Utility of screening for adverse childhood experiences (ACE) in children and young people attending clinical and healthcare settings: a systematic review

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To examine and synthesise the literature on adverse childhood experience (ACE) screening in clinical and healthcare settings servicing children (0–11) and young people (12–25).

ABSTRACT

Objective To examine and synthesise the literature on adverse childhood experience (ACE) screening in clinical and healthcare settings servicing children (0–11) and young people (12–25).

Design A systematic review of literature was undertaken.

Data source PsycInfo, Web of Science, Embase, PubMed and CINAHL were searched through June 2021. Additional searches were also undertaken.

Eligibility criteria English language studies were included if they reported results of an ACE tool being used in a clinical or healthcare setting, participants were aged between 0 and 25 years and the ACE tool was completed by children/young people or by parents/caregivers/clinicians on behalf of the child/young person. Studies assessing clinicians’ views on ACE screening in children/young people attending health settings were also included.

Data extraction and synthesis Two independent reviewers extracted data and assessed for risk of bias using the Mixed Methods Appraisal Tool. Results were synthesised qualitatively.

Results Initial searches identified 5231 articles, of which 36 were included in the final review. Findings showed that the most commonly used tool for assessing ACE was the ACE questionnaire; administering ACE tools was found to be feasible and acceptable; there were limited studies looking at the utility, feasibility and acceptability of assessing for ACE in First Nations people; and while four studies provided information on actions taken following ACE screening, no follow-up data were collected to determine whether participants accessed services and/or the impact of accessing services.

Conclusion As the evidence stands, widespread ACE screening is not recommended for routine clinical use. More research is needed on how and what specific ACE to screen for and the impact of screening on well-being.

STRENGTHS AND LIMITATIONS OF THIS STUDY

⇒ Broad inclusion criteria and five different search strategies increased the likelihood of identifying all relevant literature.
⇒ All included studies and risk of bias assessments were reviewed independently by two reviewers.
⇒ The findings and the generalisability need to be interpreted with caution due to the inclusion of only English language studies.

INTRODUCTION

Adverse childhood experiences (ACE) are stressful experiences that occur during childhood and either have a direct impact on the child (ie, physical, emotional and sexual abuse; physical and emotional neglect) or impact the environment (eg, domestic violence, divorce) in which they live. Approximately 61% of adults report having experienced ACE, with higher prevalence rates reported in priority populations. In particular, First Nations people have been shown to experience higher rates of ACE, which has been attributed to collective, historic and intergenerational trauma and continued experiences of racism.

Increasing awareness of the impact of ACE

Immediate and long-term outcomes of exposure to ACE have been documented, with research showing that ACE can result in child learning, mental health and physical health problems, as well as adult health issues such as cancer and problematic drug use. Furthermore, ACE have been shown to have an intergenerational effect; often co-occur, necessitating attention to cumulative exposures; and are costly, with the economic cost of ACE in the United States of America (USA) estimated at $428 billion across a person’s lifetime.

Given the negative effects associated with ACE, a call for routine ACE screening in health settings was made as early as 2004 with Felitti arguing that comprehensive biopsychosocial
screening (ie, medical assessments together with ACE screening) of all patients could reduce health service utilisation. Felitti reported that biopsychosocial screening in an adult population led to a 35% decrease in doctor office visits the following year, compared with 11% reduction in visits when only a biomedical approach was used. Over the last decade, others have also supported the uptake of routine ACE screening in health settings (eg, ref 16 17), with national governments and professional organisations introducing policies focused on increasing ACE identification and intervention. In the USA, for example, the American Academy of Pediatrics policy statement on trauma-informed care recognises the benefits of ACE screening. However, the report also acknowledges the potential risk associated with ACE screening (eg, lack of standardised screening tools, available tools to identify factors that have been derived from epidemiological studies rather than outcomes at the individual level). Further, it recommends that if ACE screening is undertaken then resilience screening occurs concurrently to buffer identified stressors and provide a holistic understanding of the child’s health. In Philadelphia (USA), an ACE task force was developed which applied a community-based approach (eg, increased screening, intervention and community engagement) as a means of addressing ACE in the community. In Australia, the Royal Australasian College of Physicians position statement on inequalities in child health recommended that paediatricians are trained and provided materials to address child health inequities, including comprehensive biopsychosocial assessments. Most recently, the Australian Capital Territory State Government introduced universal ACE screening (using an adoption of the Center for Youth Wellness ACE Questionnaire) as part of their Kindergarten Health Check Program—a screening programme for all children entering kindergarten.

Assessing for ACE in health settings
In addition to the growing support for the identification of ACE, there has also been growing opposition to ACE screening, and Dube has suggested that the uptake of ACE screening in health settings with child and young people is not widespread. Research examining paediatricians’ views on ACE screening has identified several barriers to ACE screening including limited knowledge and training on the subject and practitioner discomfort. Some authors, such as Finkelhor, have cautioned against universal screening by arguing that the evidence base for the benefits of ACE screening (eg, early identification and intervention) has not yet been fully established, warning about prospective costs of assessing for ACE such as potentially retraumatising, overdiagnosing and overtreating children and young people. Indeed, a recent scoping review undertaken by Ford et al, exploring the evidence base for routine ACE screening in health settings among adult populations, found that there was limited research looking at the effectiveness of retrospective ACE enquiry among adults.

Despite the lack of evidence, the authors concluded that the available literature suggested that service users and practitioners were positive about routine ACE enquiry, with some practitioners indicating that assessing for ACE improved service user and provider relationships. Less is known, however, about routine clinical enquiry of ACE with children and young people, especially those from priority populations such as First Nations children, young people and their families.

Aims
A narrative systematic review approach was used to examine and synthesise the literature on ACE screening in routine clinical practice with children (0–11 years), young people (12–25 years) and their families. This review focused specifically on ACE and not social determinants of health (SDH). SDH, which can also have negative impacts on an individual’s health, refer to the conditions in which people are born, grow, live, work and age, such as poverty, while ACE are traumatic events that occur during childhood in the microenvironment of the child. If studies focused on ACE but also screened for some SDH they were included in this review; however, when possible, only the data on ACE were interpreted.

The systematic review aimed to address the following questions in routine clinical practice with children (0–11), young people (12–25) and their families:

- What is the extent to which an ACE tool has been included?
- What is the feasibility, acceptability and validity of routine ACE screening?
- What are the benefits and risks of using ACE scores in the provision of healthcare?
- Has an ACE tool been administered to screen First Nations populations?
- What responses are implemented following ACE screening?

METHOD
Search strategy
Research evidence
Five search strategies were implemented to identify relevant research studies available up to June 2021 (no limits were placed in terms of earliest possible starting date). First, interdisciplinary research databases (PsycInfo, Web of Science, Embase, PubMed and CINAHL) were searched concurrently for entries containing any combination of the following terms: ‘Adverse childhood experience questionnaire’ OR ‘Adverse childhood experience tool’ OR ‘Adverse childhood experience measure’ OR ‘Adverse childhood event’ OR ‘ACE score’ OR ‘childhood adversity’ OR ‘childhood trauma’ AND ‘clinical setting’ OR ‘hospital setting’ OR ‘hospital’ OR ‘health service’ OR ‘health care’ OR ‘mental Health care’ OR ‘padiatric care’ OR ‘Padiatrics’. The searches were then limited by age (0–25 years) and to articles published in English. Second, a connected papers search was conducted for articles selected for the review. Third, the
The MMAT was chosen as it allows for the assessment of the quality of studies included in the review. Cibralic S, et al. BMJ Open 2022;12:e060395. doi:10.1136/bmjopen-2021-060395.

Inclusion and exclusion criteria
Articles were included for the full-text review if: (1) an ACE screening tool (ie, a questionnaire asking about history of abuse and neglect, parental substance use or mental illness, parental incarceration, domestic violence or parental divorce) was used in a clinical (eg, paediatrician or general practitioner clinics) or healthcare setting (eg, hospital settings such as acute care units); (2) the study sample included participants aged between 0 and 25 years, or, for articles that included some participants over the age of 25 years, the mean age was 25 years or less; (3) the ACE tool was completed by children/young people or by parents/caregivers/clinicians on behalf of the child/young person; and (4) the article was published in English. Studies were also included if they were assessing clinicians’ views on screening for ACE in children/young people attending health settings. Studies which focused primarily on ACE screening but also included SDH (ie, economic and social factors) were included if they met all the inclusion criteria. Studies which focused primarily on SDH (eg, poverty, food insecurity, housing, transport) were excluded as the main focus of the review was on ACE and although both constructs are interconnected, they have slightly different focuses and require different screening. Furthermore, studies which evaluated ACE screening when they were completed as part of a trauma-informed care approach, for example, were also included if they met all the inclusion criteria. In these cases, care was taken to only interpret results relating to ACE screening. Articles were excluded if: (1) they were not available in English; (2) they were not data based (eg, books, theoretical papers, reviews); (3) they were unpublished dissertations/theses; (4) they only examine the impact of one ACE (eg, divorce); (5) their focus was on adults (>25 years) reporting on their own ACE history; or (6) they were population-level surveillance studies.

Quality assessment and data analysis
The Mixed Methods Appraisal Tool (MMAT) was used to assess the quality of studies included in the review. The MMAT was chosen as it allows for the assessment of methodological quality of qualitative research, randomised controlled trials, non-randomised studies, quantitative descriptive studies and mixed-methods studies. The quality of studies is determined based on five sources for each study category. For quantitative randomised controlled trials, for example, quality is determined based on: (1) randomisation; (2) group comparability; (3) complete outcome data; (4) blinding of assessors; and (5) participant intervention adherence. Each outcome is assessed and responded to by the reviewer with a ‘yes’, ‘no’ or ‘can’t tell’. The ‘can’t tell’ option is used when the paper does not provide sufficient information for the reviewer to assign a ‘yes’ or ‘no’. Two reviewers reviewed all included studies. As MMAT discourages the calculation of an overall quality score, an overall quality score was not calculated. Consensus on the quality of studies was reached through discussion (see table 1 for quality assessments of the included studies).

Patient and public involvement
Patients and the public were not involved in the design and conduct of this review.

RESULTS
Figure 1 presents an overview of our search strategy and number of articles identified at each stage. The initial database search resulted in a total of 3231 articles (1546 from PsychInfo, 67 from Web of Science, 2707 from Embase, 865 from PubMed and 46 from CINAHL). After duplicates were excluded a total of 4913 articles remained. A further 4685 articles were excluded based on title and abstract screening, resulting in 259. Twenty-five articles could not be located, leaving in 234 articles to be read in depth. A further 19 relevant articles were identified through additional searches, resulting in a total of 253 that underwent full-text review. An additional 217 articles were excluded as they did not meet inclusion criteria. The remaining 36 articles met inclusion criteria and were included in the current review (see online supplemental table 2 for an overview of studies included in the review). Two reviewers (SC and MA) screened all article titles and abstracts and completed full-text reviews and quality assessments. Disagreements regarding study selection and quality assessment were discussed and resolved. A third reviewer (AMD) was available in case disagreements could not be resolved by the primary reviewers. Inter-rater reliability (calculated by dividing the total number of agreements by the total number of ratings) for title/abstract and full-text screening were 95% and 80%, respectively.

Overview of included studies
Online supplemental table 2 presents an overview of studies included in the review. Studies that fit the inclusion criteria included those conducted to assess for vulnerable children who would benefit from early intervention and prevalence studies identifying vulnerable populations in medical settings (ie, cross-sectional
### Table 1 Quality assessment using the Mixed Methods Appraisal Tool (2018)

| Citation                      | Screening questions | Qualitative studies | Quantitative descriptive |
|-------------------------------|---------------------|---------------------|--------------------------|
|                               | Are there clear research questions? | Do the collected data allow to address the research questions? | Is the qualitative approach appropriate to answer the research question? | Are the qualitative data collection methods adequate to address the research question? | Are the findings adequately derived from the data? | Is the interpretation of results sufficiently substantiated by data? | Is there coherence between qualitative data sources, collection, analysis and interpretation? |
| Conn et al<sup>42</sup>       | Yes                 | Yes                 | Yes                      | Yes                      | Yes                      | Yes                      | Yes                      |
| Chokshi and Skjoldager<sup>58</sup> | Yes                 | Yes                 | Yes                      | Yes                      | Yes                      | Yes                      | Yes                      |
|                               |                     |                     | Baiden et al<sup>56</sup> | Yes                      | Yes                      | No                       | Yes                      | Yes                      |
| Basu and Isaacs<sup>5</sup>   | Yes                 | Yes                 | No                       | Yes                      | No                       | Yes                      | Yes                      |
| Benarous et al<sup>9</sup>    | Yes                 | Yes                 | Yes                      | Yes                      | Yes                      | Yes                      | Yes                      |
| Bora et al<sup>31</sup>       | Yes                 | Yes                 | Yes                      | No                       | Yes                      | No                       | Yes                      |
| Bottino et al<sup>69</sup>    | Yes                 | Yes                 | No                       | Yes                      | No                       | Yes                      | Yes                      |
| Burke et al<sup>7</sup>       | Yes                 | Yes                 | Yes                      | Yes                      | No                       | Yes                      | Yes                      |
| Choi et al<sup>60</sup>       | Yes                 | Yes                 | No                       | Yes                      | No                       | Yes                      | Yes                      |
| Chung et al<sup>41</sup>      | Yes                 | Yes                 | Yes                      | No                       | Can’t tell               | Yes                      | Yes                      |
| DiGangi and Negriff<sup>43</sup> | Yes                 | Yes                 | Yes                      | Yes                      | Yes                      | Yes                      | Yes                      |
| Duddu et al (2016)<sup>78</sup> | Yes                 | Yes                 | No                       | Yes                      | Yes                      | Yes                      | Yes                      |
| Isohookana et al<sup>44</sup> | Yes                 | Yes                 | No                       | Yes                      | Yes                      | Yes                      | Yes                      |
| Isohookana et al<sup>45</sup> | Yes                 | Yes                 | No                       | Yes                      | Yes                      | Yes                      | Yes                      |
| Jones et al<sup>90</sup>      | Yes                 | Yes                 | Can’t tell               | Yes                      | No                       | Yes                      | Yes                      |
| Kaess et al<sup>96</sup>      | Yes                 | Yes                 | No                       | Yes                      | Yes                      | Yes                      | Yes                      |
| Kerker et al<sup>97</sup>     | Yes                 | Yes                 | No                       | Yes                      | Yes                      | Yes                      | Yes                      |
| Koball et al<sup>48</sup>     | Yes                 | Yes                 | Yes                      | No                       | Yes                      | Yes                      | Yes                      |
| Marshall et al<sup>97</sup>   | Yes                 | Yes                 | Yes                      | Yes                      | Yes                      | Yes                      | Yes                      |
| Mehari et al<sup>51</sup>     | Yes                 | Yes                 | No                       | Yes                      | Yes                      | Yes                      | Yes                      |
| Park et al<sup>51</sup>       | Yes                 | Yes                 | No                       | Yes                      | Can’t tell               | Yes                      | Yes                      |
| Pope et al<sup>2</sup>        | Yes                 | Yes                 | No                       | Yes                      | No                       | Yes                      | Yes                      |

*Continued*
| Table 1 Continued |
|-------------------|
| **Quantitative descriptive** | Is the sampling strategy relevant to address the research question? | Is the sample representative of the target population? | Are the measurements appropriate? | Is the risk of non-response bias low? | Is the statistical analysis appropriate to answer the research question? |
| Rahman et al⁶³ | Yes | Yes | Yes | Yes | Yes | Yes |
| Wickramasinghe et al⁴⁵⁵ | Yes | Yes | Yes | Can’t tell | Yes | Yes | Yes |
| Popp et al⁷⁹ | Yes | Yes | No | Yes | No | Yes | Yes |
| Mahindroo et al⁶⁰ | Yes | Yes | Yes | No | Yes | No | Yes |
| Marchand et al (2005)⁷⁹ | Yes | Yes | Yes | No | Yes | Yes | Yes |
| Scott et al⁵⁴ | Yes | Yes | Yes | Can’t tell | Yes | Can’t tell | Yes |
| Stork et al²⁸ | Yes | Yes | Yes | No | Yes | No | Yes |
| Liu et al⁴⁷ | Yes | Yes | Yes | No | Yes | Yes | Yes |
| Grasso et al⁸ | Yes | Yes | Yes | Can’t tell | Yes | No | Yes |

| **Mixed methods** | Is there an adequate rationale for using a mixed-methods design to address the research question? | Are the different components of the study effectively integrated to answer the research question? | Are the outputs of the integration of qualitative and quantitative components adequately interpreted? | Are divergences and inconsistencies between quantitative and qualitative results adequately addressed? | Do the different components of the study adhere to the quality criteria of each tradition of the methods involved? |
|-------------------|-------------------------------------------------|-------------------------------------------------|-------------------------------------------------|-------------------------------------------------|-------------------------------------------------|
| Barnett et al³⁸ | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Bright et al³⁶ | Yes | Yes | Yes | Yes | Yes | Yes | No |
| Wickramasinghe et al⁴⁵⁵ | Yes | Yes | Yes | Yes | Yes | No | No |
| Kia-Keating et al⁴⁷ | Yes | Yes | Yes | Yes | Yes | Yes | No |
| Marie-Mitchell et al⁶⁰ | Yes | Yes | Yes | Yes | Yes | Yes | No |

The ‘Can’t tell’ response category means that the authors do not report appropriate information to answer ‘Yes’ or ‘No’.
and file review studies). Of these studies, 18 were cross-sectional, 6 were mixed methods, 6 were prospective file reviews, 4 were retrospective file reviews and 2 were qualitative. Twenty-three studies were undertaken in the USA, 4 in Australia, 3 in Canada, 2 in Finland, 1 in Germany, 1 in New Zealand, 1 in France and 1 in the UK. Twenty-four studies used a tool to assess for ACE; 2 studies examined the feasibility while 14 looked at the acceptability of routine ACE screening in health settings; 6 studies specified that they had participant samples that identified as First Nations; 4 studies provided information on actions taken following ACE screening; and no studies assessed the benefits or risks of using ACE scores in the provision of healthcare services.

Screening for ACE in health settings

Twenty-four studies included in the review used a tool to assess for ACE as part of clinical enquiry.4 5 7 8 38–57 Of these, 3 studies also assessed for SDH.4 36 40 Forty-four studies were undertaken in the USA, 3 in Canada, 3 in Australia, 2 in Finland, 1 in Germany and 1 in France. Eight studies were conducted in primary care medical centres, 5 in paediatric clinics, 4 in inpatient units, 4 in child and adolescent mental health service settings, 1 in a hospital, 1 in a collaborative practice model health setting and 1 in a residency (ie, postgraduate training) practice. Samples varied from 15 to 9329 participants, with mean ages ranging from 5 months (parents identified infants’ ACE exposure) to 24 years. The mean number of ACE assessed for was 7, with most studies using similar core domains (ie, physical abuse, sexual abuse, emotional abuse, emotional neglect, physical neglect, single parent, domestic violence, substance abuse, mental illness, incarceration).

The most commonly used tool for screening ACE was the ‘ACE questionnaire’, originally developed as part of the seminal ACE study for use with adults,1 with 8 studies using a 10-item version,5 38 39 42 43 47 48 53 3 using a 9-item version,7 51 54 2 using a 14-item version4 55 and 1 using a 7-item version.41 For most studies using the ACE questionnaire, a score of ≥4 ACE was used to indicate high ACE exposure. Of the studies that did not use a version of the ACE questionnaire, 2 used the Post-Traumatic Stress Disorder section of the Schedule for Affective Disorder and Schizophrenia for School-Age Children Present and Lifetime (to assess for domestic violence and exposure to sexual and/or physical abuse) and the European Addiction Severity Index (to assess parental employment status).4 34 45; 2 used the interRAI Child and Youth Mental Health Assessment; 1 used an adapted version of the Traumatic Event’s Screening Inventory40; 1 used the Center for Youth Wellness ACE Questionnaire (17-item child and 19-item teen)49; 1 used the Traumatic History Profile3; 1 developed and used the Whole Child Assessment which included ACE questions55; and 1 employed
seven measures including the Childhood Trauma Questionnaire-Short Form, Trauma Experiences Checklist, Parental Nurturance Scale, Parental Harsh Discipline Scale, Violence Exposure Scale, Friends’ Delinquent Behavior Scale and School Connectedness Scale.32

Feasibility, acceptability and validity of routine ACE enquiry

Feasibility

Two studies examined the feasibility of ACE questionnaire administration in a health setting.47 49 Both studies were conducted in the USA. One study used the ACE 10-item questionnaire (completed by parents of infants; n=151, infant M age=5.77 months, SD=1.98, 49.7% male) while the other used the ACE 17-item (completed by parents of children; n=114, child M age=8.4 years, SD=2.5, 57% male) and 19-item questionnaires (completed by adolescents; n=49, M age=14.7 years, SD=1.3, 40.8% male). Both studies found administering the ACE questionnaire to be highly feasible with 92%47 and 97%49 of potential participants completing the questionnaire. Given the small number of studies looking at the administration of ACE in health settings and that both studies were undertaken in the USA, further research is indicated for generalisability.

Acceptability

Patient acceptability of ACE screening

Two studies42 50 were identified that examined caregivers’ acceptability of ACE screening and one study had looked at adolescents’ acceptability of ACE screening. All 3 studies were conducted in the USA. The 2 studies examining caregiver (combined n=45 caregivers) acceptability42 50 showed that caregivers were willing to participate in ACE screening when the screening pertained to their child/children. Both studies also indicated that some caregivers were less comfortable about discussing their own ACE, noting that they questioned how their history was relevant to their child’s health, that recalling past events may be emotionally difficult and/or retraumatising,42 and raised concerns about feeling uncomfortable if their doctor knew about their socioeconomic factors and/or stressors.50 Conn et al42 noted that a way to reduce parental discomfort may be to adopt a patient-centred, trauma-informed approach that promotes support and trust in the patient–provider relationship when screening for parental ACE. Parents in their study also suggested alternate methods including private conversations with guidance on the importance of prenatal ACE for their child’s care and emphasising the choice regarding completing screening.

Chokshi and Skjoldager38 were the only team to explore adolescents’ (n=16) perspectives on ACE screening. Results showed that adolescents believed that a primary care setting was suitable for discussing ACE, indicating that such information would increase a service provider’s understanding of their patients and help them through discussions regarding adversities.

Despite limitations including small sample sizes, convenience sampling and that all the studies were conducted in the USA, available evidence provides preliminary support for patient acceptability of ACE screening in health settings.

Health practitioner knowledge and acceptability of ACE screening

Eleven studies were identified that explored health practitioner knowledge and acceptability of ACE screening.26–51 47 49 50 55 59 Ten studies were undertaken in the USA while one was conducted in Australia. Most studies used surveys to capture practitioners’ views. Sample sizes ranged from 5 to 605 participants (qualitative studies had smaller sample sizes).

Overall, the results of these studies indicated that practitioner awareness and acceptability of, and screening for, ACE had increased over the past decade. Kerker et al,27 for example, reported that only 4% of their sample of 302 paediatricians routinely asked about ACE in 2013, whereas by 2020 studies indicated ACE screening rates ranged from 33% to 89%.29–31 Results also showed that practitioners recognised the value of ACE screening and indicated several perceived benefits, including increasing therapeutic alliance, clarifying the connection between mental and physical health, highlighting the importance of holistic care, identifying especially vulnerable children, assisting with case conceptualisation, improving treatment planning and improving patients’ understanding of certain relationships (eg, parent-child and provider-patient relationship). Most studies also explored practitioners’ perceptions of barriers to screening. Commonly identified barriers included limited training on the topic, access to screening tools, access to community resources postscreening and inadequate time. Other less common barriers identified included not seeing patients on a regular basis and discomfort asking ACE questions.

In sum, these studies provide support for practitioner acceptability of ACE screening in healthcare settings. Strengths of this body of research include that several studies have been conducted on the topic and that a variety of health providers were included in study samples (eg, paediatricians, social workers, wellness navigators). Limitations include that nearly all studies were undertaken in the USA and that nearly half of the studies had samples that were not representative of their target populations (see table 1 and online supplemental table 2), reducing the generalisability of the findings. Furthermore, though practitioners identified several benefits to screening, no study included a follow-up to examine the impacts of routine inquiry.

Validity

None of the identified studies examined the validity of the ACE screening tools.

Risks and benefits of ACE screening

As discussed in the previous section, several studies have gathered information on the perceived benefits and risks of screening for ACE.26–31 42 47 49 50 55 58 59 No studies have, however, examined what risks and benefits were
experienced by children and young people who have undergone ACE screening (eg, how did screening impact uptake of services and any consequences).

**Screening for ACE in health settings with First Nations children, young people and their families**

Six studies\(^1\) \(^3\) \(^4\) \(^5\) \(^54\) \(^55\) \(^60\) \(^61\) specified that their participant samples included First Nations children (Māori children, Native American children and Aboriginal and Torres Strait Islander children). One study was conducted in the USA, 1 in New Zealand and 4 in Australia. Four studies\(^5\) \(^54\) \(^55\) \(^60\) \(^61\) were retrospective file reviews reporting on the prevalence of ACE in their sample populations and two used clinician-completed ACE questionnaires, completed after child clinic visits using routinely collected data (eg, referral information, previous medical reports).\(^4\)\(^5\)\(^55\)\(^60\)

Of these, only 3 Australian studies segregated data based on ethnicity.\(^4\)\(^5\)\(^55\) None of the studies administered the ACE tool directly to First Nations populations thus there is no evidence regarding the utility, feasibility or acceptability of administering ACE questionnaires to First Nations populations.

**Action taken following ACE screening**

Only 4 studies provided information on action taken following routine ACE enquiry.\(^3\)\(^8\)\(^47\)\(^60\) Two studies were conducted in the USA and 2 in Australia. Two were conducted in paediatric clinics, 1 in a community medical centre and 1 in a hospital. The percentage of children identified as in need of services ranged from 10%\(^3\) to 55%\(^8\). Only 2 studies outlined the eligibility criteria for receiving services.\(^47\)\(^55\) Wickramasinghe et al\(^4\) reported that action was taken for participants with ≥4 ACE while those in Kia-Keating et al\(^1\)\(^7\) study received access to services if an infant had 1+ ACE and/or parent had 2+ ACE. Neither study reported on the types of services accessed by participants. The 2 studies that did not report eligibility criteria for referrals did provide details on the services that participants were referred to.\(^38\)\(^60\) In Barnett et al\(^38\) study, participants were most frequently referred to insurance enrolment services, childcare and housing services. In Mahindroo et al\(^60\) study, participants were referred to mental health services, Child FIRST or Child Protection, social workers, and alternative services or existing supports. None of the studies completed follow-ups thus the impact of accessing services or the percentage of participants who accessed services after referral is unknown.

**DISCUSSION**

To our knowledge, this study is the first to have systematically reviewed literature on ACE screening in routine clinical practice with children, young people and their families. The review examined 36 studies in total to ascertain the process of ACE screening, feasibility, patient acceptability, health provider knowledge and acceptability, screening undertaken with First Nations populations and evidence of the outcomes of ACE screening implementation. Our review found that there is insufficient evidence to advocate for routine use of ACE screening in clinical care involving children and young people.

The measure used most to screen for ACE in clinical and healthcare settings was the ACE questionnaire, with most studies using the 10-item version. As the ACE questionnaire was originally developed for research purposes,\(^1\) it is problematic that different studies used different cut-offs to indicate low, medium or higher ACE exposure. For example, as mentioned above, Kia-Keating et al\(^1\)\(^7\) used a score of 1+ while Wickramasinghe et al\(^4\)\(^7\) used a score of ≥4 to signify high risk and need for enhanced support. The idea of a universal cut-off score for ACE is controversial with some suggesting that universal cut-offs indicate that all ACEs are created equally when research has shown that this is not the case.\(^62\)\(^63\) Another concern is that additional factors such as the severity, timing and duration of ACE along with other SDH (eg, poverty) that can have a positive/negative impact on the way ACE are experienced are not taken into consideration (eg, age at which parents separated, whether it was amicable).\(^64\) While the focus of this review was not on SDH, it is important to note that ACE and SDH are inter-connected, and both can lead to adverse outcomes.\(^65\) They do, however, have slightly different focuses and therefore need to be screened separately.\(^66\) Though there are measures that combine the two variables, such as the Safe Environment for Every Kid (SEEK), often these measures have a stronger focus on one variable over the other (eg, SEEK has a stronger focus on SDH over ACE).\(^67\) As versions of the ACE questionnaire developed for use in Felitti et al’s\(^1\) original study appear to be the most popular questionnaire choice in child and youth settings, more research examining its utility in its current form in health settings is required.

While the available evidence supports the feasibility and acceptability of ACE screening in health settings, research is limited by the small number of studies conducted with patients (five studies) as well as lack of evidence about its feasibility and acceptability in specific patient groups such as the First Nations populations. The appropriateness of the items in the available questionnaires for use with First Nations populations will therefore need further examination.\(^68\)\(^70\) In addition, research on the feasibility, acceptability and utility of ACE questionnaires in specific population groups is necessary before widespread use of these questionnaires as part of routine clinical screening.

No studies included in this review provided information on the outcomes of ACE screening. Though a handful of studies offered information on actions taken following screening for ACE (eg, referrals provided to services),\(^3\)\(^8\)\(^47\)\(^60\) no study conducted a follow-up to determine the outcomes of these referrals. Thus, the benefits and risks of ACE screening to the patients are unknown. Reviews of grey and non-empirical literature, however, have suggested potential benefits and risks of screening.\(^24\)\(^64\)\(^71\)\(^75\) A key benefit being early detection that could result in early intervention, which, given the
plasticity of the brain during childhood and adolescents, may have the greatest impact on well-being outcomes.\textsuperscript{71,74} Another benefit was that screening increased practitioner knowledge of patient ACE, thereby improving their understanding and empathy and facilitating holistic care.\textsuperscript{72,73} In contrast, commonly cited potential risks of screening for ACE included: (1) screening for adversity without also screening for protective factors may result in a one-sided view of a child’s profile; (2) potential for harm, especially if administered by an untrained individual, including creating stigma, triggering unwarranted child protection investigations and creating opportunity costs by reducing time available for more beneficial assessments and/or activities; and (3) the possibility of creating expectations regarding help that cannot be fulfilled due to resourcing and overtreatment or undertreatment given that the ACE tools have not been validated.\textsuperscript{24,71,76} Other factors to consider are the frequency at which to implement routine ACE screening and, given that guidelines and standards for screening for ACE have not yet been developed, whether screening practices comply with the WHO standards for screening implementation.\textsuperscript{71}

In light of the findings that no study has examined the benefits of ACE screening and the potential dangers associated with screening, ACE screening may be considered ineffective and unethical.\textsuperscript{54} This is especially the case if completed in isolation, as it runs the risk of reinforcing stigmatising and demoralising sections of the population already struggling.\textsuperscript{54}

**Clinical and policy implications**

The studies examined in this review have provided preliminary support for the feasibility and acceptability of ACE screening in health settings. Given that no studies have assessed the benefits or risks of screening for ACE in paediatric patients and their families, the implementation of widespread screening is not recommended. If ACE screening is to be undertaken, it should only be conducted at this time as an experimental procedure, until evidence of benefits and absence of harm have been established. This recommendation, however, should not be interpreted to mean that specific ACE should not be screened for in high-risk populations (eg, chronic pain sufferers)\textsuperscript{77} or that ACE screening should not occur during comprehensive paediatric assessments.

**Strengths and limitations**

This review had several strengths. First, using a systematic review strategy with broad inclusion criteria as well as five different search strategies increased the likelihood of identifying all relevant literature. Second, two reviewers reviewed all included studies and completed the risk of bias assessments, increasing the likelihood that all relevant factors were considered. Third, to our knowledge, it is the first review to have examined the utility of screening for ACE in children and young people attending clinical and healthcare settings. The review was also limited by several factors. First, searches were restricted to studies written in the English language, reducing the generalisability of findings. Second, also negatively impacting the generalisability of findings, was that all included studies were conducted in high-income countries. Had studies written in a language other than English been included in the review, more studies from lower income countries may have been identified and this may have resulted in different outcomes. Third, the identified studies were limited by the lack of methodological diversity (ie, primarily file reviews and cross-sectional studies). Fourth, the quality assessment indicated that several studies had non-representative samples suggesting an increased risk of bias. Fifth, only studies looking at multiple ACEs were included in the review, and if studies examining only one type of ACE (eg, domestic violence) were to be included, the review results may have differed. Sixth, despite the broad search strategy, studies that fit the inclusion criteria but were not focused on an ACE framework may have been missed (eg, studies using a child maltreatment framework). This may have impacted the study outcomes.

**CONCLUSION**

To conclude, this review found that research on the use of universal ACE screening with children and young people in health settings is still in its infancy. While there are promising attempts at incorporating screening and assessment of ACE into routine clinical assessments, there is insufficient evidence to recommend routine screening of ACE. More research with diverse populations, using more rigorous methodologies, and assessing the risk and benefits of assessment needs to be undertaken alongside opportunities for identifying strengths, trauma-informed intervention and supports, before widespread ACE screening is recommended. If ACE screening is undertaken, it should be done so only as an experimental procedure, until evidence of benefits and absence of harm have been established.

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