Adverse Childhood Experiences: Screening and Health in Children From Birth to Age 5

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Introduction: Adverse childhood experiences (ACEs) have lifetime consequences for health and development. This study examined whether there is evidence to support a screening approach that assesses children's current exposures to risks that act as proxies for ACEs, measured in a way that falls below a threshold of explicit abuse, neglect, or illegal behavior. Method: We used data collected during routine home visitations of at-risk children aged 0-5. Home visitors used the Family Map Inventories (FMI; Whiteside-Mansell et al., 2007) to screen ACEs and measure health outcomes, and the Ages and Stages Questionnaire (3rd ed.; ASQ-3; Squires, Twombly, Bricker, & Potter, 2009) to screen child development. Parents (N = 2,004) were 28 years of age on average and most were White (60%). Children were 32 months of age on average and equally divided on gender (51% male). Results: Children were exposed at rates of 27%, 17%, 11%, and 11% to 1, 2, 3, and 4 or more FMI-ACEs, respectively. Logistic regressions revealed significant associations between FMI-ACE scores and health environments and outcomes for children, including health risks in the home (e.g., safety and secondhand smoke exposure), underuse of preventive health care, and overuse of emergency medical treatment. In terms of development, having four or more FMI-ACEs was associated with the child having a chronic health condition and screening at risk for delay in at least one area of development. Discussion: Findings highlight the potential use of questionnaires and in-home observations to measure and intervene in potentially developing ACEs. Further, our screening was associated with children whose health was at risk very early in development.

Keywords: adverse childhood experiences, child health, social determinants of health

The Adverse Childhood Experiences (ACEs) Study documented long-term negative effects of childhood trauma on behavioral and physical health outcomes in adulthood (Anda et al.,

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ual behavior), mental health conditions (e.g., depression, anxiety, suicide, anger control, and perpetrating intimate partner violence), and negative health outcomes (e.g., obesity, cancer, and chronic diseases of the lung, heart, and liver). Research has suggested that childhood toxic stress, precipitated by ACEs, is associated with biological changes in the developing brain and body that affect concurrent and long-term health and behavior (Danese et al., 2011; Johnson, Riley, Granger, & Riis, 2013; Shonkoff et al., 2012).

The ACEs studies were retrospective, with adults reporting on their childhood experiences. Recent studies have confirmed that the negative impact of ACEs begins early in development. For example, a longitudinal study of children ages birth to 11 years demonstrated the effects of ACEs on health outcomes in middle age (Widom, Horan, & Brzustowicz, 2015). Using nationally representative data from children ages 0–17 years enrolled in the National Survey of Children's Health, ACEs were associated with children having a special health-care need, not having a medical home, and having developmental or behavioral delays (Bethell, Newacheck, Hawes, & Halfon, 2014). There is also evidence from studies of children younger than 6 years that ACEs are associated with chronic health conditions (Flaherty et al., 2006; Kerker et al., 2015).

These studies have had an impact on the field, including screening for ACEs in clinical and intervention settings (Burke, Hellman, Scott, Weems, & Carrion, 2011; Marie-Mitchell & O'Connor, 2013; McKelvey, Whiteside-Mansell, Conners-Burrow, Swindle, & Fitzgerald, 2016). However, much is unknown about how to best screen for ACEs in pediatric populations. There are difficulties inherent in translating questions, originally developed to be answered by adults about the actions of others in the past, for children (i.e., their parents). The original victims of ACEs identified clear abuse and neglect, as well as illegal behaviors such as substance abuse. Asking questions about illegal and highly stigmatized behaviors to parents about their children's experiences has limitations: (a) Their answers could be potentially self-incriminating, making them likely unreliable, and (b) the reporter is also the primary point of intervention, therefore it is essential to maintain a positive working alliance with the parent.

There are variations in ACE screening methods for children in the field. Some practitioners have replicated the original studies as closely as possible by asking parents about ACEs the child has ever experienced (Bucci et al., 2015; Marie-Mitchell & O'Connor, 2013). Although measuring ACE screenings by lifetime indicators may prove useful for some professionals to guide additional testing and/or referrals to support a child's development, screenings of this type may prove less useful in other contexts. For interventionists who work to support the parenting and family environments of children at risk (e.g., home visitors and parent educators), knowing what the child is currently experiencing could prove more meaningful. A home visitor would choose different supports for a parent with current versus past depression or substance abuse. Thus, in previous work, we explored asking parents which ACEs the child was experiencing at the time (McKelvey et al., 2016). We identified proxy variables to assess ACEs (e.g., asking parents if the ever spanked their children with an object as opposed to if they physically abused their children) that would allow the identification of a high-risk environment, while maintaining a positive relationship with the parent. Findings suggested that screening scores were associated with concurrently measured parental child abuse, neglect potential, and child social-emotional development.

Current Study

Extrapolating from the research would suggest that preventing exposure of young children to ACEs and their resulting trauma is a public health opportunity to improve health and wellness for coming generations. However, we need more research to identify feasible and effective options to translate this research into practice. In this study, we set out to describe the implementation of the Family Map Inventories (FMI; Whiteside-Mansell et al., 2007)-ACE screening for families of infants, toddlers, and preschoolers. Our aim was to determine whether there was evidence to support a screening approach to assess current ACEs of the child, measured in a way that fell below a threshold of explicit abuse, neglect, or illegal behavior. Specifically, we explored whether our approach to ACE

screening was associated with the health-related environment of the home, health-care use, and concurrently assessed child health and development in very young children in similar directions, as has been shown in prior studies.

Method

Study Design

This study used data collected for the evaluation of voluntary home visiting services funded through the Maternal, Infant, and Early Childhood Home Visiting (MIECHV) program in the state of Arkansas. Families enrolled in three evidence-based home visiting models (United States Department of Health and Human Services, Administration for Children and Families, 2017): Healthy Families America (HFA), Home Instruction for Parents of Preschool Youngsters (HIPPY), and Parents as Teachers (PAT). HFA, a child-abuse and -neglect prevention program for at-risk parents, and PAT, a universal parent support program, serve families through pregnancy until the child is 3. HIPPY serves families of preschoolers to support early learning and literacy. Families enrolled in one home-visiting model at a time. Referral mechanisms differed by community, but included both agency- and self-referral. Families were eligible for services if they reported at least one of the following risks: low income (250% of federal poverty), homelessness, single and/or teen (aged 19 or younger) parent(s), parent mental illness, substance abuse, incarceration, military deployment, disability, suspected child maltreatment (based on referrals from child-protective services), child developmental delay, preterm/low-birth weight, or chronic illness. The Institutional Review Board of the University of Arkansas for Medical Sciences approved the study and families provided informed consent for services and use of data for evaluation.

Sample Description

This study used data collected at enrollment (N = 2,004). See Table 1 for parent-reported demographic and eligibility characteristics. Although the eligibility criteria for services was set at 250% of the federal poverty line, the most families (84%) were living at or below 100%,

with 96% at or below 133%. Primary caregivers were 28 years of age (range = 13–74), White (60%), and had a high school education or less (61%). Children were 32 months of age (range = 13–76 months) and approximately half (51%) were male.

Measures

The home visitor implemented family assessments and child screenings in the field, with enrollment assessments occurring within 1 month of the onset of services. Family assessments included the FMI (Whiteside-Mansell et al., 2013; Whiteside-Mansell, Bradley, Conners, & Bokony, 2007) and additional questions for reporting to the funder. Children's development was screened with the *Ages and Stages Questionnaire* (3rd. ed; ASQ-3; Squires, Twombly, Bricker, & Potter, 2009). We examined enrollment data collected from families between 2012 and 2015. Home visitors received training on conducting the FMI and the ASQ-3.

The Family Map Inventories. The FMI are semistructured interviews conducted in the home, which typically take about 1 hr to complete (Whiteside-Mansell et al., 2007). In addition to interview items, the home visitor codes observation items once the interview is completed. There are three versions of the FMI appropriate for families with children who are (a) prenatal, (b) younger than 3 years, and (c) between the ages of 3 and 5 years. The current study examined the parenting environment for one child, the youngest, in the family at enrollment; therefore, we excluded prenatal families from analysis. Items on the FMIs cover 12 domains grouped into three areas: (a) family climate and context (e.g., exposure to violence and family cohesion and conflict), (b) parent characteristics (e.g., alcohol and/or drug use and caregiver mental health), and (c) physical and social experiences (e.g., basic needs, safety, health, early learning, discipline, routines, surveillance, and social integration). The rationale for each construct within the domains has been described in previous research (Whiteside-Mansell et al., 2013, 2007). Across the domains, estimates of internal consistency reliability (Cronbach's α range = .68–.90) and test-retest reliability (63%-100%) have been adequate to good (Whiteside-Mansell et al., 2013, 2007). Identification rates of family risks with the FMI

Table	1
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Child, Parent, and Family Characteristics

Variables	Total $(N = 2,004)$	
Child characteristics		
Child is male	50.6%	
Child age at enrollment in months (M, SD; range)	32 (20; 0-74)	
Infant/toddler (<36 months)	44.1%	
Parent/family characteristics		
Parent age at enrollment in years $(M, SD; range)$	28 (8; 13-76)	
Race/ethnicity		
Caucasian	60.3%	
African-American	22.2%	
Hispanic	15.1%	
Other	2.4%	
Education		
Less than high school graduate	24.5%	
High school graduate or equivalent	36.6%	
Some college or degree	38.9%	
Employment status		
Unemployed	56.8%	
Part-time	8.6%	
Full-time	34.6%	
Eligibility characteristics		
Low-income (100% of federal poverty or less)	84.4%	
Homeless	5.3%	
Single parent	52.4%	
Teen parent	11.0%	
Suspected abuse/neglect	1.1%	
Parent mental illness	3.9%	
Substance abuse	3.5%	
Incarcerated parent	1.8%	
Parent disability/chronic illness	3.1%	
Child developmental delay	7.6%	
Child low birth weight	8.5%	
Child chronic illness	4.8%	

are similar to those reported in other national studies of low-income populations (Whiteside-Mansell et al., 2013, 2007).

As shown in Table 2, we used items from the FMI as proxies for the original ACEs to screen the risks in the environment (FMI-ACEs; Mc-Kelvey et al., 2016). These items were selected to correlate with the original retrospectively reported ACE constructs (Anda et al., 2006; Felitti et al., 1998). We constructed FMI-ACE scores similarly to the original ACE studies, such that identification of any of the risks that made up the construct was counted as a positive screening (i.e., if two questions are used to represent an ACE, risk on either question indicates risk for an ACE). Construct validity for the FMI-ACE-screening measure was verified with self-report and observed indicators of child abuse and neglect potential, such that increasing

FMI-ACE scores were associated with greater child-maltreatment risk (McKelvey et al., 2016).

In addition to the FMI-ACEs, we used measures for our analyses collected at enrollment with the FMI. We investigated family economic need using items that measure inability to meet basic needs such as housing, utilities, transportation, and child health-insurance status as potential control variables. We also used the FMI for multiple outcomes. home/car safety risk includes items that measure vehicle and fire safety, access to poisons, and other injury risks in the home. Secondhand smoke exposure includes items that assess adults smoking in the home and/or car. Child health-care-use risk measures whether a child has a doctor and receives well-child checkups. Finally, child chronic condition measures parent report of a

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Table 2

Family Map Inventories: Adverse Childhood Experiences at Enrollment Into Services

Original construct and definition ^a	Family Map Inventories items	FMI-ACEs, % $N = 2,004$
1. Emotional abuse: "Did a parent or other adult in the household often or very often swear at you, insult you, put you down, or humiliate you? or Act in a way that made you afraid that you might be physically hur?"	Family Members lose tempers or yell in anger (<i>Often or Always</i>) ^b or discipline strategy to yell at child $(\geq Often)^c$	6.6
 Physical abuse: "Did a parent or other adult in the household often or very often push, grab, slap, or throw something at you? or Ever hit you so hard that you had marks or were injured?" 	In past year, child physically hurt by someone (≥Once) ^d or discipline strategy to spank with object (≥Rarely) ^c	18.2
3. Sexual abuse: "Did an adult or person at least 5 years older than you ever touch or fondle you or have you touch their body in a sexual way? or Attempt or actually have oral, anal, or vaginal intercourse with you?"	In past year, child has seen drug or sexual activities (At Least Once) ^d and/ or open child protective services case $(Yes)^{e}$	6.0
4. Emotional neglect: "Did you often or very often feel that no one in your family loved you or thought you were important or special? or Your family didn't look out for each other, feel close to each other, or support each other?"	Family members feel close and help and support (<i>Never or Rarely</i>) ^b	19.3
5. Physical neglect: "Did you often or very often feel that you didn't have enough to eat, had to wear dirty clothes, and had no one to protect you? or Your parents were too drunk or high to take care of you or take you to the doctor if you needed it?"	Food did not last or cut meal size/skipped (Sometimes True or Often True) ^f and/or lived in temporary housing (Yes) ^g or observed cluttered or crowded home (At Risk) ^h	31.8
 Parental separation: "Were your parents ever separated or divorced?" 	Parent living outside the home $(Yes)^{g}$ and/ or owed child support $(Yes)^{g}$	31.2
7. Domestic violence: "Was your mother or stepmother often or very often pushed, grabbed, slapped, or had something thrown at her? or Sometimes, often, or very often kicked, bitten, hit with a fist, or hit with something hard? or Ever repeatedly hit over at least a few minutes or threatened with a gun or knife?"	In past year, you or someone in home physically hurt (<i>At Least Once</i>) ^d ; in past year, child saw someone physically hurt (<i>At Least Once</i>) ^d	6.2
 Substance Abuse: "Did you live with anyone who was a problem drinker or alcoholic, or who used street drugs?" 	Friends/family with drinking/drug problem in home; CAGE; ⁱ screen positive or observed concern (risk) ^h	4.7
 Household mental illness: "Was a household member depressed or mentally ill, or did a household member attempt suicide?" 	Depression (PHQ-2) ^j screen positive (score at least 2) ^k or observed concern (risk) ^h	14.4
10. Household incarceration: "Did a household member go to prison?"	Parent involved w/ legal system (Yes) ^e	10.9
		33.3
1		27.4
2		16.8
3		11.1
4 or more		11.3
Total (M, SD)		1.49 (1.57)

^a Anda et al., 2006; Felitti et al., 1998 (see https://www.cdc.gov/violenceprevention/acestudy/about.html). ^b Response range *Never or Rarely, Sometimes, Often or Always.* ^c Response range *N/A/Never, Rarely, Sometimes, Often, Always.* ^d Response range *Never, Once, Two Times, Three Times, More than Three Times.* ^e Response options *No, Yes, Don't Know.* ^f Response range *Never True, Sometimes True, Often True.* ^g Response options *No, Yes.* ^h Observational items scale 1–4. Risk is score ≥ 3 . ⁱ Ewing, 1984. ^j Patient Health Questionnaire-2 (Kroenke, Spitzer, & Williams, 2003). ^k Sum score, range = 0–6.

mental or physical health problem or illness that requires regular, ongoing care.

An addendum to the FMI included questions necessary for federal performance reporting. Parents reported incidents of urgent or emergency medical care for their children in the past 6 months. Urgent medical care counts as an emergency medical visit.

Ages and Stages Questionnaire (3rd ed.). Home visitors screened child development using the ASQ-3 (Squires et al., 2009). The ASQ-3 consists of a series of age-related questionnaires that include items related to five areas of child development: communication, problem-solving, gross-motor development, finemotor development, and personal-social development. The ASQ-3 has adequate internal consistency and strong test-retest reliability (intraclass correlations range = .75-.82). The ASQ-3 provides normed developmental quotient and cutoff scores, indicating a particular risk of developmental problems. We defined developmental concern as having any one of the five areas screened and found at risk.

Approach to Analysis

We used logistic regressions (SPSS Version 23.0; IBM, 2015) to examine the association between FMI-ACE groups (i.e., children in families with scores of 0, 1, 2, 3, and 4 or more FMI-ACEs) and health outcomes. The outcomes examined include the health environment of the home (i.e., home/car safety and exposure to secondhand smoke), health-care use (i.e., use of primary care and urgent medical care), and health and development (i.e., parentreport of the child having a chronic condition or scoring at risk on the ASQ). We tested potential overlap between FMI-ACEs and other model controls. Variance inflation factors (maximum = 1.37) and tolerance values (minimum = 0.73) did not indicate a problem with multicollinearity (Pedhazur, 1997). Odds ratios reported in previous ACE work (Bethell et al., 2014; Hunt, Slack, & Berger, 2017) were used to inform power estimates for logistic regression. Findings suggested that the sample, setting α at .05 and power at .95, would be able to detect an odds ratio of 1.71 for the smallest (.03) and 1.23 for the largest (.7) effect sizes previously published (Chinn, 2000; Demidenko, 2007).

Results

As shown in Table 2, one third (33%) of children had FMI-ACE scores of 0 at enrollment. The remaining 67% of children had FMI-ACE scores of 1 (27%), 2 (17%), 3 (11%), and 4 or more (11%). The average FMI-ACE score was 1.49 (SD = 1.57; range = 0.9).

The first set of analyses (see Table 3) examined the associations between FMI-ACE scores

Table 3

Adjusted Odds Ratios for Health Differences by Family Map Inventories–Adverse Childhood Experiences (FMI-ACEs) Score Classifications

	Number of FMI-ACEs			
Construct	1	2	3	4 or more
Health environment of the home ^a				
Home/car safety risk	1.54 (1.15-2.07)**	2.12 (1.44-3.13)***	3.22 (1.88-5.51)***	4.86 (2.52-9.28)***
Secondhand smoke	1.37 (.94–2.0) [†]	1.82 (1.21-2.75)**	2.06 (1.31-3.23)**	4.25 (2.76-6.54)***
Child health-care use ^a				
Health-care use risk	1.43 (.85-2.39)	2.61 (1.54-4.41)***	2.59 (1.44-4.63)***	2.76 (1.53-4.96)***
Urgent medical care	1.33 (.89-1.98)	1.79 (1.15-2.79)*	3.01 (1.9-4.57)***	2.85 (1.77-4.58)***
Child health & development ^b				
Chronic condition	1.1 (.75-1.6)	1.03 (.66-1.61)	1.54 (.96-2.48) [†]	1.94 (1.21-3.12)**
Developmental concern	1.24 (.85–1.79)	1.35 (.88–2.06)	1.56 (.96–2.51) [†]	1.63 (1.0–2.65)*

Note. Adjusted odds ratios (95% CIs) represent comparisons of the FMI-ACEs classifications to those with a 0 FMI-ACEs score.

^a Adjusted for primary caregiver age, education and race; family basic needs risk; child age and gender; and home visiting program model. ^b Adjusted for primary caregiver age, education and race, family basic needs risk, child age, gender and secondhand smoke exposure, and home visiting program model.

 $^{\dagger} p < .10. \quad ^{*} p < .05. \quad ^{**} p < .01. \quad ^{***} p < .001.$

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and the health environments of the families. Analyses controlled for primary caregiver age, education, and race; child age and gender; and home-visiting program model. We explored whether FMI-ACEs were associated with family economic need and children's healthinsurance status. FMI-ACE scores were significantly associated with family resources, Wald(4) = 179.79, p < .001, but not the healthinsurance status of the child, Wald(4) = 5.59, p = .23; therefore, we also controlled for family resources. Results demonstrated significant associations between FMI-ACE scores and the environmental safety of the children, namely the home- and car-safety index and secondhand smoke exposure in the home. The odds of scoring at risk in home and car safety were nearly five times higher for children in families with the highest FMI-ACEs than for those with a score of 0; OR = 4.86, p < .001, 95% CI [2.52, 9.28]. Further, the odds of secondhand smoke exposure for children with the highest FMI-ACE scores of 4 or more were four times higher than children with an FMI-ACE score of 0; OR = 4.25, p < .001, 95% CI [2.76, 6.54]. When examining preventive health care, children in families with FMI-ACE scores of 2, 3, and 4 or more had twice the odds of having inadequate preventive care than children with FMI-ACE scores of 0 (OR = 2.61, p < .001, 95% CI [1.54, 4.41]; *OR* = 2.59, *p* < .001, 95% CI [1.44, 4.63]; and OR = 2.76, p < .001, 95%CI [1.53, 4.96]). Examining emergency medical treatment during the past 6 months showed a similar pattern for children in the three highest FMI-ACEs groups. Children with FMI-ACE scores of 2, 3, and 4 or more had significantly higher odds of having emergency or urgent medical care than those with FMI-ACE scores of 0 (*OR* = 1.79, *p* < .001, 95% CI [1.15, 2.79]; OR = 3.01, p < .001, 95% CI [1.9, 4.57]; OR =2.85, p < .001, 95% CI [1.77, 4.58]). Finally, we used logistic regressions to exam-

Finally, we used logistic regressions to examine whether a child had a chronic condition or screened at risk in any area on the ASQ-3 (Squires et al., 2009). These analyses controlled for variables included in a previous set of outcome analyses (i.e., the demographic controls and family resources scale scores), as well as secondhand-smoke exposure. Secondhandsmoke exposure was included because it was found to be significantly associated with FMI-ACE screening scores and is a known contrib-

utor to asthma, a common chronic condition in young low-income children (Krieger et al., 2002). FMI-ACE scores were significantly associated with the health and development of children, particularly for children in families with FMI-ACE scores of 4 or more. For example, the odds of having a chronic condition were nearly twice as high for children in families with FMI-ACE scores of 4 or more compared with children in families with FMI-ACE scores of 0; *OR* = 1.94, *p* = .006, 95% CI [1.21, 3.12]. Further, for children in families with FMI-ACE scores of 4 or more, the odds of finding risk for developmental delay was more than 1.5 times higher than those with FMI-ACE scores of 0; OR = 1.62, p = .05, 95% CI [1.0, 2.64].

Discussion

This study expanded our understanding of approaches to ACE screening. It also investigated associations between ACE screening scores, measured with proxies, and health and wellness in early childhood. Our screening approach identified current ACEs as experienced by the child, using questions that do not explicitly identify child abuse and neglect or other illegal behavior by the parent. Using this approach, we saw similar relationships between ACEs and the health environments and development of children to those reported in previous studies (Bethell et al., 2014; Flaherty et al., 2006; Kerker et al., 2015). This screening measure makes it possible to detect adverse experiences, allowing timely and targeted interventions to reduce parenting risks and the negative impact on the child. Our findings raise questions for future research and suggest potential targets for intervention.

This study demonstrated an association between ACEs screening and the health environments of children, such that children who experienced ACEs had higher odds of exposure to safety risks and to secondhand smoke in their homes. Unintended injury is the leading cause of disability and death for children in the United States (Borse, & Sleet, 2009; Gilchrist, Ballesteros, & Parker, 2012). Further, secondhand smoke exposure is associated with respiratory and ear infections, asthma, and even sudden infant death syndrome (Öberg, Jaakkola, Woodward, Peruga, & Prüss-Ustün, 2011). These findings suggest a need for home health and safety interventions for families who have reported even one ACE. Screening more widely for ACEs in these contexts would permit targeting of intervention to those families with greater need.

We also found that receiving inadequate preventive health care and receiving urgent medical treatment were more likely for children with two or more ACEs. Inadequate preventive care has been reported in child-maltreatment samples (Bethell et al., 2014). The association between urgent medical treatment and ACEs, collected from parents as both lifetime and current experiences, has also been documented in a small clinical sample (Marie-Mitchell & O'Connor, 2013). The use of urgent care and having greater safety and health risks in the home are associated in the literature (Mace et al., 2001), but the correlational nature of our data prevents concluding causal relationships. Our findings suggest a need for more intensive interventions for families who have children exposed to ACEs. Home visiting, as used in this study, is one such avenue for intensive intervention that has been shown to negatively influence childhood injury (Roberts, Kramer, & Suissa, 1996) and positively influence the use of preventive health care (Duggan et al., 1999).

Finally, we demonstrated that being less healthy (i.e., having a chronic condition or screening at risk for developmental delay) was more likely for young children in families with the highest levels of ACEs. These negative associations may occur through multiple mechanisms. Our study is the first to demonstrate disparities in health environments and healthcare use for children exposed to a higher number of ACEs. Further, this is only the second study to report finding associations between scores on a screening measure for ACEs and developmental delay (Marie-Mitchell & O'Connor, 2013), and it is the first to report this finding for children from birth to age 5.

The American Academy of Pediatrics has recommended that practices providing care for children be prepared to screen for risk factors associated with toxic stress and identify resources to help families address those risks (Garner et al., 2012). However, as a field, our efforts at targeting support for children at risk for experiencing toxic stress is not possible without appropriate methods for the identification of ACEs. A strength of this study is that it provides evidence that the associations between FMI-ACE screening scores, which are measured using proxies for ACEs, and health outcomes are consistent with other prospective studies of ACEs in young children (Bethell et al., 2014; Flaherty et al., 2006; Kerker et al., 2015). This is particularly relevant, as asking parents directly about ACEs could be potentially incriminating and likely unreliable. Further, the FMI-ACEs screening provides an avenue for clinicians and interventionists to identify risks while maintaining a working relationship with parents, whose engagement and eventual behavior modification are critical for reducing the identified risks.

The families in this study are at greater socioeconomic risk than the general population. Future studies should measure ACEs with proxies in a more socially diverse population. The FMI-ACEs represent proxies for ACEs (e.g., asking if the parent spanks with objects, rather than asking about confirmed physical abuse). It is important to note that using proxies to screen for ACEs could potentially weaken the association between the scores and the outcomes. There is one particular ACE, sexual abuse, which is difficult to measure with proxies. Our items included the child witnessing sexual or drug activities and active child-protective services cases. We recognize that the reason for any given child-protective services involvement is unknown. However, we feel that the inclusion of this item in the scale is necessary, as it reflects a more serious indicator of abuse and neglect. The findings from this study, with associations between FMI-ACEs and health in the expected direction, and the validation of the scale using other measures of parenting (McKelvey et al., 2016), support the scale construction.

Conclusion

This study addressed gaps in the literature by documenting the associations between ACE screening scores, less optimal health environments, health-care use, and developmental outcomes for infants, toddlers, and preschoolers. Findings suggest that our approach to ACE screening can identify children whose health is at risk very early in development. Expanding screening for ACEs into pediatric settings could support direct intervention by linking families to assistance, such as home-visiting services, that can support the development of the child.

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