

American Journal of Orthopsychiatry

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Online First Publication, April 1, 2021. <http://dx.doi.org/10.1037/ort0000536>

CITATION

Liu, S. R., Grimes, K. E., Creedon, T. B., Pathak, P. R., DiBona, L. A., & Hagan, G. N. (2021, April 1). Pediatric ACES Assessment Within a Collaborative Practice Model: Implications for Health Equity. *American Journal of Orthopsychiatry*. Advance online publication. <http://dx.doi.org/10.1037/ort0000536>

Pediatric ACEs Assessment Within a Collaborative Practice Model: Implications for Health Equity

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It is now well understood that exposure to Adverse Childhood Experiences (ACEs) is negatively linked to health and well-being across the lifespan. In an effort to disrupt ACEs exposure and its effects, there is a nationwide movement to screen for ACEs in primary care, despite a lack of well-established guidelines for assessing and responding to risk within routine care. Additionally, developing culturally responsive models of ACEs assessment is imperative, particularly because racial and ethnic minority populations face disproportionate risk of exposure to ACEs and disparities in quality of health care. Using mixed methods, we explored the feasibility, acceptability, and utility of conducting ACEs routine inquiry with an ethnically and economically diverse pediatric population through a unique collaborative practice model (CPM) consisting of an integrated, multidisciplinary team within primary care. In the CPM study, 163 children from a safety-net health system were enrolled; of those, an ACEs questionnaire was collected from 158 (97%) study participants as part of their mental health evaluation. The sample was highly ACEs exposed, with 40% of children and 56% of teens having scores of four or more. There were significant associations between level of ACEs exposure and degree of mental health impairment in both children and teens. Providers viewed the ACEs assessment process as feasible, acceptable, and to have utility for the care of the study's diverse pediatric population. Findings highlight benefits, challenges, cultural considerations and recommendations for promoting health equity through a primary-care integrated ACEs assessment model.

Public Significance Statement

Racial/ethnic minority and low socioeconomic status populations face disproportionate exposure to ACEs and barriers to accessing treatment. Results of a mixed methods study found that a multidisciplinary, team-based approach to assessing ACEs in primary care is feasible, acceptable, and useful to providers working with diverse and highly stressed children and families. This model of routine ACEs inquiry can inform earlier recognition and individualized treatment to improve health and healthcare equity and outcomes for trauma-exposed youth.

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Adverse childhood experiences (ACEs), historically defined as exposure to abuse, neglect, and household challenges, are common across the United States. Nationally representative findings from the 2011/12 National Survey of Children's Health (NSCH) indicate nearly one-half of U.S. children are exposed to at least one ACEs, with higher rates among older, lower-income, racial/ethnic minority, and uninsured or publicly insured youth (Bethell et al., 2017). An abundance of research with adults illustrates a robust dose-response relationship between

ACEs and at least 40 negative health outcomes, as well as risky behaviors and limited success in “life potential” domains, such as academic achievement and graduation rates (Centers for Disease Control, 2016; Felitti & Anda, 2010; Felitti et al., 1998). Research has also identified links between ACEs and poor physical and mental health in childhood and adolescence (Appleyard et al., 2005; Bomysoad & Francis, 2020; Burke et al., 2011; Liu et al., 2018).

ACEs Routine Inquiry

Because of their prevalence and potentially lethal consequences, ACEs have gained recognition as a preventable root cause of poor health (Conn et al., 2018; Forkey & Conn, 2018; Shonkoff, 2012). Furthermore, the fiscal burden of unaddressed ACEs is substantial, with one recent systematic review and meta-analysis estimating that ACEs generate costs of up to \$581 billion annually in the United States due to lost productivity (Bellis et al., 2019). There is related interest from researchers, policymakers, and practitioners in identifying ways to routinely identify, prevent, and intervene in response to ACEs exposure, including reducing time to treatment (Grimes, 2017; Kia-Keating et al., 2019; Marsicek et al., 2019; Purewal et al., 2016). Integrated pediatric mental health models have been proposed to facilitate earlier recognition of childhood trauma, yet few practices have fully adopted ACEs screening or routine inquiry (Forkey & Conn, 2018; Kerker et al., 2016).

Of note, the existing ACEs literature uses the terms “screening” and “routine inquiry” somewhat synonymously, but some scholars have disputed the term “screening” in the context of ACEs, arguing that it is only suitable when there is an identifiable early disease stage and when there are known early interventions for disease prevention (Lacey & Minnis, 2020). Therefore, this study will use the term “assessment” or “routine inquiry.” A limited amount of preliminary research has been conducted on ACEs routine inquiry within or related to pediatric populations. Marsicek et al. (2019) found feasibility in assessing 1,206 children for ACEs at well-child visits to a general pediatric clinic over the course of 1 year. Marie-Mitchell et al. (2019) undertook an implementation process of a pediatric ACEs questionnaire, finding their tool and process to be both feasible and acceptable. Selvaraj and colleagues found that screening was feasible and acceptable but also concluded that their tool did not improve identification of ACEs (Selvaraj et al., 2019). Finally, Kia-Keating et al. (2019) screened infants and their parents for ACEs when they presented for infant well-child visits and found their process to be highly acceptable and feasible.

Important Future Directions and Study Aims

Overall, the preliminary body of work on ACEs routine inquiry is promising, particularly in terms of feasibility and acceptability, but there remains a need to further develop the evidence base for utility regarding use of ACEs routine inquiry as a clinical tool within integrated primary care pediatric models (Barnes et al., 2020; Bethell et al., 2017; Forkey & Conn, 2018; Selvaraj et al., 2019). Furthermore, it is critical to investigate and understand unique considerations of implementing routine inquiry with low-income and culturally diverse pediatric populations. ACEs are not just a public health issue, but a major issue of health equity. ACEs and related health outcomes are deeply intertwined with historical context and structural racism such that factors like multigenerational

trauma, educational and occupational marginalization, and lack of neighborhood resources have created a disproportionate burden of ACEs and poor health among low-income communities and communities of color (Liu et al., 2018; Metzler et al., 2017). Recognizing how ACEs and racism are inextricably linked, scholars have called for culturally responsive approaches to all ACEs research, assessment, and intervention and prevention. Such approaches acknowledge racism as a root contributor to existing disproportionality in ACEs exposure and later health outcomes among youth of color, and recognize and endeavor to address the multiple barriers to health and health care faced by historically marginalized populations (Bernard et al., 2020; LaBrenz et al., 2020; Liu et al., 2019).

In this study, we utilize a concurrent mixed methods strategy to evaluate the feasibility, acceptability, and utility of a culturally responsive collaborative practice model of ACEs routine inquiry. Based on prior research, we hypothesized that it might be feasible and acceptable to provide ACEs routine inquiry, but were particularly interested in seeing if that feasibility and acceptability was altered by implementation within a socioeconomically and culturally/linguistically diverse population. We additionally hypothesized that there might be a relationship between ACEs and psychiatric impairment in our sample, but had no a priori hypotheses regarding how that might manifest with standardized measures of clinical functioning in children and adolescents.

Method

Setting and Study Populations

This study of ACEs routine inquiry took place within an urban safety-net health-care system serving approximately 25,000 highly socioeconomically and racially/ethnically diverse children and families. Starting in September 2016, the health-care system launched a longitudinal study within primary care for children of ages 3–18 years to improve recognition of childhood trauma and mental health needs, and reduce health-care disparities. The ACEs study took place in this context, and as a component of the collaborative practice model (CPM). The CPM intervention was selected based on earlier indications of effectiveness in improving treatment access and engagement, among high-need children and adolescents (Grimes et al., 2018). The collection of child and teen ACEs scores was done using a structured interview which took about 10–15 min. The study was not randomized. Primary care clinicians from two of ten pediatric clinics were able to refer patients in need of a child mental health evaluation to the CPM intervention study, where they received specialized assessment and clinical care management. Primary care clinicians serving children at the remaining eight clinics continued to refer children who required mental health evaluation to outpatient mental health resources. All research protocols were approved by the Cambridge Health Alliance Institutional Review Board (IRB): CHA-IRB-1062/04/17 Enhancing Systems of Care: Supporting Families and Improving Youth Outcomes (E-SOC).

Patients. The population of children and adolescents whose data were used for the quantitative part of this study included all 114 children and 49 adolescents enrolled in the CPM intervention arm between October 2017 and November 2019. All participants received ACEs routine inquiry as part of the CPM intervention. Approximately 53% of children and 58% of teens did not speak

English as their primary language, and 83% of children and 80% of teens identified as racial/ethnic minorities (see Table 1).

Providers. The population of providers who participated in the qualitative part of this study were five clinicians, all of whom collected ACEs information during the CPM clinical evaluation process in primary care. These five providers participated in semi-structured interviews related to acceptability, feasibility, and appropriateness of the ACEs routine inquiry process. The providers to be interviewed were selected through purposive criterion sampling. Sampling decisions were made a priori based on predetermined criteria—in this case, if providers had a direct role in assessing ACEs as part of the CPM intervention. An additional sampling aim was for the providers to represent a range of professional backgrounds and amount of time on staff. Providers gave informed consent after being apprised of the purpose, risks, and benefits of the study, and were interviewed in person or over the phone. Interviews

were audio-recorded and transcribed. Every provider who was given the option to participate in the study elected to do so. The final sample included three licensed clinical social workers and two physicians-in-training, whose amount of time on staff ranged from 3 months to 3 years.

Collaborative Practice Model. The CPM team consults to the primary care provider (PCP) and consists of three distinct specialty roles, frequently acting side by side and always in coordination with each other and the PCP. The team is led by a full-time clinical care manager (CCM), who is a licensed clinical social worker; a full-time family support specialist (FSS), who is a peer-to-peer parent with lived experience parenting a child with mental illness; and a part-time consulting child psychiatrist. Where possible, the assigned FSS will share a similar cultural, linguistic, or community background with the family they are working with; if not, interpreters are used for language differences, and cultural

Table 1
Child and Adolescent Descriptive Information

	Child (n = 114)	Teen (n = 49)
Primary language (%)		
English	47.4	40.8
Spanish	32.5	32.7
Portuguese	14.9	20.4
Other	5.3	6.1
Race/ethnicity (%)		
Hispanic/Latino	60.5	59.2
White	16.7	20.4
Black	19.3	12.2
Multiple/other	3.5	8.2
Female (%)	43.0	59.2
Age (range, M, SD)	3–12, 8.4, 2.5	13–17, 14.7, 1.3
Clinical functioning (CAFAS) (range, M, SD)	20–160, 64.0, 23.8	20–150, 70.6, 28.2
Individual ACE endorsement (%)		
1. Parental separation	76.1	68.8
2. Parental incarceration	13.6	12.5
3. Family mental illness	44.5	45.7
4. Domestic violence	30.0	39.6
5. Emotional abuse	19.1	41.7
6. Sexual abuse	9.1	13.0
7. Neglect	6.4	8.3
8. Physical abuse	19.3	37.5
9. Family substance use	22.0	22.9
10. Emotional neglect	20.2	33.3
11. Foster care	5.5	8.3
12. School bullying	36.1	41.7
13. Parental death	5.5	8.3
14. Separation from parent through deportation or immigration	10.1	10.4
15. Serious medical procedure or life-threatening illness	9.2	0.00
16. Community violence	20.2	45.8
17. Racism or discrimination	9.3	16.7
18. Arrest or incarceration	n/a	6.3
19. Intimate partner violence	n/a	0.0
ACES continuous scores		
Original 10-item measure (range, M, SD)	0–9, 2.6, 2.2	0–9, 3.2, 2.1
Expanded measure (range, M, SD)	0–12, 3.5, 2.6	0–12, 4.6, 3.0
ACES categorical scores (%–expanded version, %–original ten items)		
0	1.8, 10.9	6.3, 8.3
1	22.7, 29.1	10.4, 18.8
2	15.5, 18.2	12.5, 10.4
3	20.0, 20.0	14.6, 22.9
4+	40.0, 21.8	56.3, 39.6

consults are sought, if needed, from the larger community. The PCP participates in the referral handoff, ongoing integrated team “huddles,” concurrent decision-making and clinical care management. Supervised physicians-in-training also assist with evaluations and ACEs routine inquiry.

Once a child is referred to the CPM team, they participate in a comprehensive child and family evaluation that includes clinical interviews and assessment measures. When families do not speak English, a trained medical interpreter from the health-care system is called in to join the evaluation. Additionally, the CPM team recruits culturally and linguistically diverse staff; if they have fluency in the family’s primary language, they may provide additional support to make sure the family understands what the team is saying, and to make sure the parent/guardian is heard. A foundational aspect of the evaluation is the parent/guardian interview to identify family needs and strengths. Led by the FSS, this interview frequently reveals the “rest of the story” that families might not typically share with clinicians. It is in this supportive context that the ACEs routine inquiry was conducted by trauma-informed CCM social workers and trainee physicians who received individualized training in the use of the questionnaire. Throughout the interview, patients were reminded they could stop at any time, for any reason.

After the evaluation, significant findings, including history of childhood trauma and clinical recommendations are reviewed with the PCP, the parent/guardian, and the child to create a shared treatment plan and safety plan if needed. The CPM team facilitates specialty mental health referrals and connections to community resources as appropriate. The team continues to serve as a consultative resource to the family’s pediatrician and to the family, maintaining communication with any child-serving agencies and community partners relevant to the patient’s treatment plan and supporting the family in following up with recommendations.

Measures

Demographics. Demographic information collected for the current study included age, race/ethnicity, sex, and primary language.

Child and Adolescent Functional Assessment Scale (CAFAS). Through semi-structured clinical interviews, the CAFAS assesses behavioral and psychological impairment in youth of ages 5–19 across eight domains (school, home, community, etc.). Higher scores (total and subscales) correspond to greater impairment (Hodges et al., 1998). The CAFAS has demonstrated validity and reliability (Hodges & Wong, 1996). Total scores can range from 0 to 240 and correspond to levels of functional impairment as follows: between 0 and 10 is minimal; between 20 and 30 is mild; between 40 and 60 is moderate; between 70 and 80 is marked; and 90 or greater is severe (Hodges et al., 1998). A 20-point change in CAFAS score is considered an indicator of clinically significant change in level of functioning (Hodges et al., 2004). Consistent with instrument parameters, CAFAS scores were only obtained on youth of ages 5–17 in this study sample (which included youth of ages 3–17)

Adverse Childhood Experiences. The ACEs (child and teen) questionnaires utilized in this study were developed by the

Center for Youth Wellness (CYW ACE-Q; Purewal et al., 2016). Originally designed as a paper and pencil questionnaire to be filled out by parent or child, this questionnaire was administered in a brief interview format in the current study because of linguistic, literacy, and cultural barriers. The child version (ages 12 and under) was completed by a parent/caregiver on behalf of the child, and spans the ten items included in the original ACEs study (covering categories of abuse, neglect, and household dysfunction; Felitti et al., 1998), as well as seven additional items asking about foster care, bullying, parent/guardian death, separation due to deportation/immigration, serious medical procedure/illness, violence in neighborhood, and discrimination. The teen version of the questionnaire was completed by self-report and includes the same items as the child questionnaire plus two more items asking about experiences of intimate partner violence or one’s own arrest/incarceration.

Semi-Structured Provider Interviews. The semi-structured interview guide for providers involved in ACEs data collection was created through collaboration and consensus of three study authors, based on study aims. The guide was intended to elicit staff perspectives regarding acceptability, feasibility, and appropriateness of ACEs routine inquiry. The interview guide was informed by a review of the scientific literature, and the study team’s research and clinical knowledge. Interviews collected participants’ observations and recommendations related to the routine inquiry process. Sample questions include “Can you describe your observations of the ACEs routine inquiry process in the clinic?” and “Are there any changes that would improve the ACEs routine inquiry process?” One-to-one interviews were conducted by two authors with prior training in qualitative research methods and experience in conducting semi-structured interviews and focus groups about sensitive topics such as trauma in health-care settings. Interviews were then audio-recorded and transcribed verbatim.

Analytic Approach. This study utilizes a concurrent embedded mixed method strategy (Bishop, 2015; Creswell, 2009), utilizing both quantitative and qualitative methods to gather complementary insights related to feasibility (extent to which an innovation can be practically used in a given setting), acceptability (view among stakeholders that a given innovation is agreeable or satisfactory), and appropriateness (perceived compatibility with needs and practices of a setting or population; perceived utility in addressing a given problem; Hamilton & Finley, 2020) of ACEs routine inquiry for youth. *Feasibility* was explored through qualitative results as well as percentage of ACEs routine inquiries that were completed for all study participants. *Acceptability* was assessed through results of qualitative interviews with providers. *Appropriateness* was examined through qualitative results and quantitative analyses assessing whether the ACEs score was indicative of functional impairment in our sample. In line with concurrent embedded mixed methods, this study is primarily guided by qualitative analyses and complemented by quantitative results. Results are presented separately and integrated or “mixed” in the discussion (Creswell, 2009).

The qualitative component of this study was conducted from a rapid qualitative analysis (RQA) framework. RQA, a primarily deductive subcategory of thematic analyses, has emerged as one method that maintains rigor and feasibility in implementation research where projects often involve many “moving parts” and

short timelines. RQA is well suited to common implementation study aims, including understanding barriers and facilitators to uptake of practice innovations or changes (Hamilton & Finley, 2020). In brief, after completing the interview process (including audio-recording and transcription verbatim), neutral domain names corresponding with each interview question are generated and placed into a template, which is then piloted, assessed, and revised as necessary by the research team until there is agreement that the template allows for accurate condensation of interview material (Hamilton, 2013). In this study, two team members individually completed summaries for each interview, then met to achieve consensus by ensuring domains were identifiable in the data and that there was consistency between team members in capturing domains. In line with RQA, summaries were then placed into a matrix organized by domain, which allowed for review of key findings within each domain and elucidation and synthesization of overarching themes (Hamilton, 2013; Hamilton & Finley, 2020; Koenig et al., 2016; Palinkas et al., 2019; QualRIS, 2019).

Quantitative analyses started with univariate descriptive statistics characterizing the study sample and summarizing ACEs and CAFAS scores. Then relationships between a child's ACEs (expanded version) and CAFAS scores were assessed through multivariable regression using Stata/MP 16 (StataCorp, College Station, TX). Because the type of ACEs measure differed between child and adolescent participants, analyses were stratified by age group. Results were adjusted for demographics, including age, sex, race/ethnicity, and language. Nine children in our sample were not included in the regression analyses because they were below the age of five and thus ineligible for the CAFAS measure. Multiple imputation by predictive mean matching with 100 iterations was used to address low levels of missing ACEs data (2% for child sample, 5% for teen sample; Goodman et al., 2017; Little & Rubin, 2014).

Results

Study Sample Characteristics

Sample demographic and ACEs descriptive information is reported in Table 1. Mean CAFAS scores of 64 ($SD = 23.8$) for children and 70.6 ($SD = 28.2$) for teens indicate that on average, children in the sample were exhibiting moderate to marked functional impairment and teens were on average exhibiting marked impairment. On the expanded ACEs scale, fewer than 2% of child participants had scores of 0, while 40% had scores of 4 or more. For adolescents, approximately 6% had scores of 0 and 56% had scores of 4 or more (see Table 1).

Quantitative Analyses

Of the study participants, 158 (97%) completed an ACEs questionnaire, indicating high feasibility of ACEs routine inquiry within the CPM. Table 2 presents results of regression analyses associating ACEs score with clinical functioning for children and adolescents, adjusting for age, sex, race/ethnicity, and language. In both models, ACEs scores emerged as the only variable significantly associated with clinical functioning. Results suggest that ACEs and covariates together explain 10% and 35% (as determined by R^2_{adj} values) of the variance in functional impairment scores for children and

adolescents, respectively. Estimates indicate that every additional ACE experienced by children in the study sample was associated with a 2.83 point increase ($SE = .93, p < .01$) in CAFAS score, or level of clinical impairment. For adolescents, every additional ACE was associated with a 5.76 point increase ($SE = 1.28, p < .001$) in CAFAS score (see Table 2).

Qualitative Analyses

Qualitative interviews of providers administering ACEs routine inquiry as part of the CPM resulted in response saturation at five interviews, with a set of overarching themes emerging repeatedly across participants in four domains: benefits, challenges, cultural considerations, and recommendations.

Benefits. Interviewees described three major categories of benefits: added breadth and depth to case conceptualization, improved treatment planning, and strengthened understanding between parent and child, and provider and patients.

Case Conceptualization. Providers consistently expressed beliefs that the routine inquiry process allowed the treatment team to gather significant information that might have otherwise been missed with broader and/or less specific interview techniques. They felt that assessing for ACEs allowed them to learn information about past trauma, as well as ongoing trauma and safety concerns.

Treatment Planning. Patient disclosure of ACEs information directly informed the CPM team's next steps in terms of diagnoses, treatment planning, referrals to therapy and other services, treater preferences, and safety planning. As one provider said, "The more you know ... what a child has experienced the more you ... understand ... what interventions might be appropriate. If I

Table 2
Regression Analyses of ACEs and Demographics on Clinical Functioning, Child and Adolescent Samples

Predictors	Child ($n = 105$)		Adolescent ($n = 49$)	
	Estimate	SE	Estimate	SE
ACEs (expanded)	2.83**	.93	5.76***	1.28
Age	.15	1.11	.67	2.91
Female (ref. = Male)	-4.06	4.63	-7.13	7.09
Race/ethnicity (ref. = Hispanic/Latinx)				
White	-2.42	6.79	11.48	10.97
Black	11.60	7.96	-2.85	15.23
Other	-1.52	12.64	-8.65	15.33
Language (ref. = English)				
Spanish	-2.34	6.02	4.52	11.03
Portuguese	-2.69	6.94	9.20	10.78
Other	14.08	12.15	3.54	16.48
Constant	63.53***	5.12	61.19***	10.16
Model statistics	$F(9,93) = 2.32^{**}$, $R^2_{adj} = .10$		$F(9,37.1) = 3.90^{**}$, $R^2_{adj} = .35$	

Note. Final child sample is $n = 105$ because nine children in our sample were below the age of 5 and ineligible for CAFAS scores. Multiple imputation with 100 iterations was used to address low levels of missing ACEs data (2% for child sample, 5% for teen sample). ** $p < .01$. *** $p < .001$.

was going to refer a child for ... [in-home or outpatient] therapy ... I would say, "This child has history of" ... and [that] will impact the therapy." Participants also believed that ACE information allowed the CPM team and pediatricians to have a more comprehensive, trauma-informed understanding of their patients' experiences and the context within which they lived. For example, one provider stated, "It gives ... insight into what the family ... needs, but is not presenting in the forefront. A lot of the time ... [families] are coming in like 'This just happened, and we need help.' But there's so many underlying things that have happened before that contribute."

Relationships. Finally, interviewees described how assessing for ACEs provided important relational benefits for both the child–parent relationship and the provider–patient relationship. For example, interviewees described times when assessing for ACEs increased a parent's understanding of their child's experience and/or the impact of past events through helping them "put the pieces together." Asking about ACEs also "opened the door" for families to discuss hard topics with their provider. Another interviewee spoke to both relational pieces, saying "I think it adds tremendous value ... you're obtaining this information ... in a way that normalizes it and makes it easier to talk about. Part of how trauma becomes trauma and ... symptomatic in families is that it's not talked about."

Challenges. Providers described several considerations and challenges with the ACEs routine inquiry process, including time required, questionnaire structure, potential provider discomfort, and accuracy of information.

Timing. Regarding the degree to which making time for the ACEs interview is a barrier, some participants described challenges related to the amount of time the instrument can take, particularly if certain items are endorsed and need to be addressed by the team. Other participants acknowledged that the time burden could become an issue in other settings but expressed a sentiment that the CPM structure allowed adequate time to assess for ACEs.

Questionnaire Structure. Another challenge that participants identified regarded questionnaire structure. Specifically, interviewees felt that the wording of the questionnaire could be confusing when presented to parents/guardians and adolescents. One interviewee said, "The questions are just worded really funky ... they're confusing ... and if I read them verbatim to families, they won't get it. So, a lot of times I ... reword them and ask again." Additionally, although the CPM team has developed its own way to introduce the ACEs instrument and follow up when certain items are endorsed, some suggested that the instrument could be improved if these elements were built into the questionnaire itself.

Potential Provider Discomfort. Providers also spoke of their own concerns around how to assess for ACEs in a way that did not feel "shaming or blaming" for parents, and therefore the need to have providers with specialized training (as their team did): "to really modulate the ... shame that might occur within a parent ... can be difficult ... [on our team], everyone is trained to ... have the sensitivity that's required to ... deliver those questions and hear people's answers."

Response Accuracy. Finally, providers questioned whether responses might vary by reporter (e.g., in this study, teens self-reported on ACEs, and parents reported on their child's ACEs, but if children also reported on their own ACEs, might their responses look different from those of their parents?). Additionally, interviewees had noticed that a few parents moved through the questionnaire rapidly and answered all no's, and they hypothesized that this might be for several reasons—perhaps there was no adversity in the child's life, or perhaps the parent did not want to think about the possibility of adversity and/or they felt uncomfortable in disclosing past or present events.

Cultural Considerations. Providers described two main considerations related to administering this instrument with a diverse population: the importance of having multidisciplinary, multicultural, multilingual team members and the importance of being family centered in approach.

Team Composition. Consistently, providers described the importance of the FSS's presence. They believed that the presence of the FSS increased parents' comfort in disclosing ACEs, particularly when their child's ACEs risk may have been intertwined with their own parenting. As one provider explained,

in terms of attuning to our diverse and complex population ... we are asking the parent to disclose really sensitive information about exposure that their child received, oftentimes in their care ... it is so loaded with potential ... guilt and shame ... I think the [FSS] is just so ... crucial to that, because you have a parent with a lived experience who can share ... what experience their child had. When it's [questions about] mental illness, when it's questions about depression and suicide, when it's a question about substance use, it does help if the parent has met a member of the team, whoever they might be, who they feel like is in their corner, no matter what the answer is.

From participants' perspectives, purposeful hiring of multicultural and multilingual staff allowed them to better meet the many cultural and linguistic needs of their patient population. Additionally, the team had access to the health-care system's interpreter services if needed. Finally, interviewees felt that having a primary care consultation team composed of providers from three different training backgrounds (psychiatry, social work, and peer-to-peer family support) increased their ability to provide effective, multidimensional, family-centered care to families and reduced typical patient–medical provider power dynamics. One provider said, "Having an entire team ... talking together with mom and kid ... dissipates the ... adversarial component. You all come together ... weighing the pros and cons and everything and think of a way to move forward."

Family-Centered Model. Participants also believed that the family-centered nature of the model helped connect with the diverse patient population they were serving and use the ACEs information they were gathering. Specifically, they felt that being able to meet with parent and child both individually and together, and having a model structure where the CPM team continued to consult on and intermittently follow the family over an extended period of time, allowed them to intervene on behalf of safety needs and clinical concerns for the children and provide support to families

that might otherwise be difficult to engage. Finally, participants spoke about the importance of administering the ACEs through a narrative interview (in English and/or translated into another language, as necessary), which allowed for clarifying responses, asking questions in a more sensitive way, and modifying wording when necessary to attune to different family structures and social dynamics.

Recommendations. Outside of recommendations related to cultural considerations, recommendations provided by participants for implementing the ACEs routine inquiry fell into three main categories: workflow, communication of information, and training.

Workflow. Participants felt that collecting information on parent ACEs in addition to child ACEs could contribute to a deeper, more multifaceted understanding of cases and further inform treatment planning. Additionally, participants thought that having parents respond to the ACEs questionnaire for all children, regardless of their age (while still having teens self-report on their ACEs), would provide important information regarding parent versus child understanding and knowledge of ACEs. Repeatedly, interviewees emphasized the importance of having a multidisciplinary team in primary care to assist with collecting and responding to ACE information. As one provider said, “There’s definitely scope for the physicians to be able to make referrals based on either a high score or particular items . . . but I think physicians . . . feel more empowered if they had . . . like a social worker or a family support specialist to work with them.”

Participants described how nesting the ACEs routine inquiry into a comprehensive assessment allowed for relationship-building prior to asking about ACEs and thus, families felt more comfortable answering. Interviewees emphasized taking time to introduce and normalize the assessment and build rapport before administering the ACEs questionnaire:

There are triggering questions, so I usually preface the conversation . . . I might say ‘This is some article work that I ask to all families of all ages, some of it may seem irrelevant. So, if it seems irrelevant just answer no and move on. And some of it may be a sensitive question, so you know if you need to take a break or you feel like you don’t want to answer it, that’s okay.’ . . .

Information Communication. In terms of dissemination, participants consistently stated their belief that in order for the ACEs information to be meaningful, it must be communicated to other providers and incorporated into treatment planning. Participants all emphasized the importance of communicating ACEs information back to the child’s primary care provider—in part because the provider may have a stronger relationship with the family, and in part because the information should inform their treatment with families. Additionally, participants explained their belief in the importance of only collecting this information if one feels one has the ability to respond to ACEs disclosures with next steps. As one provider explained,

We’re asking, but then we’re also working with the family as to how we’re going to resolve it or how we’re going to . . . provide resources . . . I just know that some pediatricians have been overwhelmed, within reason, because . . . if they learn something about patients and feel like they can’t do anything to help them, then that’s not a good feeling . . .

[with the CPM], I think it’s different, because we’re able to do those follow-ups, and we’re able to say . . . ‘we learned this but we’re doing x, y, and z about it.’

Training. Finally, participants highlighted the importance of someone with specialty training in trauma to collect ACEs information, such as the CPM team social worker or child psychiatrist. Some providers expressed a belief that all medical professionals should receive training in ACEs as the field moves forward. Participants also emphasized the importance of prior preparation, communication, and planning related to administering ACEs, in part to counteract the provider discomfort that can arise. Participants provided a number of suggestions to address this discomfort, including developing a way to introduce and normalize the assessment, and remembering that “you are asking for a reason.” As one provider said,

I think for the clinician . . . it’s a matter of knowing why you’re asking. So, if you are able to explain to the parent why you’re asking, I think that may make you feel less uncomfortable asking them . . . beforehand, we think ‘Oh my god I’m going to ask these like really personal questions and like really horrible things for them to answer,’ but it’s more . . . that was my [issue]. But when I’m in it . . . I think it’s more normal for people . . . and that’s across the board for parents and teens.

Discussion

There is a growing body of research demonstrating the robust relationship between ACEs and the risk for poor health, outcome disparities, and greater societal costs. As a result, legislation and practitioners across the country are moving rapidly toward implementing ACEs routine inquiry in pediatric practices. The preliminary body of work on routinely assessing for ACEs in primary care narrows substantially when looking for research on assessing for ACEs in pediatric primary care and among socioeconomically and culturally diverse populations. This study is an initial foray into expanding the literature regarding ways to accomplish ACEs routine inquiry within a safety net pediatric primary care system. Results support the feasibility, acceptability, and appropriateness of ACEs routine inquiry as part of a culturally responsive CPM. Furthermore, study findings detail important opportunities and considerations for obtaining ACEs history in pediatric primary care practices serving highly diverse and stressed populations.

Results indicate that the model employed in this study demonstrates high levels of feasibility, with 97% of the study participants responding to an ACEs questionnaire over a 2-year period. This completion rate is higher than rates reported by previous studies, which range from 47% to 92% (Kia-Keating et al., 2019; Marsicek et al., 2019; Selvaraj et al., 2019). Qualitative data further indicate high acceptability among providers related to ACEs administration, with universal expressions of support and belief in its importance. The levels of feasibility and acceptability found in this study are attributed to a number of factors identified in the qualitative results, particularly the integrated, multidisciplinary team approach, the extended and comprehensive nature of the provider–patient relationship, the specialized trauma training of the various team members, their experience and preparation with assessing for and discussing ACEs with families, having multicultural and multilingual team members, and taking a family-centered approach. Finally, results revealed the vital importance of undertaking ACEs routine inquiry as part of a team that supports one another and the primary

care provider in working with complex, trauma-exposed families that can contribute to provider burnout.

Our findings that assessing child ACEs in pediatric practice is both feasible and acceptable align with conclusions of other recent studies (Kia-Keating et al., 2019; Marie-Mitchell et al., 2019; Marsicek et al., 2019). More broadly, for years researchers have studied the feasibility and utility of screening for and trying to manage child mental health problems (such as trauma exposure and related concerns) within primary care. In alignment with this study's findings, results from previous studies indicate providers have expressed valuing behavioral health screens at well-child visits because of the discussion they encourage around mental health issues (Hacker et al., 2013). Research has also identified common challenges with this practice—short visits with competing priorities, limited options for consultation and referral, and limited skills and knowledge related to behavioral health management (Wissow et al., 2008). These findings are in contrast to those of our study, which suggest that the CPM builds in enough dedicated time, follows a workflow that allows for all domains of inquiry, and has a multi-disciplinary team for consultation that includes behavioral health experts. The characteristics identified in this study as contributing to acceptability also align with expert recommendations for identifying and responding to psychosocial adversity in patient-centered medical homes (Bair-Merritt et al., 2015), which include having a standardized tool to capture adversity, training providers on how to address adversity experiences, having a team member with expertise in mental health, and providing culturally responsive care. These are important factors to consider for any model of primary care practice, regardless of whether a CPM is being utilized or not.

Our final study aim was to assess appropriateness of the model of ACEs routine inquiry utilized in this study. Specifically, is the process compatible with needs of the setting and population, and is it useful in addressing a given problem? The clinical appropriateness of implementing ACEs routine inquiry as part of a CPM within a safety-net pediatric health-care system is supported by the high level of ACEs exposure in our study population. Population prevalence reports estimate that approximately 12–16% of adults endorse 4 or more ACEs (Merrick et al., 2018; Centers for Disease Control and Prevention, 2016); by contrast, in this study, 40% of children, and 56% of adolescents, respectively, had ACEs scores of 4 or more.

Additionally, the finding of a linear correspondence of ACEs scores with clinical functioning (as assessed by the widely used CAFAS instrument) adds new information to the existing evidence base, showing that we do not need to wait for adult outcomes; the real-time child behavioral health risks associated with ACEs are tangible and quantifiable. And, in many cases, these risks may go unrecognized without the opportunity that routine inquiry provides. Further, the observed increase in strength of association between ACEs and CAFAS scores from childhood to adolescence illustrates how the magnitude of the impact that ACEs have on behavioral health intensifies with age (CAFAS scores for children increase by 2.8 points on average with every additional ACE, whereas CAFAS scores for adolescents increase by 5.76 points for every added ACE). In part, this may be because adolescence is a developmentally sensitive period for the emergence of mental health disorders (Paus et al., 2008), and may be when mental health challenges that have their roots in early-life adversity begin to emerge in ways that are identifiable and quantifiable. Higher average ACEs scores in

adolescence are also consistent with developmental theories that suggest prior vulnerability is often consistent with later vulnerability. Pragmatic factors may include the fact that additional years of age can represent additional opportunities for ACEs exposure and parent/guardian report on ACEs for children, whereas, in our study, the adolescents self-reported.

Overall, these findings about prevalence and severity of ACEs, among a patient population that may face barriers to care and potentially go unnoticed, are important for both clinicians and policymakers. First, it is critical to begin assessing ACEs risk with parents as early as their child's infancy or even during pregnancy, in order to mitigate further ACEs and accumulating health risks as children grow and develop. To do that, knowledge of how trauma impacts health and health risk must be universal among all primary care providers. Further, the powerful effect of childhood trauma needs to be kept in mind throughout practitioners' everyday practice. Changes in school performance, irritability, suicidal ideation, insomnia, etc. can all be indicators of past or ongoing ACEs, but this connection may be missed or misunderstood if one is not taking a trauma-informed approach, that is, acknowledging and integrating patients' trauma history into all aspects of patient-provider interaction and treatment (Substance Abuse and Mental Health Services Administration, 2014). In terms of policymakers, the progression of the impact of each ACE on the CAFAS score from childhood to adolescence reflects the cumulative risk of exposure as children get older, pointing to the necessity of creating health-care systems designed to (a) intervene earlier, by identifying ACEs in early childhood, and (b) reduce time to treatment among both young children and adolescents (Grimes, 2017).

In addition to the utility of ACEs routine inquiry demonstrated by the association between ACEs score and demonstrable functional impairment in our study, our qualitative research revealed provider-reported benefits of assessing for ACEs to include improved understanding of clinical presentation and context and ongoing safety concerns, improved treatment planning (including referrals to specific services and safety planning), more coordinated and informed care across providers, and stronger relationships and understanding between parents and children, and between providers and patients. Assessing for ACEs allowed providers to take the first step in delivery of trauma-informed care, an essential component of effective health services.

Considerations and Recommendations

In addition to the support results provided for the feasibility, acceptability, and utility of this study's model of ACEs routine inquiry, there were several important challenges highlighted and "lessons learned" that can inform recommendations for improving future research and practice. For example, challenges were identified around potentially confusing wording of the CYW ACE-Q measure, timing, and provider comfort level in asking parents about events that might bring up feelings of shame or perceptions of blame. Additionally, providers questioned whether they were consistently getting accurate responses from patients regarding ACEs exposure. Some of these challenges are similar to findings of past research. For example, Marsicek et al. (2019) and Kia-Keating et al. (2019) also identified timing concerns and potential provider discomfort in discussing ACEs items. In our study, providers acknowledged that for the most part, time was not an issue because the CPM

structure allowed for more lengthy interviews; however, they thought it could be an issue for different models of routine ACEs inquiry in pediatric practices. It is also important to note that in our study, providers explained that their comfort levels improved as they gained more experience with administration of the questionnaire; however, ongoing organizational support in this area, for example, in the form of consultation and supervision (which is a part of this study's model), is an important consideration for future research and practice. To our knowledge, other research with the CYW ACE-Q has not raised concerns with wording of the measure. However, relatively speaking, the field of ACEs assessment tools and procedures for youth is still in its infancy. This questionnaire was originally designed as a self- or parent report measure, and clinicians in this study had to restructure it into a verbal interview. This process may have accentuated some of the wording challenges they identified. Clinical validation studies of the CYW ACEs-Q (the tool used in this study) are still underway (Purewal et al., 2016), and as research and practice interest in ACEs routine inquiry continues to grow, it will be important to develop clear understanding of the psychometric properties of various ACEs tools and their appropriateness for different purposes, settings, and administration formats (Barnes et al., 2020; Bethell et al., 2017). The last potential challenge raised by providers in this study was parents moving too rapidly through the questionnaire and answering "no" to all questions. Although there could be many explanations for this type of response, it is important to acknowledge that regardless of how patients' answer an ACEs questionnaire, implementation of routine inquiry is an opportunity for provider-patient engagement, relationship-building, and education on childhood trauma, toxic stress, and tools for prevention and coping (Bethell et al., 2017).

In contrast to other studies that assess ACEs by handing a form to all patients at the start of a well-child visit (and only going through it with them as necessary), this study involved trained providers assessing ACEs in an interview format. In our study, providers believed administering ACEs through a narrative interview was key. To our knowledge, there are no other published studies assessing ACEs in this manner in primary care settings. Selvaraj et al. (2019) administered ACEs routine inquiry at well-child visits through a self-report paper questionnaire but found unexpectedly low endorsement of ACEs (6%), leading them to question whether self-report questionnaires were an effective strategy for identification of ACEs in pediatric medical homes. Notably, patients included in Selvaraj and colleagues' study were demographically similar to those in our study in that they were an urban, low-income, racially/ethnically diverse population. Similarly, in their study of parent perspective of screening for ACEs in a pediatric primary care, Conn et al. (2018) found some parents preferred face-to-face screening rather than on paper, in order to facilitate trust and elaborate on yes/no responses. Our study supports this, with the follow-up questions and enriched understanding of the context for a child or adolescent's clinical presentation building a foundation for individualized treatment engagement. Future research may explore the pros and cons of using an ACEs tool in this manner. Additionally, as research grows in support of the feasibility and acceptability of routine ACEs inquiry within pediatric settings, second generation questions must address what differences in workflows and procedures are needed for different types of settings. For example, the CPM model is resource-intensive and may not be necessary in all pediatric

clinics, but preliminary data on this study's high-need population indicate opportunities for reducing health disparities.

Specific recommendations that emerged in this study were to screen parents as well as children for ACEs and make time to build rapport with families and introduce and normalize the assessment. Practice implications include support for incorporating a review of ACEs risk as part of an annual well-child visit in the same way other health risks are reviewed. Additionally, there should be a system for communicating ACEs information to members of the care team so that it can be incorporated into treatment planning. Further recommendations were to train all health-care staff in trauma and ACEs routine inquiry. These recommendations are similar to those identified in the literature. For example, Conn et al. (2018) found parents emphasizing the importance of providers taking time to introduce the ACEs questionnaire. In relation to assessment of parent ACEs, the impact of parent ACEs on child well-being has been demonstrated in research (Folger et al., 2018; Hatch et al., 2020; Schickedanz et al., 2018), and several other projects have implemented programs to assess parent ACEs (Kia-Keating et al., 2019; McCrae & Burkhardt, 2020). Going forward, it will be important for routine inquiry programs in primary care to take this into consideration. Other studies of ACEs routine inquiry have emphasized the importance of all-staff trainings in ACEs and toxic stress (Kia-Keating et al., 2019; Marsicek et al., 2019; Selvaraj et al., 2019); future research may focus on identifying the type and dosage of training and the ongoing support needed for successful implementation of an ACEs routine inquiry program. Lastly, it is important to highlight that in this study, ACEs were collected as one piece of a comprehensive evaluation that also assessed for family and child context and strengths. Although a focus on this did not emerge in our results, research has demonstrated how positive childhood experiences and natural supports are associated with better health, even in the context of ACEs exposure, leading scholars to suggest that best practices for ACEs inquiry should jointly include assessment of protective factors, including within-child characteristics and contextual factors such as family and community characteristics (Bethell et al., 2019; Liu et al., 2019).

Finally, findings related to cultural considerations in this study are key, given the disproportionate distribution of ACEs among communities of color and calls for culturally responsive approaches to all ACEs research, assessment, and intervention and prevention (Bernard et al., 2020; LaBrenz et al., 2020; Liu et al., 2019). Providers interviewed in this study spoke to key lessons learned for working with diverse, complex patient populations, including the importance of having multidisciplinary, multicultural, multilingual team members, and the importance of being family centered in approach. The FSS was consistently identified as a key role to provide support and partnership for the parent. These findings are similar to those of the Support, Connect, and Nurture (SCAN) project regarding the benefits of a multidisciplinary team approach (McCrae & Burkhardt, 2020). The project assessed current and expecting parents for ACEs and connected families with three components—a family development specialist, community parenting programs and other resources, and routine office visits enhanced through health-care staff educated in trauma (McCrae & Burkhardt, 2020). Furthermore, the FSS in our model of routine inquiry plays a similar role to that of Wellness Navigators in Kia-Keating et al.'s (2019) ACE screening program.

Limitations

Possible limitations of this study include its unique setting and context. The ACEs routine inquiry process used in this study is a part of a larger CPM intervention study. Enrolled children were referred to the CPM study because their PCP noted possible indications of mental health needs and they were requesting a child mental health evaluation/consultation. This is different from implementing ACEs routine inquiry for all patients across a pediatric practice, and more research is needed to determine differences and similarities in how the model of this study might apply to a broader and perhaps less symptomatic and complex population. It is possible that respondents may be more amenable to completing measures like this when already seeking help, and thus feasibility and acceptability might look different at general well-child visits (although emerging evidence elsewhere supports both feasibility and acceptability in this context; Kia-Keating et al., 2019; Marsicek et al., 2019; Marie-Mitchell et al., 2019).

Another important note is that the recommendations identified in this study, although in alignment with the existing literature, are the result of interviews with a specialized sample. Further research is needed with larger and more diverse samples before widespread implementation of these recommendations across clinical settings. Additionally, since a very small percentage of patients did not complete ACEs assessments, data on reasons for noncompletion were not formally collected. In future research, particularly in the context of lower completion rates, collecting data on variables related to ACEs assessment completion could be an important contribution to the field. Finally, this study gained valuable information from providers who were administering the ACEs questionnaire. However, future work should continue to gather these and other perspectives, for example, from children, parents, primary care providers, and staff in roles similar to that of the FSS's and the social workers in this study. Getting additional perspectives will be critical for scaling up various models of ACEs routine inquiry in pediatric primary care.

Conclusions

This study offers a close look at three interrelated and important areas of research within the ACEs literature: assessing for ACEs in primary care, culturally responsive practice, and the potential for the results of routine inquiry to impact treatment planning. Our findings suggest that assessing for ACEs within an integrated primary care pediatric setting assists primary care clinicians with early identification of needs and tailored treatment recommendations. Providers heavily endorsed the ACEs routine inquiry model in this study, noting that asking the questions elicited important aspects of a child's history and helped build a trusting relationship with the family. Both of these factors served to facilitate reduced time to treatment for ACEs-related mental health conditions in at-risk children who might otherwise be missed. Furthermore, incorporating cultural considerations into the model design and implementation was key. This study presents a model of ACEs routine inquiry that appears feasible, acceptable, and useful with a complex, diverse patient population. With resources, time, and attention given to refining, scaling up, and implementing this model and similar approaches, the potential is great for

improving health and health-care equity and outcomes among vulnerable children.

Keywords: adverse childhood experiences (ACEs), childhood trauma screening, pediatric integrated care, health disparities, collaborative practice model (CPM)

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