



Inter-Clinician Variability in Primary Care Providers' Adverse Childhood Experience Knowledge, Training, Screening Practices, and Perceived Intervention Barriers: an Exploratory Cross-Sectional Study

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Abstract

Adverse childhood experiences (ACEs) are traumatic events that occur before the age of 18 that can have immediate and long-term negative health, behavioral, and social outcomes. Primary care providers (PCPs) can help mitigate the negative effects of ACEs by identifying at-risk children and families in need of support. This cross-sectional study, that incorporates inter-clinician variability into the sample, explored PCPs ACE knowledge, training, screening practices, and perceived intervention barriers to addressing ACEs. Results found that PCPs had limited familiarity with the ACE study and the effects of ACEs, few PCPs received training on ACEs, only some PCPs formally screened their patients for ACEs, and lack of time and training were PCPs most cited perceived barriers to addressing ACEs. A statistically significant difference in PCPs ACE knowledge and perceived barriers to addressing ACEs by inter-clinician variability was found. To more effectively address ACEs in the primary care setting, the following is recommended - effective ACEs educational tools and resources for both resident and attending PCPs, training on addressing sensitive topics including ACEs beginning in resident physician education, efficient models for ACEs office-based screening, increased access to mental health care for patients, strengthened care coordination with community organizations, and collaborative practice networks.

Keywords Adverse childhood experiences · Toxic stress · Primary care providers · Inter-clinician variability

Introduction

Adverse Childhood Experiences (also called ACEs), are traumatic events that occur before the age of 18 (Centers for Disease Control and Prevention, 2019). There are three types of ACEs that include: (1) abuse – physical,

emotional, and sexual; (2) neglect – physical and emotional; and (3) household dysfunction – mental illness, domestic violence, substance misuse within the household, parental loss, separation or divorce, and having an incarcerated relative (Centers for Disease Control and Prevention, 2019). The landmark ACE study, conducted between 1997 and 1999, by the Centers for Disease Control and Prevention and Kaiser Permanente, found that ACEs are common (64% of participants had experienced one ACE); ACEs cluster (almost 40% of participants experienced two or more ACEs); and ACEs have a dose-response relationship to health, behavioral, and social problems (participants' cumulative ACE scores had a strong, graded relationship to numerous health, behavioral, and social problems over the participants' lifespan) (Felitti et al., 1998).

Since the publication of the original ACE study, ACE replication studies have confirmed a dose-response

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relationship between a person's ACE score and many negative health, behavioral, and social outcomes¹ (Anda et al., 2008; Brown et al., 2010; Chapman et al., 2004; Dietz et al., 1999; Dong et al., 2003; Dong et al., 2004; Dong et al., 2005; Dube et al., 2001; Shonkoff et al., 2012; Sinnott et al., 2015; Springer et al., 2007; Williamson et al., 2002). ACEs, if left untreated, have also been found to progress over time² (Anda et al., 2008; Brown et al., 2010; Chapman et al., 2004; Dietz et al., 1999; Dong et al., 2003; Dong et al., 2004; Dong et al., 2005; Dube et al., 2001; Shonkoff et al., 2012; Sinnott et al., 2015; Springer et al., 2007; Williamson et al., 2002). Today, ACEs contribute to many of the nation's most serious public, economic, and social health issues (Centers for Disease Control and Prevention, 2019).

Given the profound public health implications of ACEs, the medical community, particularly primary care providers (PCPs)³ (American Academy of Family Physicians, 2018), can play a vital role in addressing ACEs. Due to their regular contact with children and families potentially exposed to adversity and trauma, PCPs are uniquely positioned to screen for ACEs and provide prevention, intervention, and treatment services through their own practice, or refer to mental health, child welfare, or social service agencies within their local community (Friemoth, 2014; Kerker et al., 2016; Marie-Mitchell et al., 2016). In addition, due to the high level of respect and public trust they are afforded, PCPs can play a substantial role in raising ACE awareness, as well as program development and public policy adoption designed to address child maltreatment and family violence and dysfunction (American Academy of Pediatrics, 2014; Cohen et al., 2008; Garner et al., 2012; Moseley et al., 2011).

¹ Negative health, behavioral, and social outcomes linked to ACEs include: severe obesity, diabetes, heart disease, chronic obstructive pulmonary disease, stroke, cancer, depression, broken bones, lack of physical exercise, smoking, alcoholism, drug use, suicide attempts, missed work, and sexually transmitted infections (Anda et al., 2008; Brown et al., 2010; Chapman et al., 2004; Dietz et al., 1999; Dong et al., 2003; Dong et al., 2004; Dong et al., 2005; Dube et al., 2001; Shonkoff et al., 2012; Sinnott et al., 2015; Springer et al., 2007; Williamson et al., 2002).

² Outcomes of untreated ACEs over time include: in childhood - developmental delays, learning and behavior problems, and poor school behavior and performance; in adolescence - poor mental health, early sexual activity, alcohol and drug use, and delinquency; in adulthood - psychiatric problems, alcohol/drug abuse, chronic health problems, and criminal involvement (Anda et al., 2008; Brown et al., 2010; Chapman et al., 2004; Dietz et al., 1999; Dong et al., 2003; Dong et al., 2004; Dong et al., 2005; Dube et al., 2001; Shonkoff et al., 2012; Sinnott et al., 2015; Springer et al., 2007; Williamson et al., 2002).

³ Primary care providers are "specialists in Family Medicine, Internal Medicine or Pediatrics who provide definitive care to the undifferentiated patient at the point of first contact, and take continuing responsibility for providing the patients comprehensive care" and "devote the majority of their practice to providing primary care services to a defined population of patients" (American Academy of Family Physicians, 2018).

Despite the important role PCPs can play in addressing ACEs, research has found few PCPs are knowledgeable about ACEs, receive ACE training, or address ACEs through the routine screening of their patients (Kerker et al., 2016; Farrow et al., 2018; Kalmakis et al., 2016; Szilagyi et al., 2016; Tink et al., 2017; Weinreb et al., 2010; Bright et al., 2015), representing a missed opportunity to reduce the negative impact of ACEs on child and family health and well-being. Therein, this study seeks to extend the research on this topic by exploring PCPs ACE knowledge, training, screening practices, and perceived intervention barriers, including inter-clinician variability in such exploration. Exploring inter-clinician variability is crucial given the varying education, training, practice guidelines, and board certification processes among PCPs (Fong et al., 2020). Building understanding on this topic can help determine effective strategies for addressing ACEs in the primary care setting.

Primary Care Providers' Knowledge of Adverse Childhood Experiences

Since its original publication, the ACE study has received significant attention. In addition, the topic of ACEs has been subject to numerous replication studies. Despite this, most PCPs remain unfamiliar with the original ACE study, do not associate ACEs with long-term negative health consequences, and incorrectly estimate the prevalence of ACEs. For instance, Kerker and colleagues (Kerker et al., 2016) found that fewer than 11% of pediatricians reported being very or somewhat familiar with the ACE study. Similarly, Szilagyi et al. (Szilagyi et al., 2016) reported that pediatric providers were largely unfamiliar with the ACE study. Specifically, only 2% of study respondents were very familiar, 8% were somewhat familiar, and 13% were vaguely familiar, while 76% were not at all familiar with the ACE study. Also, Farrow et al. (Farrow et al., 2018) found that nearly 4 out of 5 obstetrician-gynecologists were not familiar with the ACE study.

In addition, Tink and colleagues (Tink et al., 2017) found that family medicine residents did not associate chronic physical disease or unhealthy behaviors with ACE histories. Like Tink, Farrow et al. (Farrow et al., 2018) found that the majority of surveyed obstetrician-gynecologists were not aware that ACEs are associated with physical disease. However, Szilagyi and colleagues (Szilagyi et al., 2016) found that nearly all of the surveyed pediatric providers did recognize the impact of ACEs on developmental, physical, and mental health.

Finally, Weinreb and colleagues (Weinreb et al., 2010) found that less than one third of family physicians correctly estimated ACE rates. Bright et al. (Bright et al., 2015) found that pediatricians' perceived ACE prevalence estimates in low-income children were lower than state reported prevalence. Kalmakis and colleagues (Kalmakis et al., 2016) found

that the majority of surveyed nurse practitioners believed less than 10% of patients had an ACE history. Tink et al. (Tink et al., 2017) found that only one third of surveyed residents correctly identified ACE prevalence in women and one tenth in men. Farrow et al. (Farrow et al., 2018) found that surveyed obstetrician-gynecologists either over or underestimated ACE prevalence rates.

Primary Care Providers' Adverse Childhood Experiences Training

With new understanding of the relationship between ACEs and chronic health conditions, PCPs' prevention and intervention of ACEs has been called the "ultimate health promotion and preventive medicine intervention" leading to "improved health for generations of patients" (Friemoth, 2014). Even so, few PCPs receive ACE training. For example, Bright et al. (Bright et al., 2015) found that only 61.2% of pediatricians had completed some form of training on child maltreatment, while 58.3% completed some form of training on one other ACE. Tink et al. (Tink et al., 2017) found that 54.5% of surveyed residents had no formal training to screen for ACEs. Farrow et al. (Farrow et al., 2018) found that 31.4% of surveyed obstetrician-gynecologists received formal training on the effects of ACEs and how to screen for ACEs in medical school, 32.6% in residency, and 46.5% in continuing medical education.

Primary Care Providers' Adverse Childhood Experiences Screening Practices

PCPs treat patients for numerous health conditions that are common in individuals who experienced exposure to ACEs. While PCPs routinely address their patients' negative health behaviors (such as substance abuse, overeating, a sedentary lifestyle, or unprotected sex), they are less likely to consider the upstream causes of such behaviors by screening for ACEs. For instance, Weinreb et al. (Weinreb et al., 2010) found that less than one-third of surveyed family physicians reported they usually or always screened their patients for childhood trauma, while 25% reported they rarely or never screened. Similarly, Kalmakis and colleagues (Kalmakis et al., 2016), found that only one third of surveyed nurse practitioners regularly screened their patients for childhood abuse, while Farrow et al. (Farrow et al., 2018) found that nearly one-third of surveyed obstetrician-gynecologists did not screen their patients for a history of childhood abuse. In addition, Kerker and colleagues (Kerker et al., 2016) found that only 4% of surveyed pediatricians usually asked their patients about all seven ACEs, while Tink and colleagues (Tink et al., 2017) found that only 2% of surveyed residents

screened patients for ACEs at their first visit. In like manner, Szilagyi et al. (Szilagyi et al., 2016) found that most surveyed pediatricians did not inquire about their patients' parent's ACEs. The highest rate of PCP ACE screening was reported by Bright et al. (Bright et al., 2015), who found that at least 50% of surveyed pediatricians screened their patients for child maltreatment. Factors found to be associated with PCPs increased likelihood to screen their patients for ACEs included the PCPs' gender and personal history of ACEs, PCPs' belief that ACE screening was within their professional role, PCPs believing they could positively influence their patients' parenting, and PCPs' personal interest in mental health training (Kerker et al., 2016; Kalmakis et al., 2016; Szilagyi et al., 2016; Tink et al., 2017; Weinreb et al., 2010).

ACE screening rates in pediatric and adult health care settings remain low despite evidence that ACEs are common and associated with negative health outcomes (Merrick et al., 2019) and the call by the American Academy of Pediatrics for pediatricians to screen for ACEs (American Academy of Pediatrics, 2014; Cohen et al., 2008; Garner et al., 2012). ACE screening rates also remain low even though there is belief among PCPs that ACE screening is within their role and relevant to patient care (Weinreb et al., 2010), growing acceptance of ACE screening by patients (Farrow et al., 2018; Selvaraj et al., 2018), and findings that ACE screening in routine care is feasible (Selvaraj et al., 2018; Glowa et al., 2016). Low ACE screening rates have been attributed to multiple barriers PCPs face when trying to address ACEs.

Barriers to Adverse Childhood Experiences Screening

For PCPs, multiple barriers exist to ACE screening. These identified barriers include gaps in PCPs' ACE knowledge, inadequate ACE screening training, and discomfort asking patients about their trauma history (Farrow et al., 2018; Kalmakis et al., 2016; Tink et al., 2017; Weinreb et al., 2010; Albaek et al., 2018). Additional barriers consist of lack of time and support staff to screen for ACEs, lack of clinical guidelines on ACE screening, multiple or competing primary care screening recommendations, limited patient referral resources, and inadequate insurance reimbursement for screening (Farrow et al., 2018; Kalmakis et al., 2016; Tink et al., 2017; Weinreb et al., 2010; Bright et al., 2015). Other barriers cited are PCPs' belief trauma is not a medical problem, ACE screening is not their role, and there is little the PCP can do to help patients reporting a trauma history (Kerker et al., 2016; Farrow et al., 2018; Weinreb et al., 2010; Bright et al., 2015; Albaek et al., 2018). Further barriers documented include PCPs' concern ACE screening will offend or retraumatize patients, verifying reports of trauma will be difficult, and issues related to mandatory child abuse reporting (Farrow et al.,

2018; Tink et al., 2017; Albaek et al., 2018; Bair-Merritt & Zuckerman, 2016).

Research examining the relationship between ACE screening barriers and PCP ACE screening practices have found a significant association between the specific barriers of time, resources, and PCP attitudes and beliefs, and ACE screening rates (Kerker et al., 2016; Farrow et al., 2018; Kalmakis et al., 2016; Szilagyi et al., 2016; Tink et al., 2017; Weinreb et al., 2010; Bright et al., 2015).

Current Study

This exploratory cross-sectional study seeks to extend current research on the topic of PCPs' role in addressing ACEs by: (1) including inter-clinician variability (position and specialty) in the research sample when examining PCPs' ACE knowledge, training, screening practices, and perceived barriers to addressing ACEs; and (2) examining whether such variability impacts PCPs' ACE knowledge, training, screening practices, and perceived barriers to addressing ACEs. As stated earlier, including inter-clinician variability in such examination is crucial given the varying education, training, practice guidelines, and board certification processes among PCPs.

Method

Participants

Using purposive sampling, this study targeted PCPs (family medicine physicians, pediatricians, and internal medicine/pediatric physicians) caring for children at a not-for-profit integrated health care organization based in the Midwest United States.

Procedure

The data for this study was collected using a survey administered online with SurveyMonkey®. The survey contained 17 closed-ended questions adapted from published literature (Kerker et al., 2016; Kalmakis et al., 2016; Tink et al., 2017; Weinreb et al., 2010). In October 2016, a study solicitation email that included informed consent and the survey URL was sent to the study sample. Two email reminders were sent to those who had not completed the survey. The study was closed in December 2016. Prior to survey dissemination, the study was reviewed and approved for human participation by the researchers' institutional review boards.

Measures

This study measured four constructs that included PCPs': (1) ACE knowledge; (2) ACE training; (3) ACE screening practices; and (4) perceived intervention barriers to addressing ACEs. PCPs' ACE knowledge was measured as the study participants' level of familiarity with the original ACE study and knowledge of the effects of ACEs on child well-being and adult health, behavioral, and social outcomes, both using a 4-point Likert scale. PCPs' ACE knowledge was also measured as the study participants' agreement or disagreement with the statement that ACEs are associated with long-term negative health consequences. To assess PCPs' ACE training, study participants were asked whether they had received formal training on ACEs or trauma-informed care and whether they would benefit from training on ACEs, both measured as dichotomous variables (yes/no). The ACE training assessment also included questions on the best format to learn about ACEs and useful ACE-related resources for the practice setting, where study participants could select more than one option.

PCPs' ACE screening practices were assessed by whether they had ever screened patients for ACEs, as well as which ACEs were most frequently screened for, where study participants could select more than one option. PCPs' ACE screening practices were also assessed by the existence of practice setting protocols for ACE screening, assessment, referral, and treatment, measured as a dichotomous variable (yes/no). Perceived intervention barriers to addressing ACEs was measured as the study participants' perception of barriers to their ability as primary care providers to address ACEs, where they could select more than one option. Using a three-point Likert scale, perceived intervention barriers to ACE screening were also identified by asking study participants how difficult it is for patients who need routine or emergency mental health services to be seen by mental health providers in the community.

Data Analysis

The survey data was analyzed using descriptive statistical techniques to provide a general description of the population sampled, as well as the participants' ACE knowledge, training, screening practices, and perceived intervention barriers to addressing ACEs. To examine whether inter-clinician variability influenced PCPs' ACE knowledge, training, screening practices, and perceived barriers to addressing ACEs, Chi-Square and Fisher's Exact tests and Monte Carlo Estimates for the Exact tests were performed with an alpha level of .05 ($\alpha = .05$) as criterion for significance. All analyses were performed using SAS Version 9.

Results

Participants

Of the 383 surveys disseminated, 99 were completed (for a response rate of 25.8%). Of the 99 completed surveys, 27 were excluded because of incomplete data. This resulted in 72 completed and eligible surveys available for analysis.

Table 1 displays the characteristics of the study participants. There were an equal number of male and female participants. The average age of participants was 40.0 ± 12.8 years (mean ± SD). Attending Physician was the most common position (61.1%), followed by Resident Physician (38.9%). Over 70% (72.2%) of participants specialized in family medicine, 15.3% in pediatrics, and 12.5% in internal medicine/pediatrics.

ACE Knowledge

The majority of participants reported being not at all familiar with the ACE study (37.5%), followed by vaguely familiar (34.7%), somewhat familiar (25%), and very familiar (2.8%) (see Table 2). Similarly, the majority of participants reported they were not knowledgeable (26.4%) or somewhat knowledgeable (54.2%) about the effect of ACEs on child wellbeing and adult outcomes. Only 18.1% of participants reported being knowledgeable and 1.4% of participants reported being very knowledgeable about the effects of ACEs (see Table 2). Even though participants reported limited familiarity with the ACE study and the effects of ACEs on child well-being and adult outcomes, the majority of participants agreed there was an association between ACEs and a number of long-term negative health outcomes (see Table 3).

Table 1 Participant Characteristics

Variable	n(%)	Mean	SD
Gender (N=72)			
Male	36(50)		
Female	36(50)		
Age (N=68)		40	12.8
Position (N=72)			
Attending Physician	44(61.1)		
Resident Physician	28(38.9)		
Area of Specialty (N=72)			
Family Medicine	52(72.2)		
Pediatrics	11(15.3)		
Internal Medicine and Pediatrics	9(12.5)		

Table 2 Participants' Adverse Childhood Experiences (ACE) Knowledge

Variable	n(%)
Familiarity with the ACE Study (N=72)	
Very familiar	2(2.8)
Somewhat familiar	18(25)
Vaguely familiar	25(34.7)
Not at all familiar	27(37.5)
Knowledgeable about the effect of ACEs on child wellbeing and adult outcomes (N=72)	
Very knowledgeable	1(1.4)
Knowledgeable	13(18.1)
Somewhat knowledgeable	39(54.2)
Not knowledgeable	19(26.4)

ACE Training

Most participants reported they had not received formal training on ACEs or trauma-informed care (90.3%). Almost all participants reported they would benefit from training on ACEs (95.8%). Participants indicated the best format to learn more about ACEs was by a lecture presentation (39.4%), followed by attending a seminar/workshop (38%), receiving educational materials (16.9%), or online (5.6%) (see Table 4).

ACE Screening Practices

More than half of participants reported they had never screened their patients for ACEs (52.8%), while 36.1% had inquired about ACE risk factors. Only 2.8% of participants used a formal ACE screening tool. Among participants who screened for ACEs, most screened adult patients for their own ACEs (29.2%), while 19.4% screened children about their own ACEs, 16.7% screened parents of pediatric patients about their child's ACEs, and 9.7% screened parents of pediatric patients about their own ACEs. Participants commonly

Table 3 Participants' Adverse Childhood Experiences (ACE) Knowledge

Variable	Agree (f)	Disagree (f)
Exposure to ACEs is associated with the following health outcomes later in life:		
Obesity	70	2
Liver disease	55	15
Cancer	46	25
Lung disease	55	15
Sexually transmitted diseases	70	1
Heart disease	61	10
Diabetes	67	5

Table 4 Participants' Adverse Childhood Experiences (ACE) Training

Variable	n(%)
Received formal training on ACE or trauma-informed care (N=72)	
Yes	7(9.7)
No	65(90.3)
Benefit from training on ACEs (N=72)	
Yes	69(95.8)
No	3(4.2)
Best format for practice setting to learn about ACEs (N=71)	
Attend seminar/workshop	27(38)
Lecture presentation	28(39.4)
Receive educational materials	12(16.9)
Online	4(5.6)

inquired about substance abuse, adolescent depression, behavior problems, and anxiety disorders, while less commonly about an incarcerated caregiver, neighborhood violence, and neglect (see Table 5). While the majority of participants

Table 5 Participants' Adverse Childhood Experiences (ACE) Screening Practices

Variable	n(%)
Ever screened patients for ACEs (N=72)	
Yes, I have used a formal ACE screening tool	2(2.8)
Yes, I have inquired about ACE risk factors	26(36.1)
No	38(52.8)
Unsure	6(8.3)
If yes, who have you screened for ACEs (select all that apply; N=72)	
Parents of pediatric patients about their own ACEs	7(9.7)
Parents of pediatric patients about their child's ACEs	12(16.7)
Children about their own ACEs	14(19.4)
Adult patients about their own ACEs	21(29.2)
Conditions routinely inquire about (select all that apply; N=72)	
Child depression	38(52.8)
Adolescent depression	63(87.5)
Behavior problems	59(81.9)
Bullying	37(51.4)
Anxiety disorders	46(63.9)
Substance use	66(91.7)
Domestic violence exposure	31(43.1)
Physical, sexual, or emotional abuse	39(54.2)
Neglect	14(19.4)
Parental mental illness	21(29.2)
Parental substance abuse	20(27.8)
Incarcerated caregiver	8(11.1)
Neighborhood violence	9(12.5)

reported their practice setting had protocols in place for ACE screening (42 participants answering yes) and ACE referral (49 participants answering yes), a lower number of participants reported the existence of practice setting protocols for ACE assessment (33 participants answering yes) and ACE treatment (25 participants answering yes) (see Table 6).

Barriers to Addressing ACEs

Participants identified the leading barrier to addressing ACEs as inadequate time (70.8%) and lack of training in managing a child who has experienced trauma (62.5%; see Table 7). The majority of participants perceived patient access to routine services as somewhat difficult (50%) and very difficult (47.2%) and emergency services as somewhat difficult (58.3%; see Table 8).

Inter-Clinician Variability in ACE Knowledge, Training, Screening Practices, and Perceived Barriers to Addressing ACEs

There was a statistically significant difference in participants' perceived barriers to addressing ACEs by position (see Table 9). Specifically, participants' perceived barriers – lack of care coordination services to link families with community resources (Monte Carlo Estimate for the Exact test p value = 0.0468) and discomfort in asking sensitive questions (Monte Carlo Estimate for the Exact test p value = 0.0085) – differed between resident physicians and attending physicians. There was a statistically significant difference in participants' ACE knowledge by specialty (see Table 10). Specifically, the distribution of responses of participants' ACE knowledge differed between participants working in family medicine and internal medicine and pediatrics (Monte Carlo Estimate for the Exact test p value = 0.0032). There was no statistically significant difference in participants' ACE training and screening practices by position or specialty.

Table 6 Participants' Adverse Childhood Experiences (ACE) Screening Practices

Variable	Yes (f)	No (f)
Practice setting protocols in place for patients who have experienced ACEs(N=72)		
Screening	42	30
Assessment	33	38
Referral	49	23
Treatment	25	47

Table 7 Participants’ Perceived Intervention Barriers to Addressing Adverse Childhood Experiences (ACE)

Variable	Yes n(%)	No n(%)
Barrier to addressing ACEs (N=72)		
Inadequate time	51(70.8)	21(29.2)
Lack of local resources	29(40.3)	43(59.7)
Lack of care coordination services to link families with community resources	26(36.1)	46(63.9)
Discomfort in asking sensitive questions	16(22.2)	56(77.8)
Parental reluctance to discuss sensitive/personal topics	29(40.3)	43(59.7)
Lack of training in managing a child who has experienced ACEs	45(62.5)	27(37.5)
Inadequate reimbursement	3(4.2)	69(95.8)

Discussion

This study found that few participants were knowledgeable about, received training on, or formally screened for ACEs. Participants’ most cited perceived barriers to addressing ACEs were inadequate time and lack of training in managing a child who has experienced ACEs. Limited access to mental health services for patients was a major concern for participants. There was a statistically significant difference in participants’ perceived barriers to addressing ACEs by position and participants’ ACE knowledge by specialty. Finally, there was no statistically significant differences in participants’ ACE training and screening practices by position or specialty.

This study supports findings in previous research that PCPs lack knowledge about, receive little formal training on, and do not routinely screen for ACEs (Kerker et al., 2016; Farrow et al., 2018; Kalmakis et al., 2016; Szilagyi et al., 2016; Tink et al., 2017; Weinreb et al., 2010; Bright et al., 2015). This study’s most commonly cited perceived barriers to addressing ACEs were also consistent with the current literature (Farrow et al., 2018; Kalmakis et al., 2016; Tink et al., 2017; Weinreb et al., 2010; Albaek et al., 2018).

By expanding the scope of prior studies to include inter-clinician variability, this study found that while there were education and training needs across position and specialty, there was greater training needs for resident physicians to become more comfortable discussing sensitive topics like ACEs and greater education needs on the topic of ACEs

among physicians specializing in family medicine, as well as pediatrics. This highlights the importance of incorporating ACE education and training for PCPs across position and specialty. Understanding the ACE education and training needs of a cross-section of the primary care community can inform such efforts. Lecture presentations, seminars, and workshops were our participants’ preferred method to learn about ACEs.

While most participants routinely inquired about depression, substance use, anxiety, abuse, and bullying, they less often inquired about neglect, having an incarcerated caregiver, and neighborhood violence. Each of these adverse experiences is included in the modified ACE screen for children developed by the Center for Youth Wellness (CYW) (Harris & Renschler, 2015; Center for Youth Wellness, n.d.). The CYW ACE Questionnaire is recommended by the American Academy of Pediatrics and can be used in the primary care setting. Encouraging the use of comprehensive ACE screening in primary care can help identify children in unsafe situations who may not otherwise be recognized.

The top two perceived barriers to addressing ACEs identified in this study, inadequate time and lack of training in managing a child who has experienced trauma, suggest that to incorporate ACE screening into primary care practices, the medical community needs to develop efficient systems for ACE screening and enhance provider confidence in counseling families who have experienced trauma. Studies like Glowa et al. (Glowa et al., 2016) and Selvaraj et al. (Selvaraj et al., 2018) can help convince primary care providers that ACE screening does not add significant time to the office visit. Designating a provider who serves as an ACE “champion” can be valuable in creating efficient office flow for ACE screening, documentation, and data collection. Provider confidence in counseling can be strengthened through trauma-informed training.

Creating practice networks to share training modules and best practices can also enhance ACE screening in primary care. The National Pediatric Practice Community on Adverse Childhood Experiences (NPPC), which is an initiative of the Center for Youth Wellness, is a model of an

Table 8 Participants’ Perceived Intervention Barriers to Addressing Adverse Childhood Experiences (ACE)

Variable	Routine n(%)	Emergency n(%)
Patient difficulty accessing routine or emergency mental health services (N=72)		
Very difficult	34(47.2)	16(22.2)
Somewhat difficult	36(50)	42(58.3)
Not difficult	2(2.8)	14(19.4)

Table 9 Inter-clinician Variability in Participants' Adverse Childhood Experiences (ACE) Knowledge, Training, Screening Practices, and Perceived Intervention Barriers by Position

Variable	Resident Physician n(%)	Attending Physician n(%)	p value
Familiarity with the ACE Study			0.8967
Very familiar	0(0)	2(4.5)	
Somewhat familiar	7(25)	11(25)	
Vaguely familiar	10(35.7)	15(34.1)	
Not at all familiar	11(39.3)	16(36.4)	
Knowledgeable about the effect of ACEs on child wellbeing and adult outcomes			0.0785
Very knowledgeable	1(3.6)	0(0)	
Knowledgeable	2(7.1)	11(25)	
Somewhat knowledgeable	15(53.6)	24(54.5)	
Not knowledgeable	10(35.7)	9(20.5)	
Received formal training on ACE or trauma-informed care			0.6981
Yes	2(7.1)	5(11.4)	
No	26(92.9)	39(88.6)	
Benefit from training on ACEs			0.2770
Yes	28(100)	41(93.2)	
No	0(0)	3(6.8)	
Ever screened patients for ACEs			0.7925
Yes, I have used a formal ACE screening tool	0(0)	2(4.5)	
Yes, I have inquired about ACE risk factors	10(35.7)	16(36.4)	
No	15(53.6)	23(52.3)	
Unsure	3(10.7)	3(6.8)	
Barrier to addressing ACEs			
Inadequate time			0.6026
Yes	21(75)	30(68.2)	
No	7(25)	14(31.8)	
Lack of local resources			0.1410
Yes	8(28.6)	21(47.7)	
No	20(71.4)	23(52.3)	
Lack of care coordination services to link families with community resources			0.0468*
Yes	6(21.4)	20(45.5)	
No	22(78.6)	24(54.5)	
Discomfort in asking sensitive questions			0.0085*
Yes	11(39.3)	5(11.4)	
No	17(60.7)	39(88.6)	
Parental reluctance to discuss sensitive/personal topics			0.2215
Yes	14(50)	15(34.1)	
No	14(50)	29(65.9)	
Lack of training in managing a child who has experienced ACEs			0.1333
Yes	21(75)	24(54.5)	
No	7(25)	20(45.5)	
Inadequate reimbursement			1.0000
Yes	1(3.6)	2(4.5)	
No	27(96.4)	42(95.5)	

Note. Fisher's Exact test and Monte Carlo Estimate for the Exact test was used for the analysis

An alpha level of .05 was used to determine statistical significance

$p^* < .05$

Table 10 Inter-clinician Variability in Participants’ Adverse Childhood Experiences (ACE) Knowledge, Training, Screening Practices, and Perceived Intervention Barriers by Specialty

Variable	Specialty			p value
	Family Medicine n(%)	Pediatrics n(%)	Internal Medicine and Pediatrics n(%)	
Familiarity with the ACE Study				0.5112
Very familiar	2(3.8)	0(0)	0(0)	
Somewhat familiar	11(21.2)	5(45.5)	2(22.2)	
Vaguely familiar	21(40.4)	2(18.2)	2(22.2)	
Not at all familiar	18(34.6)	4(36.4)	5(55.6)	
Knowledgeable about the effect of ACEs on child wellbeing and adult outcomes				0.0032*
Very knowledgeable	0(0)	0(0)	1(11.1)	
Knowledgeable	8(15.4)	0(0)	5(55.6)	
Somewhat knowledgeable	28(53.8)	8(72.7)	3(33.3)	
Not knowledgeable	16(30.8)	3(27.3)	0(0)	
Received formal training on ACE or trauma-informed care				0.4586
Yes	4(7.7)	2(18.2)	1(11.1)	
No	48(92.3)	9(81.8)	8(88.9)	
Benefit from training on ACEs				0.3910
Yes	50(96.2)	11(100)	8(88.9)	
No	2(3.8)	0(0)	1(11.1)	
Ever screened patients for ACEs				0.5568
Yes, I have used a formal ACE screening tool	2(3.8)	0(0)	0(0)	
Yes, I have inquired about ACE risk factors	19(36.5)	5(45.5)	2(22.2)	
No	27(51.9)	4(36.4)	7(77.8)	
Unsure	4(7.7)	2(18.2)	0(0)	
Barrier to addressing ACEs				0.5031
Inadequate time				
Yes	37(71.2)	9(81.8)	5(55.6)	
No	15(28.8)	2(18.2)	4(44.4)	
Lack of local resources				0.3717
Yes	21(40.4)	6(54.5)	2(22.2)	
No	31(59.6)	5(45.5)	7(77.8)	
Lack of care coordination services to link families with community resources				0.2562
Yes	21(40.4)	4(36.4)	1(11.1)	
No	31(59.6)	7(63.6)	8(88.9)	
Discomfort in asking sensitive questions				0.0842
Yes	15(28.8)	1(9.1)	0(0)	
No	37(71.2)	10(90.9)	9(100)	
Parental reluctance to discuss sensitive/personal topics				0.5586
Yes	22(42.3)	5(45.5)	2(22.2)	
No	30(57.7)	6(54.5)	7(77.8)	
Lack of training in managing a child who has experienced ACEs				0.3664
Yes	35(67.3)	6(54.5)	4(44.4)	
No	17(32.7)	5(45.5)	5(55.6)	
Inadequate reimbursement				0.6281
Yes	2(3.8)	1(9.1)	0(0)	
No	50(96.2)	10(90.9)	9(100)	

Note. Fisher’s Exact test and Monte Carlo Estimate for the Exact test was used for the analysis. An alpha level of .05 was used to determine statistical significance

*p** < .05

innovative approach to collaboration on ACE initiatives that seeks to “have primary care pediatricians and other pediatric serving physicians implement universal screening for ACEs and routinely use an understanding of ACEs and toxic stress to enhance the quality of patient care and health outcomes”

(Harris & Renschler, 2015). Collaborations like these can help practices learn how to effectively use ACE screening data to develop interventions for patients with high ACE scores. In addition to a national network, strengthening relationships between primary care and community organizations can create

avenues for education of providers and patients, parental coaching, and mental health care for families.

Finally, promoting screening for ACEs in primary care must occur in conjunction with strengthening availability and access to high quality mental healthcare and community organizations that support families. This can be done through expanding the mental health workforce, educating and training primary care providers, developing clinical infrastructure, and creating multidisciplinary care coordination teams to help families who face barriers in accessing local services (Hodgkinson et al., 2016). This study's findings support this recommendation. Specifically, attending physicians were more likely than resident physicians to perceive a lack of care coordination services to link families with community resources as a barrier to addressing ACEs. Attending physicians who often have worked longer in a community, may have more experience serving families who have been exposed to adversity and trauma, may be more familiar with the challenges in connecting such families to appropriate resources, and may be more aware of how such resources could be beneficial for such families.

Study Limitations

There were several limitations to this study. Due to the low response rate of 25.8%⁴ (Baruch & Holtom, 2008; Cook et al., 2000; Nulty, 2008; Sheehan, 2001; Cook et al., 2016; Cunningham et al., 2015; Wiebe et al., 2012; Taylor & Scott, 2019) this study's results may not have accurately captured the views of the community. Selection bias could have been introduced through the purposive sampling technique, limiting the generalizability of this study's findings. As there was an unequal distribution of specialties that responded to this survey with the majority of responses from family medicine, this study's results may not be representative of the pediatric primary care community. The use of a validated survey would have strengthened the reliability of this study's findings. Finally, the participants in this study all practice in the same county. ACE awareness, screening, and protocols may differ between geographical areas and the results of this study may not be reflective of national trends. This study did, however, include inter-clinician variability in the research sample when examining PCPs' ACE knowledge, training, screening practices, and perceived intervention barriers to addressing ACEs, addressing future research calls in previous research studies (Tink et al., 2017; Glowa et al., 2016).

⁴ While this response rate is low, research suggests Web-based survey response rates typically range from 20 to 40% (Baruch & Holtom, 2008; Cook et al., 2000; Nulty, 2008; Sheehan, 2001) and the response rates of physicians are lower due to multiple factors (Cook et al., 2016; Cunningham et al., 2015; Wiebe et al., 2012; Taylor & Scott, 2019).

Conclusion

Few PCPs formally screen children for ACEs representing a missed opportunity for prevention and early intervention. PCPs are well-positioned to screen for and address ACEs as a part of routine patient care. Future steps to promote ACE screening in primary care practices include developing effective educational tools and resources for primary care providers at all levels of training, creating efficient models for office-based screening, increasing access to mental health care for patients, developing collaborative practice networks and relationships with community organizations. Primary care providers are poised to be at the frontline to screen for and address ACEs. They can also play a role in raising national awareness about ACEs, helping to change policies, and developing programs to prevent child maltreatment and family violence.

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