intervention/data collection process.
The groups (PASS and comparison treatment) were compared to determine whether there were differences as a function of demographic variables, ADHD subtype status, and presence of comorbid conditions. Groups did not differ significantly on any of these factors. For example, in PASS, 30.3% of participants were female, 33.3% were prescribed medication to treat ADHD at baseline, and the average grade level was 2.1 ($SD = 1.3$). In the comparison group, 30.8% of participants were female, 35.9% were prescribed medication, and the average grade level was 1.7 ($SD = 1.2$). Collapsing across groups, the mean grade level of participants was 1.9. Thirty-one percent of the participants were female, and 63% of families were classified as belonging to the lowest three (of five) categories of the Hollingshead (1975) scale, reflecting that the sample consisted primarily of families in the low and middle socioeconomic groups. A large portion of families (65%) resided in single-parent households. With regard to ethnicity, 97% were non-Hispanic; with regard to racial composition, 90% were Black/African American, 6% were White, and 4% were multi-racial. Children with ADHD-Combined Type comprised 82% of participants, 21% had ADHD-Inattentive Type, and 7% had ADHD-Hyperactive-Impulsive Type. Regarding comorbidities, 36% were diagnosed with Oppositional...
Defiant Disorder and 10% with an internalizing disorder. Altogether, 35% of participants were prescribed medication to treat symptoms of ADHD at the time of baseline data collection.

The findings revealed significant family challenges in becoming engaged and maintaining engagement in treatment. Nonetheless, 76% of families who initiated treatment received at least three sessions. On average, families received 9.0 sessions (8.1 in person and 0.9 by telephone). All families received multiple components of PASS; brief family therapy, consultation about school problems, consultation about medication, and crisis intervention were provided to 79%, 72%, 55%, and 41% of families, respectively. Family-school sessions were conducted on average 0.5 (SD = 0.8) times per family, ranging from 0 to 3 sessions. However, only 8 families participated in one or more family-school sessions. PASS therapists conducted an average of 0.2 (SD = 0.5) individual teacher sessions, ranging from 0 to 2.

Both interventions (PASS and the comparison treatment) were perceived by parents to be acceptable. At post-treatment, the mean item score on the Treatment Evaluation Inventory – Short Form (which ranges from 0 = strongly disagree to 4 = strongly agree) was 3.18 (SD=0.47) for PASS and 3.30 (SD=0.55) for the comparison group. The difference in ratings was not significant.

Based upon linear mixed-effects regression models, the analyses demonstrated that there were no significant differences between groups (PASS and comparison treatment) on any of the outcome measures, although the study was powered to detect effect sizes that were large in magnitude. Nonetheless, the PASS intervention demonstrated promise when compared to the control group with regard to improving the perceived helpfulness of services (ES=0.45) and reducing access barriers to care (ES=0.45). Also, families in PASS showed evidence of improvements in ratings of acceptability of medication from baseline (M=3.95, SD=1.73) to post treatment (M=4.37, SD=4.37), but families in the comparison treatment demonstrated essentially no change on this variable from baseline (M=4.31, SD=1.61) to post treatment (M=4.29, SD=1.45). The effect size for the group difference in change scores for medication acceptability was 0.36.

In addition, PASS demonstrated promise with regard to reducing negative parenting during a high demand task. Observations of parenting practices during the clean up task of the DPICS revealed that families in PASS demonstrated a reduction in ineffective parenting behaviors, such as asking questions and attending to non-compliant behavior, from baseline (M=14.43, SD=10.48) to post treatment (M=8.42, SD=4.93), whereas families in the comparison group demonstrated only minimal change on this factor from baseline (M=10.62, SD=6.33) to post intervention (M=9.21, SD=7.24). The effect size for the group difference in change scores for ineffective parenting practices was 0.29.

With regard to changes in behavior at the level of the child, there was essentially no difference between groups with regard to reductions in disruptive behavior as rated by parents on the Iowa Conners Scale (ES=0.09). However, there was evidence that families in PASS demonstrated a reduction in functional impairments from baseline (M=3.74, SD=1.21) to post treatment (M=3.39, SD=1.29). The change for the control group was minimal (baseline M=3.36, SD=0.95; post treatment M=3.39, SD=1.21). The effect size for the group difference in change scores for functional impairment was 0.35. There was essentially no difference between groups with regard to changes in the quality of the parent-teacher relationship.

As indicated, there was considerable variability in the number of PASS sessions attended by families who participated in this treatment (1 to 23). Exploratory analyses were conducted to examine the relationship between parental attendance at PASS sessions and change on outcome measures. These analyses demonstrated that higher levels of attendance were associated with greater reductions in ineffective parenting practices, as assessed by direct observations on the DPICS (r=-0.59).

V. Discussion and Interpretation of Findings
Conclusions Based on Findings

The findings affirm that it is feasible to provide a multimodal intervention based in primary care to address the concerns of families of elementary-age students coping with ADHD. In addition,
the study demonstrated that the multimodal intervention (PASS) was viewed by parents as an acceptable form of treatment for their children.

The study illustrated the challenges of getting families from urban settings engaged at the outset in psychosocial services. For example, about 14% of eligible referrals were not able to be contacted to conduct the initial telephone screening. In addition, 22% of families who met screening criteria did not attend the evaluation designed to confirm eligibility. Further, 12% of families assigned to PASS and 23% of families assigned to the control group did not attend any of the intervention sessions.

The study also illustrated the challenges of keeping families from urban settings engaged in psychosocial treatment even when provided in the context of community-based primary care. Attendance at PASS sessions was highly variable and 24% of families attended fewer than three sessions, which generally does not allow sufficient time to implement the multimodal strategies contained in this program.

Components of PASS were provided in response to children’s presenting problems, families’ request for support, and family preferences for intervention. As such, it is worth noting that a high percentage of families received services related to educational concerns (72%). Although the study was designed to provide teacher consultation in these cases, only 11 of 21 cases in which there was a school concern (52%) had a teacher consultation. There were a number of challenges involved in getting schools to participate in the project, described below.

Another unique feature of providing psychosocial services in urban settings is that unexpected or traumatic events are more likely to occur in these settings as opposed to more affluent environments. It was noted that over one-third of the families involved in PASS received counseling to address crises that arose with the child or family. Addressing crises required that clinicians temporarily suspend the use of family therapy and school consultation strategies. Expecting clinicians to respond to crises, as opposed to making referrals to other providers to do so, likely increased the chance of families receiving some support and may have contributed to the acceptability of the program. However, coping with crises in these cases did detract from the time that could be spent using evidence-based strategies to address presenting concerns.

The groups did not differ on any of the outcome measures included in this study. The small sample sizes per group placed significant limits on the power of the analyses to detect group differences. Nonetheless, the findings suggested that PASS is a promising intervention with regard to reducing barriers to care, increasing parental views about the acceptability of medication as a treatment for ADHD, reducing ineffective parenting behavior, and reducing child impairments. Effect sizes reflecting group differences in change scores (from baseline to post intervention) on measures of these variables ranged from 0.29 to 0.45. In addition, it was noted that greater family attendance at sessions was moderately associated with reductions in ineffective parenting.

**Study Limitations**

Several study limitations deserve attention. First, the school district in which the study was conducted required communication with regional district representatives, principal approval, and teacher consent before data collection at school and school consultation could occur. These requirements served as major obstacles to involving the school. As such, school data were so limited that they were not included in the analyses. Also, almost 50% of the cases who had a school concern did not receive a consultation with the teacher. Second, the study protocol required that children meet criteria for ADHD on the K-SADS and Vanderbilt Scale in order to be enrolled in the study. Although this protocol helped define population parameters, which is useful for external validity, it resulted in several referred families being excluded from the study and clinical service. Third, video observations of parent-child interactions were conducted in offices situated within primary care practices, which is not an ideal setting for such procedures. Sound quality was at times compromised in these settings, although it was still possible to achieve a relatively high level of inter-observer reliability with the
observations. Also, on several occasions, video recorders failed to operate, which precluded the collection of observation data. A fourth limitation is that the group did not provide an adequate control for placebo factors that are intrinsic to psychosocial interventions. The control intervention included components of family education and support, which likely helped in keeping families engaged in treatment. Nonetheless, the groups differed with regard to non-specific aspects of therapy, such as amount of attention and support provided by a therapist. Differences in these non-specific factors may have contributed to differences between groups on outcome measures.

Comparison to Findings of Previous Studies

The findings highlight the challenges of engaging families in intervention when providing services in urban settings (McKay & Bannon, 2004; Power, Hughes, et al., 2010) and the need for specialized intervention strategies to promote engagement and reduce barriers to care (Dishion & Stormshak, 2007; Nock & Kazdin, 2005). The findings of this study confirm those of other studies affirming the acceptability and feasibility of psychosocial interventions for families coping with ADHD (Krain et al., 2005; Power et al., 2012). In addition, the findings support the results of numerous studies indicating the effectiveness of family behavioral interventions in treating children with ADHD with regard to improving parenting practices and child behavior (Fabiano et al., 2009; Power et al., 2012).

Applications to MCH Health Care Delivery Situations

This study supports the use of co-located models of practice whereby behavioral health services are provided in the context of pediatric primary care practice in urban settings. Recommendations for establishing these models of practice in urban primary care include: (a) collaborate with primary care providers and families in designing the programs; (b) recruit behavioral health providers who are culturally effective and highly committed to providing care to underserved populations; (c) offer ongoing training and supervision to clinicians in providing culturally competent care; (d) enlist a community health partner to assist with treatment and provide family advocacy services; (e) collaborate closely with school officials at the district and building level to develop strategies to promote effective collaboration between primary care and school settings; (f) use engagement strategies (e.g., persistent phone calling by clinicians, use of motivational interviewing strategies) to promote engagement at the outset and throughout treatment; and (g) evaluate outcomes with regard to reducing barriers to care, improving acceptability of medication, improving parenting practices, improving the quality of the family school relationship, and improving student outcomes at home and school.

Policy Implications

This study highlights the challenges of developing partnerships between primary care practices and school districts, especially in large urban settings. Given that the sole providers of mental health services for children and youth are typically primary care providers and school professionals, there is a critical need to link the primary care health system and school system to coordinate the efforts of these providers. Policy efforts are needed at a local, state, and national level to reduce barriers to collaboration between the health and school systems, especially in urban settings serving low-income families.

Directions for Future Research

This study represents a preliminary investigation of the feasibility and effectiveness of a multimodal intervention for children with ADHD based in urban primary care practices. A larger-scale study with a much larger sample size is needed to test out the effectiveness of this intervention. It is critically important to develop partnerships with schools so that outcome data pertaining to school behavior and performance can be obtained. Also, in the context of a larger scale investigation, it will be possible to examine models of mediation that can elucidate mechanisms of action related to change in the home and school settings.
VI. List of Products

1. Peer reviewed publications published


2. Chapters


3. Newsletter articles


4. Conference presentations


References


