5-4-2021

A Tailored Multicomponent Intervention in Primary Care for Survivors of Adverse Childhood Experiences (ACES)

Rebecca L. Peterson

A TAILORED, MULTICOMPONENT INTERVENTION IN PRIMARY CARE FOR SURVIVORS OF ADVERSE CHILDHOOD EXPERIENCES (ACES)

by

REBECCA L. PETERSON

EVIDENCE-BASED PRACTICE PROJECT REPORT

Submitted to the College of Nursing and Health Professions

of Valparaiso University,

Valparaiso, Indiana

in partial fulfillment of the requirements

For the degree of

DOCTOR OF NURSING PRACTICE

2021

Student	Date	Advisor	Date
Rebecca L. Peterson	05/04/2021	Theresa A Kessler	05/04/2021

DEDICATION

This project is dedicated to my daughters Wuendy Mendez, Nyirou Anyak, and Athieng Anyak.

Each of you has demonstrated resilience and strength as survivors of a traumatic past.

ACKNOWLEDGMENTS

I would like to express my sincere gratitude to my faculty advisor, Dr. Theresa A. Kessler, PhD, RN, ACNS-BC, CNE, FAAN, and my site facilitator, Ken Van Beek, L.M.S.W. Without their expertise and support, this project would not have been possible. In addition, I would like to recognize the staff at Catherine's Health Center for their willingness to change practice. Finally, I would like to thank my family for believing in me.

TABLE OF CONTENTS

LIST OF TABLES

Table **Page**

LIST OF FIGURES

Figure **Page**

ABSTRACT

Adverse childhood experiences (ACEs) include 10 traumatic events of abuse, neglect, and household dysfunction that occur before 18 years of age. Adverse childhood experiences affect greater than 60% of the population, and approximately one in six individuals affirm that they have experienced four or more types of ACEs. They are associated with negative, long-term health outcomes in adults, including 9 out of the 10 leading causes of death in the United States (Centers for Disease Control and Prevention, n.d.; Felitti et al., 1998). The purpose of this evidence-based practice project was to implement a tailored, multicomponent intervention to mitigate the adverse health outcomes in adult survivors of ACEs. The project participants included 50 adult, primary care patients with an ACE score of one or greater at a Federally Qualified Health Center in West Michigan. A categorization tool was used to determine participants risk status (low, intermediate, or high risk). All levels of risk received ACE education and resilience interventions. Resilience interventions were individually tailored to strengthen social support and increase mindfulness practices. Intermediate and high-risk participants received an additional mental health intervention. A perceived stress scale (PSS) was administered at the time of intervention and at 12 weeks post-intervention. To determine the effectiveness of the interventions, a paired-samples *t* test was calculated to compare the mean intervention PSS to the mean post-intervention PSS. The mean intervention PSS was 21.09 (*SD* = 6.77), and the mean post-intervention PSS was 18.71 (*SD* = 8.22). A significant decrease from intervention PSS to post-intervention PSS was found ($t(33) = 2.229$, $p = .033$). In addition, 88.2% (*n* =30) of participants reported progress on one or more of the interventions. The results indicated that a tailored, multicomponent intervention reduced perceived stress and facilitated the implementation of resiliency and mental health interventions.

CHAPTER 1

INTRODUCTION

Background

Adverse childhood experiences (ACEs) are situations of childhood abuse and/or household dysfunction that occur before the age of 18 (Felitti et al., 1998). Experiences of trauma in childhood have been researched by Felitti et al. (1998) in the seminal Centers for Disease Control and Prevention (CDC)-Kaiser Adverse Childhood Experience (ACE) Study, which correlated ACEs to poor adult health outcomes. Based on the CDC-Kaiser ACE study, there were two categories of ACEs: (a) childhood abuse, which included the experiences of psychological, physical, and sexual abuse; and (b) household dysfunction, which encompassed scenarios of substance abuse, mental illness, domestic violence, and criminal behavior by household members (Felitti et al., 1998). With the progression of research from 1998, ACEs have been expanded to include a total of 10 categories of events. Emotional neglect, physical neglect, and parental separation or divorce are the most recent additions to the 10 categories (CDC, n.d.). The 10 categories that are assessed in an ACE screening are: physical abuse, physical neglect, emotional abuse, emotional neglect, sexual abuse, household domestic violence, household substance abuse, mental illness in the household, a household member incarcerated, and parental separation or divorce (CDC, n.d).

To deepen and expand the understanding of the 10 categories of ACEs, the concept of adverse childhood experiences was further clarified in a concept analysis (Kalmakios & Chandler, 2013). The operational definition was stated as, “Adverse childhood experiences are childhood events, varying in severity and often chronic, occurring within a child’s family or social environment that cause harm or distress, thereby disrupting the child’s physical or psychological health and development” (p. 1495). The analysis also explored the cumulative effect of adverse events on well-being, and the phenomenon that frequently childhood experiences of adverse

events are overlapping. Using Kalmakis and Chandler's (2013) concept analysis and operational definition, the link between the 10 commonly assessed adverse events and poor health outcomes can be understood.

The theory of toxic stress is the foundational understanding of the etiology of adverse health outcomes in adults who are survivors of ACEs (Aces aware, 2020; Burke Harris, 2018). The theory describes how repeated activation of a child's stress response as a result of adverse childhood experiences, leads to a dysregulated response. The dysregulated response leads to alterations in brain structure and function, hormonal dysregulation, and epigenetic changes which alter the way the genetic program is read (American Academy of Pediatrics, 2021; Burke Harris, 2018). The alterations in brain structure include changes in the hippocampus, prefrontal cortex, and the amygdala. Impaired memory and mood control can be caused by changes in the hippocampus, difficulties in judgement, decision making, impulse control, and attention can result from changes in the prefrontal cortex and alterations in processing emotional reactions can be caused by changes to the amygdala (Center for Youth Wellness, n.d; Herzog & Schmahl, 2018). The dysregulated stress response produces an inappropriate amount of cortisol, which can suppress the immune system and increase levels of proinflammatory markers (Anda et al., 2006; Center for Youth Wellness, n.d.; Herzog & Schmahl, 2018). This disruption in multiple developing organ systems, hormonal regulation, and genetic expression leads to the life-long adverse health effects recognized in adults (Aces aware, 2020; Burke Harris, 2018).

The long-term consequences of ACEs affect a multitude of physical and psychological health outcomes (Felitti et al., 1998). Hargreaves et al. (2019) observed that high ACEs in the adult population significantly correlated with greater chronic disease burden, which reflects the findings of the CDC-Kaiser study. Hargreaves et al. (2019) found that the greater the ACE score, the greater the number of chronic diseases. A dose-response correlation has been discovered with diseases such as ischemic heart disease, chronic lung disease, cancer, and

liver disease (Filitti et al., 1998). A dose-response correlation is one in which increasing exposure to ACEs cause increasing risk of disease states. For example, the odds of an individual attempting suicide if they have experienced one ACE is 1.8 greater than an individual who has zero ACEs. The odds increase to 3.0 for an ACE score of two, 6.6 for an ACE score of three, and 12.2 for an ACE score of four or more (Felitti et al., 1998). In the Felitti et al. (1998) study, individuals who had survived four or more categories of ACEs, compared to those who had experienced none, had 2.2 times greater odds of having ischemic heart disease, 3.9 times greater odds of having chronic bronchitis or emphysema, 1.9 times greater odds of any type of cancer, and 2.4 times greater odds of hepatitis or jaundice (Felitti et al., 1998). Additional long-term health problems that have been found to be associated with ACEs are stroke, asthma, diabetes, arthritis, kidney disease, and skeletal fractures (Aces aware, 2020).

In addition to disease, psychological conditions and risky health behaviors have a dose-response correlation with ACEs. A sample of significant psychological conditions and risky health behaviors identified were alcohol abuse, smoking, obesity, depression, and risky sexual behaviors. For example, individuals that experienced four or more ACEs had a 7.4-fold increase in alcohol abuse as compared to those who did not experience ACEs (Felitti et al., 1998). More recently, Chapman et al. (2010) discovered that ACEs were associated with sleep disturbances in a similar dose-response relationship. An ACE score of one increased the odds of trouble falling asleep or staying asleep by 1.2 times as an individual with an ACE score of zero. When the ACE score increased to four, the odds of trouble falling asleep or staying asleep increased to 2.0. Likewise, the odds of being tired after sleeping is 1.2 times more for an individual with an ACE score of 1 than with an ACE score of zero, and increases to 1.8 with an ACE score of four (Chapman et al., 2010).

Miller-Cribbs et al. (2016) found that individuals with higher ACEs had more difficulty accessing health care and had greater interruptions in care. Specifically, significant correlations were found between those with an ACE score of one or greater and the conditions of having to

go without medical care in the last 12 months, going without medical care when it was needed due to lack of insurance or money to pay for it, and visiting the emergency room because they did not have access to a physician. Also, a retrospective correlation was noted in that those with an ACE score of one or greater did not have a physician or dentist as a child (Miller-Cribbs et al., 2016). An increase in utilization of health care services was also a significant finding, in which increasing ACE scores correlated with an increase in emergency room visits and a decrease in primary care office visits (Hargreaves et al., 2019).

Universal ACE screening in the adult population is recommended by the CDC (n.d.), the American Heart Association (n.d.), the California Office of Health Care Services (2020), and the Substance Abuse and Mental Health Services Administration (2014). Moreover, the American Academy of Family Physicians (AAFP) (2020) supports research on ACE screening and strategies to improve health outcomes. The AAFP states that, “The AAFP supports programs that aim to: (1) prevent the occurrence of ACEs; (2) reduce the severity of the acute consequences of ACEs; and (3) treat long-term consequences of ACEs” (para 2). In addition, the CDC recommends implementation of interventions to decrease the immediate and long-term effects of ACEs (CDC, n.d.), and the Substance Abuse and Mental Health Services Administration (2014) supports interventions for adults with ACEs that reflect trauma-informed principles and are culturally appropriate.

Data from the Literature Supporting Need for the Project

National Data

A significant discovery of the CDC-Kaiser ACE study was the commonality of adverse experiences in childhood across gender, ethnic, and socioeconomic categories (Felitti et al., 1998). Approximately 61% of individuals across the United States have experienced one or more ACEs, and 15.8% experienced four or more ACEs (CDC, n.d). However, Merrick et al. (2019) observed that “women, American Indian/Alaskan Native, Black, and the Other racial/ethnic groups were more likely to experience four or more adverse childhood experiences

than were men and Whites" (p. 1001). Also, older adults, especially 65 years and older, reported less exposure to ACEs than younger adults (Merrick et al., 2019).

State Data

The ACE findings specific to Michigan mirror broader national findings. The most recent data for Michigan were reported in the 2016 Behavioral Risk Factor Survey. In Michigan, 66% of those surveyed reported one or more ACEs, and 18% reported experiencing four or more ACEs (Public Sector Consultants, 2019).

Data from the Clinical Agency Supporting Need for the Project

The site for implementation of the evidence-based practice (EBP) project is a Federally Qualified Health Center (FQHC) located in Western Michigan and is in the process of completing the certification to become a patient-centered medical home. In January of 2019, the agency implemented ACE screenings on each new patient and at health maintenance visits if an ACE screening had not previously been completed. The process was developed to target a goal of one ACE screening per patient in the electronic medical record (EMR) (Project facilitator, personal communication, July 7, 2020). A paper copy of the ACE screening was sent out in the new patient paperwork packets or given to existing patients to fill out when they arrived in the office. The ACE score is entered into the EMR under a diagnosis of: Screening for Disorders. If the ACE score is three or above, the completed screening is scanned into the EMR.

The implementation site has a part-time medical director, two full-time nurse practitioners (NPs), and a part-time physician and NP. In addition, the site has two behavioral health social workers for integrated primary care. Through discussion with the staff, it was found that the providers were unsure of the best treatment for elevated ACE scores. Two providers noted that if the ACE score was significantly elevated, they would consider consulting either behavioral health or refer to mental health services; however, there was not a consistent patient education or intervention process (Providers, personal communication, July 9, 2020).

The clinic had 796 (*N* = 796) completed ACE screenings in the EMR, with 32.91% of individuals having a score of zero, 39.7% having a score of one to three, and 27.39% having a score of four or more. A random stratified sample of 40 (*n* = 40) was selected to determine additional demographic characteristics. The random stratified sample was comprised of 45% males and 55% females. The mean age the sample was 43.7 years (*SD* = 14.4). The demographics of race were: 70% White, 17.5% Black, 5% Latino, 2.5% Asian, 2.5% American Indian/Alaska Native, and 2.5% Other. For individuals with an ACE score of one to three, the average was 2.44 health problems associated with ACEs per person, and for those with an ACE score of four or greater the average was 4.36 health problems associated with ACEs per person. The three most common reported ACEs experienced were household substance abuse, parents separated or divorced, and household mental illness.

Purpose of the Evidence-Based Practice Project

The purpose of this EBP project was to implement a multicomponent intervention for the adult population of a primary care setting to combat the long-term sequala of ACEs.

PICOT Question

In primary care adult patients who have survived ACEs (P) does a tailored, multicomponent intervention (I) affect the level of perceived stress (O), from time of intervention (C), over a 12-week period (T)?

Significance of the EBP Project

The high prevalence and persistent health consequences of ACEs require action by health care providers to ensure the provision of holistic health care that addresses contributing factors to a patient's current health. Through an exhaustive literature search and collaboration with the agency, the project leader implemented a tailored, multicomponent interventional approach to treat adults who are survivors of ACEs. The goals of the intervention were to provide individualized trauma-informed interventions to improve current health and prevent further health consequences. Specifically, the approach implemented interventions that strived

to decrease an individual's perceived stress, provide individualized health promotion, and connect intermediate and high-risk individuals to mental health professionals.

CHAPTER 2

EBP MODEL AND REVIEW OF LITERATURE

Evidence-based Practice Model

Overview of EBP Model

The Iowa Model Revised: Evidence-Based Practice to Promote Excellence in Health Care (Iowa model) was chosen as the best-fit model to guide the implementation of the ACE intervention due to the linear progression of the design, ease of use, incorporation of interprofessional teams, and focus on application of evidence into practice (Melnyk & Fineout-Overholt, 2019). The Iowa model was developed by Marita G. Titler to facilitate the implementation of research into practice and later revised to assist in the guidance of EBP implementation, with a focus on systems and individual decision making (The Iowa Model Collaborative, 2017). In addition, the Iowa model corresponds to the pattern of the nursing model of assessment, diagnosis, planning, implementation, and evaluation. The Iowa model employs the following steps which coordinate with stages of the nursing process which are listed in parenthesis: (a) identifying triggering issues/opportunities (assessment), (b) state the question or purpose (diagnosis), (c) form a team (planning), (d) assemble, appraise and synthesize body of evidence (planning), (e) design the practice change (planning), (f) pilot the practice change (implementation), (g) identify and sustain the practice change (implementation and evaluation), and (h) disseminate results (evaluation) (The Iowa Model Collaborative, 2017).

In addition to the liner progression of the model, three important questions guide the feedback loops (The Iowa Model Collaborative, 2017). The first question follows the step in which the question or purpose of the EBP project is stated. This question asks: *Is this topic a priority?* If the answer is *no*, then the project team needs to consider looping back to identify other triggering issues or opportunities. The second question is posed after the synthesis of evidence, which asks, *Is there sufficient evidence?* If the answer is *no*, then conducting

research or considering another issue is recommended. Finally, the third question: *Is change appropriate for adoption in practice?* can loop the team back to redesign, reassemble, or consider another issue, if the answer is *no* (The Iowa Model Collaborative, 2017). These three questions create important decision points throughout the project that require strategic evaluation to move forward with the project. In summary, the Iowa model provides clear direction for the development and implementation of an EBP project. It provides a step-by-step process in which critical evaluation is needed in order to progress.

Application of EBP Model to Doctor of Nursing Practice (DNP) Project

Identify Triggering Issues/Opportunities

The ACE intervention project was developed using the patient-centered issue of traumatic childhood events that correlate with poor adult health outcomes. The clinic had been using the 10-item ACE screening instrument on new patients and health maintenance visits since January of 2019; however, the agency did not employ standardized evidence-based interventions based on screening results. Therefore, a need was developed internally to investigate and standardize interventions for adults with ACE scores of one or greater. In addition, an external need had been issued though the recommendations of several health care associations, such as the CDC (n.d.), Substance Abuse and Mental Health Services Administration (2014), and the AAFP (2020).

State the Question or Purpose

The purpose of the EBP project was to implement tailored interventions which mitigate the health effects of adult survivors of ACEs. The PICOT question stated: In primary care adult patients who have survived ACEs (P) does a tailored, multicomponent intervention (I) affect the level of perceived stress (O), from the time of intervention (C), over a 12-week period (T)?

Form a Team

The emphasis on a multidisciplinary team was ideal for an EBP implementation of ACE interventions due to the multidisciplinary nature of trauma and the priority of holistic

interventions (Valeras et al., 2019). The multidisciplinary project team consisted of the DNP student project leader, the project graduate nursing faculty advisor, and the project facilitator, who is a behavioral health social worker. The staff members from the clinical agency viewed this clinical problem as a priority and desired a successful implementation into the clinic setting. The additional key stakeholders identified were the behavioral health providers, the medical director, the clinic's nurse practitioners and physician. Other stakeholders were identified throughout the project, including medical assistants, the office manager, wellness coach, the nurse case manager, and the referral coordinator.

Assemble, Appraise, and Synthesize Body of Evidence

A comprehensive computer-based literature search was undertaken including databases, hand-searching, and citation chasing. Inclusion and exclusion criteria were developed to aid in the selection of evidence. The evidence was appraised with Melnyk and Fineout-Overholt's rapid critical appraisal checklists (2019) and included if it was appraised at moderate to high quality. Finally, the evidence was synthesized to identify significant interventions that would target the multiple sequala of childhood trauma from ACEs. The best practice recommendation was cognitive behavioral therapy (CBT), with the flexibility to implement it in a variety of formats. Several formats are available for CBT including group, individual, integrated into the primary care setting, and trauma-focused. Additional interventions strongly supported by the evidence were motivational interviewing, mindfulness-based therapy, skills training, shared decision making, and strengthening social support.

Design and Pilot the Practice Change

The practice change included a categorization tool of risk assessment (low, intermediate, or high-risk) based on the ACE screening score and associated health care problems. Interventions were developed based on risk category: low risk interventions were education and resiliency promotion, intermediate and high-risk interventions were education,

resiliency promotion, and a mental health intervention. The pilot implementation phase was conducted by the project leader over a six-week period.

Identify and Sustain the Practice Change

After the pilot intervention, the medical providers transitioned to integrate the implementation of interventions into the standard of care. Education and support were provided by the project leader and the site facilitator to the medical providers to aid in the integration and sustainability of interventions. Furthermore, evaluation and practice change adjustments were ongoing as the practice was sustained.

Disseminate Results

The implementation and outcomes of the practice change were disseminated to the clinic staff, the community of Valparaiso University, and at an international nursing convention. In addition, the results were presented to a partner clinic that had expressed the need for the practice change.

Strengths and Limitations of EBP Model for DNP Project

The Iowa model has three strengths that make it an advantageous model for this EBP project. Because of the liner pattern that closely follows the nursing process, it is practical and intuitive for nursing professionals to utilize. Secondly, it implements a collaborative approach, which is beneficial for a team-based topic, such as the multi-disciplinary nature of ACE interventions. Thirdly, the final step in the Iowa model calls for dissemination of results. The emphasis on dissemination of results is essential to advance the nursing profession and improve patient outcomes. The only limitation identified of the Iowa model is the focus on a team with a collaborative approach, which was also identified as a strength. A collaborative team approach would be a barrier to an individual or team of nurses who do not have access to a multidisciplinary team and could create fatigue if the burden of the work is on one individual or a small team of nurses.

Literature Search

Sources Examined for Relevant Evidence

A comprehensive literature search was conducted under the guidance of the Research Services Librarian. The databases of Joanna Briggs Institute, Cochrane Library, TRIP, CINAHL, MEDLINE, and PsycINFO were utilized for the literature search (see Table 2.1). Many search terms and MeSH headings were trialed to capture the most expansive body of evidence. The final search terms included were “Adverse childhood experiences” or “child* trauma* and intervent* or treat* or manage* or strateg* or screen* or assess* or tool. Additionally, the MeSH term of “Adverse childhood experiences” was used in the CINAHL database. All databases were searched within the timeframe of 2015-2020 to capture the most current evidence. CINAHL, MEDLINE, and PsychINFO were searched with the limiters of English language, scholarly evidence, and the adult population.

As shown in Table 2.1, the Joanna Briggs Institute database search obtained 11 results, the Cochrane Library search obtained 80 results, TRIP search obtained 120 results, CINAHL search obtained 204 results, MEDLINE search obtained 184 results, and PsychINFO search obtained 197 results. Inclusion into the final aggregate of evidence was granted if the evidence: (a) was rated as moderate to high quality on the evidence appraisal checklist, (b) included at least one intervention for an ACE score of one or more, and (c) focused on the adult population. Duplicate evidence and evidence that solely focused on pharmacological interventions were excluded. In addition, multiple articles were reviewed and excluded which focused exclusively on the adolescent into young adult population and did not extend to the older adult age group. At the conclusion of the literature database search, two pieces of evidence were selected form CINAHL, three pieces from MEDLINE, and one from PsycINFO.

The Centers for Disease and Prevention (CDC) website and the California Department of Health Care Services (DHCS) were hand searched. Sixteen pieces of evidence were evaluated from the CDC website and six from DHCS (see Table 2.1). The same inclusion and

exclusion criteria were applied; therefore, one piece of evidence was selected from DHCS. Multiple references were located through citation chasing of previous evidence reviewed and selected, and one piece of evidence was selected using the previously outlined inclusion and exclusion criteria process. In total, eight pieces of evidence were used for the EBP project from the database searches, citation chasing, and hand searching (see Table 2.1).

Table 2.1

Literature Search

Database Searched	Keywords	Number of Results	Number Accepted
JBI	(“Adverse childhood experiences” or “child* trauma*”)	11	0
Cochrane Library	(“Adverse childhood experiences”) or (child* trauma) and (intervent* or treat* or manage* or strategy*)	80	0
TRIP	(“Adverse childhood experiences” or “child* trauma*” or “child* advers*) and (treat* or intervent* or manage* or strategy*)	120	0
CINAHL	(MM “adverse childhood experiences”) or (“adverse childhood experiences”) and (strategy* or intervent* or manage* or treat* or screen* or assess* or tool)	204	2
MEDLINE	“adverse childhood experiences” and Intervent*	184	3
PsycINFO	(adverse childhood experiences) and intervent* or treat*	197	1
Citation Chased		35	1
Hand Searched		22	1

Levels of Evidence

Rating systems of levels of evidence are important tools to systematically discern the best quality and highest level of evidence (Melnyk and Fineout-Overholt, 2019). The level of evidence rating tool by Melnyk and Fineout-Overholt (2019) was used to level the evidence. The tool categorizes evidence from Level I (highest quality evidence) through VII (lowest quality evidence) (Melnyk and Fineout-Overholt, 2019). The literature search to answer the PICOT question resulted in a variety of levels of evidence. Two Level I pieces of evidence were selected, one was a systematic review of randomized control trials (RCT) and quasi-experimental studies and one piece of evidence was a combination of a systematic review of RCT and quasi-experimental studies in conjunction with a systematic review of qualitative studies (Level V). One Level II randomized control study and two Level III quasi-experimental studies were included. One Level IV cohort study and one Level VI qualitative study were included. Finally, a Level VII clinical workflow was included which contained an ACE screening and intervention algorithm for pediatric and adult populations.

Appraisal of Relevant Evidence

The tools used to conduct the quality appraisals of the evidence was the Melnyk and Fineout-Overholt (2019) rapid critical appraisal checklists. This collection of tools was chosen based on the efficient, yet comprehensive analysis of validity, reliability, and applicability for each level of evidence. The rapid critical appraisal checklists provide a systematic way to evaluate each piece of evidence, and based on the checklist, the evaluator can determine the quality of the evidence. The evidence was rated by the evaluator as either poor, moderate, or high based on the evaluation of validity, reliability, and applicability. Evidence was included in this EBP project if rated as moderate or high; poor evidence was not included in this EBP project. Table 2.2 describes each piece of evidence together with the level of evidence and quality appraisal.

Table 2.2

Evidence Table

Citation	Purpose	Design	Sample	Measurement/ Outcomes	Results/Findings	Level/ Quality
Korotana, L. M., Dobson, K. S., Pusch, D., & Josephson, T. (2016). A review of primary care interventions to improve health and outcomes in adult survivors of adverse childhood experiences. *Clinical Psychology Review, 46*, 59-90.	To evaluate interventions in primary care for adults who have been exposed to ACEs	Systematic Review	99 studies included RCTs, quasi-experimental, and uncontrolled trials	Independent Variables (IV): Cognitive behavioral therapy (CBT) completed in groups or individually, emotional regulation skills training, expressive writing, eye-movement desensitization and reprocessing therapy, mindfulness-based therapy, and	All studies included in the systematic review trialed an intervention for adults in primary care with at least one childhood ACE-categorized event. CBT was the most comprehensively studied intervention which, "demonstrated the most consistent positive outcomes" (p. 83). Many forms of cognitive behavioral therapy had clinically positive outcomes, such as group, individual, skills-focused, and trauma-informed. CBT interventions ran weekly for approximately 12 – 16 weeks. Mindfulness-based therapy and	Level I Moderate quality

				psychodynamic therapy Dependent Variables (DV): Mental health (depression, anxiety, emotional regulation, and PTSD symptoms), physical health symptoms, quality of life, and health-risk behaviors	expressive writing also showed clinical improvement. Emotion-focused therapy, eye movement desensitization and reprocessing therapy, and psychodynamic therapy had limited studies, but displayed improved outcomes The statistical measures were not reported for each included study, instead an overview of the clinical results was described.	
McDonnell, C. J., & Garbers, S. V. (2017). Adverse childhood experiences and obesity: Systematic review of behavioral interventions for women. *Psychological Trauma: Theory, Research, Practice, and Policy, 10*(4), 387-395.	Original purpose to review interventions for obese adults, specifically women, with ACEs Revised purpose to review group-level interventions for adult women with ACEs	Systematic Review (group-level interventions) Systematic review of descriptive and qualitative studies (mediating variables)	11 studies were included in the review of group-level interventions for women with ACEs which included RCTs and quasi-experimental studies 15 studies were included in the review of	Independent Variables (IV): Trauma-informed group therapy, trauma-informed individual therapy, substance abuse counseling, trauma-informed skills classes, and yoga Dependent Variables (DV): Psychological symptoms and	There was no evidence of obesity treatment interventions for women with a history of ACEs. The intervention that was found to produce the greatest significant results was trauma-informed therapy, both as a group or individual. The trauma-informed therapy referenced was classified as a form of CBT. Two studies implemented a yoga intervention, one study had	Systematic review: Level I Moderate quality Systematic review of descriptive and qualitative studies:

	A second literature synthesis occurred to examine mediating variables between ACEs and obese women		mediating variables, including cross-sectional, longitudinal, and cohort studies	distress and self-esteem. Instruments used to measure DV: Symptom Check List-90-R, Brief Symptom Inventory, and Rosenberg Self-Esteem Scale	significant outcomes and one had insignificant outcomes. The variables of binge/emotional eating and depression and/or anxiety symptoms were identified as meditating variables between female obesity and ACE scores.	Level V Moderate quality
Eseadi, C., Anyanwu, J. I., Ogbuabor, S. E., & Ikechukwu-Ilomuanya, A. B. (2016). Effects of cognitive restructuring intervention program of rational-emotive behavior therapy on adverse childhood stress in Nigeria. *Journal of Rational-Emotive Cognitive-Bhavioral Therapy, 34*, 51-72.	To evaluate the effects of a cognitive restructuring intervention with survivors of adverse childhood stress	RCT	Convenience sample with a treatment group of 13 and control group of 13 from Nsukka Town in Nigeria	Independent Variable (IV): 12 weeks of cognitive restructuring intervention program of rational-emotive behavior therapy and two weeks of follow-up meetings Dependent Variable (DV): Irrational thoughts and behaviors Instrument used to measure DV:	Scores on the Rational-Emotive Behavior Therapy questionnaire post-intervention compared with the control group were significant in that the intervention produced a decrease in irrational thought and behaviors and reduced the emotional-behavioral disturbance ($p < 0.001$)	Level II High quality

				Rational-Emotive Behavior Therapy Questionnaire		
Cameron, L. D., Carroll, P., & Hamilton, W. K. (2018). Evaluation of an intervention promoting emotion regulation skills for adults with persisting distress due to adverse childhood experiences. *Child Abuse & Neglect, 79*, 423-244.	To evaluate the 12-week ACE Overcomers program, which focuses on emotional regulation, social skills, and resiliency	Two group quasi-experimental pretest/posttest design	Convenience sample of 92 participants: 60 in faith-based program and 32 in secular program from a community sample	Independent Variables (IV): ACE Overcomers program: faith-based or standard ACE Overcomers program, which is a 12-week group session, educational and skills training program with accompanying workbook and homework assignments Dependent Variables (DV): Emotional regulation, resilience, mental well-being, physical symptoms/illness, and quality of life	Significant posttest improvements in emotional regulation ($p < .01$), resilience ($p < .001$), mental well-being ($p < .001$), physical symptoms/illness ($p = .001$), and specific facets of quality of life ($p = .001$) No significant difference found between faith-based and standard program ($p > .25$)	Level III Moderate quality

				Instruments to measure the DV were: Courtauld Emotional Control Scale, Rumination and Reflections Questionnaire, Emotion Regulation Questionnaire, Mindful Attention Awareness Scale, Ego Resilience 89, General Self-Efficacy Survey, 10-Item perceived Stress Scale, Modified Differential Emotions Scale, Centre for Epidemiological Studies Depression Scale, Short From 36, and Health Appraisal Questionnaire		
Goldstein, E., Topitzes, J., Birstler, J., & Brown, R. L. (2019). Addressing	To evaluate an ACE score intervention for Black, low-	Quasi-experimental	Convenience sample of 40 adult Black patients in a	Independent Variables (IV): Trauma-informed medical care	Significant improvements post-intervention (posttest):	Level III Moderate quality

adverse childhood experiences and health risk behaviors among low-income, Black primary care patients: Testing feasibility of a motivation-based intervention. *General Hospital Psychiatry, 56*, 1-8.	income patients in primary care	pretest/posttest design	Federally Qualified Health Center in Wisconsin	(defined by screening for ACEs, two motivational interviewing sessions and a behavioral health referral) Dependent Variable (DV): Perceived stress, health risk behaviors and follow-through on behavioral health referral Instrument used to measure DV: Perceived Stress Scale	Perceived stress decreased ($p <$ .001) and maintained significance at follow-up Improvement post-intervention in health risk behaviors of: unhealthy alcohol use ($p = .03$), poor nutrition ($p = .003$), and risky sexual behaviors ($p <$ .001), which were not maintained at follow-up "30% additional participants were connected with behavioral health services throughout the course of the study" (p. 6).	
Cheong, E. V., Sinnott, C., Dahly, D., & Kearney, P. M. (2017). Adverse childhood experiences (ACEs) and later-life depression: Perceived social support as a potential protective	To identify correlations between ACE scores and adult depressive symptoms and to see if social support moderates these symptoms	Cohort Study	Analyzed data from cohort of 2047 males and females aged 50-69 in Ireland	Independent Variable (IV): ACE score of one or greater Dependent Variable (DV): Depressive	An ACE score of 1 or more was associated with 2.85 times the odds of depressive symptoms of those rated poor perceived social support; however, with moderate or strong perceived social support the odds of depressive	Level IV High quality

factor. *British Medical Journal (BMJ) Open, 7*(9), e013228.				symptoms using the CES-D questionnaire and perceived social support measured with the Oslo Social Support Scale	symptoms dropped significantly to 2.21 ($p < 0.01$) One or more on the ACE score was significantly correlated with depressive symptoms ($p < 0.001$) and long-term illness/disability ($p < 0.001$)	
Purkey, E., Patel, R., Beckett, T., & Mathieu, F. (2018). Primary care experiences of women with a history of childhood trauma and chronic disease. *Canadian Family Physician, 64*(3), 204-211.	Understand the experience of women with a history of ACEs and chronic disease in a primary care setting	Qualitative study	26 women with an ACE score of 4+ and two chronic diseases, located in Ontario, Canada		Six themes emerged from the interviews: (a) importance of continuity of care, (b) challenges with family medicine residents, (c) provider awareness of abuse history, (d) distress due to triggering events, (e) characteristics of clinic staff and space, and (f) engagement in care plans and choice	Level VI High quality
Aces aware. (2020, April). *ACE screening clinical workflows, ACEs and toxic stress risk assessment algorithm, and ACE-associated health conditions: For pediatrics and adults.* Aces aware. https://www.acesaware.org/wp-	Provide a risk assessment algorithm and interventions for ACE screening in pediatrics and adults for health care providers throughout all of California	Clinical workflow	NA	NA	NA	Level VII Moderate quality

content/uploads/2019/12/ACE-Clinical-Workflows-Algorithms-and-ACE-Associated-Health-Conditions.pdf

Level I Evidence

Korotana et al. (2016). The systematic review by Korotana et al. (2016) included 99 studies. The majority were RCTs (*n* = 68), but the review also included uncontrolled (without a control) trials (*n* = 18) and quasi-experimental studies (*n* = 13). The original literature search criteria included interventions for adults who had experienced one or more ACEs. The literature search obtained zero results; therefore, the criteria was broadened to include studies that evaluated an intervention for any one of the 10-ACE categories/events. For example, the search was expanded to include studies that evaluated interventions for adult survivors of physical abuse or studies evaluating interventions for adult survivors of a household with domestic violence. Therefore, the results of the revised literature search captured interventions for individual ACE categories, but not research specifically labeled as: *interventions for ACEs*. The strength of the systematic review was the robust collection of studies that were synthesized and the detailed literature search process with outlined inclusion and exclusion criteria. Each study was described with the ACE category based on the participants, sample, trial type, treatment, modality, and primary outcomes.

The primary finding was that cognitive behavioral therapy (CBT) was clinically effective at decreasing symptoms of conditions associated with ACEs. Several of the studies targeted symptoms of depression, anxiety, post-traumatic stress disorder (PTSD), coping, emotional regulation, and risky health behaviors and found that CBT clinically reduced the targeted symptoms. Expressive writing and mindfulness-based therapy were found to be clinically effective at reducing symptoms of depression, PTSD, and anxiety and clinically improving emotional regulation. A significant limitation of the presented evidence for CBT and ACE interventions was that physical conditions associated with the ACE-related poor health outcomes were not measured. Further limitations of the review were that individual data, not aggregate, were used to analyze the results, and statistical analysis for the included studies

were not reported. In summary, the validity was moderate, reliability was low, and applicability was high, leading to a moderate quality appraisal.

McDonnell and Garbers (2017). The systematic review by McDonnell and Garbers (2017) adjusted their original literature search inclusion criteria due to a similar circumstance as Korotana et al. (2016). The clinical problem for the initial literature search was interventions for obesity in women who were survivors of ACEs. Due to lack of evidence obtained, the inclusion criteria were broadened to include interventions for women who were survivors of ACEs. Eleven articles, reporting nine interventions, were used for the systematic review. The interventions included group or individual cognitive behavioral therapy, trauma-informed curriculums, and yoga interventions. The outcomes of the studies pointed to a significant decrease in symptoms of PTSD and psychological distress and an increase in overall mental health and self-esteem. However, two studies utilized yoga as an intervention, and one study found a significant positive effect on participants' self-concept and one identified no effect on level of physical activity and symptoms of PTSD. The systematic review included both RCTs and quasi-experimental designs; therefore, the outcomes of the studies were analyzed individually and then synthesized. The study had high applicability and was consistent with other evidence obtained.

Level II Evidence

Eseadi et al. (2016). Eseadi et al. (2016) conducted a RCT in Nigeria. The researchers used the Adverse Childhood Stress Experience Questionnaire, which has 10-items that correlate to the 10-ACE screening items, to assess adverse childhood experiences among those who self-identified as experiencing childhood stress. The intervention was a 12-week cognitive restructuring intervention of rational-emotive behavior therapy. Cognitive restructuring is similar to CBT, in which harmful thoughts, feelings, and behaviors are replaced with healthier thoughts, feelings, and behaviors. The strength of this study was the development of a control group that did not receive the intervention. The outcome was measured by the rational-emotive

behavior therapy questionnaire, a tool that has support for reliability and validity. Cognitive restructuring led to significant improvements in irrational thoughts and behaviors, and emotional-behavioral disturbances. Despite the use of a different scale to access childhood trauma, the scale items directly corresponded with the 10-item ACE screening tool (CDC, n.d). The study was strong in both validity and reliability and further strengthens both Korotana et al. (2016) and McDonnell and Garbers (2017) findings that CBT is an effective intervention for treatment of survivors of childhood trauma in the adult population.

Level III Evidence

Cameron et al. (2018). A quasi-experimental design was used to implement an ACE Overcomers program with two groups of ACE survivors. A convenience sample of 92 participants was obtained by advertising in local media. Sixty participants enrolled in the faith-based program and 32 in the secular. A total of 33 participants were lost to follow-up. The ACE Overcomers program lasted 12-weeks and focused on emotional expression and processing, mindfulness, resilience, and problem-solving. Both programs received similar material, except the faith-based had Biblical verses and prayers while the secular had philosophical references. Several tools were used to assess the participants' pre- and post-intervention outcomes, which included the Courtuld Emotional Control Scale, Rumination and Reflections Questionnaire, Emotion Regulation Questionnaire, Mindful Attention Awareness Scale, Ego Resilience 89, General Self-Efficacy Survey, Perceived Stress Scale, Modified Differential Emotions Scale, Centre for Epidemiological Studies Depression Scale, Quality of life-Short From 36, and Health Appraisal Questionnaire. Significant results were noted in emotional regulation, resiliency, mental well-being, quality of life and symptoms of illness. Participants showed significant ($p <$ .01) improvements in emotional regulation tendencies, significant ($p <$ .001) improvements in resilience (ego resilience and general self-efficacy), significant ($p <$ .001) improvements in mental well-being, significant ($p <$ .001) improvement in specific facets of quality of life, and significant ($p <$ .001) improvement in illness symptoms, as measured by daily somatic

complaints and number of sick days. No significant difference was noted between the faith-based and secular program outcomes ($p > .25$). A weakness of the design was the use of multiple measures, because with more statistical analyses the greater the chance that findings will turn out statistically significant, when in reality, the difference is caused by chance. Additional weaknesses noted were that the participants self-selected into the intervention group, which could result in highly motivated participants who were interested in a positive outcome, and a high attrition rate was reported (35.9%). Overall, this was a well-designed study, with tools that had valid and reliable support which targeted multiple key skills identified to buffer the effects of childhood trauma.

Goldstein et al. (2019). The researchers used a quasi-experimental study design with low-income, Black, primary care patients in a Midwest, urban community. A multi-step intervention of screening, motivational interviewing (MI), and referral to behavioral health was implemented in 40 individuals who agreed to participate and had an ACE score of one or greater. The total sample size at the completion was 35, with 5 participants being lost to follow-up. The clinical outcomes measured pre- and post-intervention were the Perceived Stress Scale (PSS), Health Risk Behaviors tool, and acceptance of a behavioral health referral. Significant results were noted in a drop in PSS from baseline to post-intervention ($p < 0.001$) and at follow-up ($p < 0.001$). The Health Risk Behaviors of unhealthy alcohol use, poor nutrition, and risky sexual behaviors were significant at post-intervention, however did not maintain significant results from baseline to follow-up. Finally, 37.5% of participants were receiving counseling at baseline, and 30% of additional participants were connected with behavioral health throughout the study as a result of the referral intervention. The lack of control group reduced the validity; nevertheless, validity, reliability, and applicability remained stable because of the clearly defined intervention, appropriate statistical analysis, reliable reporting of results, consistent instruments

used throughout the study, use of tools with valid and reliable support, and applicability to the current agency population.

Level IV Evidence

Cheong et al. (2017). A cohort study included a sample size of 2047 men and women in Ireland who ranged in age 50-69 years. The study results demonstrated the odds of depressive symptoms were higher among individuals with a greater ACE score. This finding affirmed the original CDC-Kaiser ACE study (Felitti et al., 1998) in which an ACE of four or more had 3.9 greater odds of depression than those with an ACE of zero. The researchers also observed that long-term illness/disability was significantly correlated with higher ACEs. This finding also affirmed the original CDC-Kaiser ACE study (Felitti et al., 1998) where an ACE of three or more had 2.3 greater odds of chronic disease than those with an ACE of zero. In addition, the authors found that lower perceived social support was significantly correlated ($p < 0.01$) with higher depressive symptoms in same-score ACE individuals. Perceived social support was considered a buffer to the effects of elevated ACE scores on depression and chronic health. The study was appraised as a high quality due to comprehensive strengths in validity, reliability and applicability.

Level VI Evidence

Purkey et al. (2018). This qualitative study contained in-depth interviews of 26 women who had both a history of childhood trauma, as evidenced by an ACE score of four or more, and two chronic diseases. Six themes emerged from the interviews: (a) importance of continuity of care, (b) challenges with family medicine residents, (c) provider awareness of abuse history, (d) distress due to triggering events, (e) characteristics of clinic staff and space, and (f) engagement in care plans and choice. Incorporation of interventions related to the qualitative findings included screening, education, discussion about past trauma, continuity and trust of providers and staff, and patient collaboration with plan of care. These essential themes can guide intervention development and implementation and provide high applicability. The study

design supported the validity of the findings as evidenced by: 26 out of the 30 eligible women completed the interview, interviewers used a script, the interviews were audio-recorded and independently reviewed, and criteria for saturation was met. The reliability was strong because the data collection, data analysis, and importance of the study were clear and the findings were presented in a logical and understandable manner with illustrated quotes.

Level VII Evidence

Aces aware (2020). Aces aware (2020) published a clinical workflow with an assessment algorithm with associated interventions for pediatric and adult patients who are survivors of ACEs. It was developed in collaboration of the DHCS and the California Office of the Surgeon General. The algorithm divides adult patients into four response and follow-up categories (interventions). The first category is labeled as low risk for adults who have an ACE score of zero to three and do not have associated health conditions. The intervention for this category is to provide education and assess for protective factors. The second category is labeled as intermediate risk. This category also encompasses the score of zero to three, yet in addition, these individuals have ACE-associated health conditions (see Appendix C). The intervention for intermediate risk is education, assess for protective factors, jointly formulate a treatment plan, and provide support services and treatment. The third category listed is high risk, which includes an ACE score of four to ten with or without ACE-associated health conditions. Interventions for the high risk category are the same as the intermediate risk category. Finally, the fourth category is unknown risk, in which the ACE score is unknown or incomplete. The recommendation for unknown risk is to provide education and reassess at future visits.

The algorithm provides concrete descriptions of risk categories and focuses on a multi-component intervention plan. Support services and treatment are recommended for both intermediate and high risk, in addition to a shared-decision making treatment plan. The applicability and generalizability of the clinical workflow is strong. However, the credibility is

evaluated as moderate, due to unknown factors, such as if an explicit process was used to identify, select, and combine evidence and if the workflow was subjected to peer review. In addition, the strength of evidence is not given with each recommendation.

Construction of Evidence-based Practice

Synthesis of Critically Appraised Literature

CBT

The use of CBT to reduce symptoms associated with adverse health outcomes of ACEs was supported by multiple studies, including RCTs, uncontrolled trials, and quasi-experimental studies, which were included in the two systematic reviews by Korotana et al. (2016) and McDonnell and Garbers (2018). The randomized control trial by Eseadi et al. (2016) implemented an intervention similar to CBT, called cognitive restructuring intervention program of rational-emotive behavior therapy, and demonstrated improvements in emotional-behavioral disturbance by significantly decreasing irrational thoughts and behaviors. Additional support for CBT was found in the multicompetent intervention by Goldstein et al. (2019), in which a referral to behavioral health services was included for all patients in the study who were not already connected to behavioral health. And finally, the Aces Aware (2020) clinical workflow included linking patients to mental health support services for individuals at intermediate and high risk.

A variety of modalities of CBT were found to clinically and significantly improve symptoms associated with adverse health outcomes of ACEs. CBT can be facilitated in a variety of forms and structures, including: trauma-focused CBT, group therapy, individual therapy, cognitive processing therapy, cognitive-based coping group therapy, and imagery rescripting and rehearsal (Korotana et al., 2016; McDonnell & Garbers, 2018). The robust clinical and statistically significant outcomes of CBT are primarily focused on psychological and social outcomes, such as symptoms of anxiety, depression, PTSD, risky health behaviors, coping, quality of life, health symptom behaviors, resiliency, irrational thoughts and behaviors, self-efficacy, and emotional regulation (Eseadi et al., 2016; Korotana et al., 2016; McDonnell &

Garbers, 2018). Mental health interventions encompass a variety of modalities of CBT, and priority is placed on a patient's individual preference for mental health services.

Patient-centered Care with Shared Decision Making & MI

Patient-centered care with shared decision making and MI are combined for this synthesis because they both utilize similar intervention techniques in which the medical provider partners with the patient to set goals to motivate patient behavioral change. MI and shared decision making have been shown to significantly decrease perceived stress and clinically improve health risk behaviors (Goldstein et al., 2019). Coinciding with the positive benefits of MI, the clinical recommendation for intermediate and high-risk ACE survivors highlights patient-centered shared decision making with the intervention described as, "jointly formulate treatment plan" (Aces aware, 2020, p. 7). Finally, choice, control and collaboration are principles of trauma-informed care that were validated in the evolution of the theme which depicted the importance of engagement in care plans and choice in the primary care setting by ACE survivors (Purkey et al, 2018).

Skill Development

Skill development is an important component of CBT, but it can also be identified as an independent intervention. Skill development is a process by which education and practice of skills can change maladaptive emotional regulation and coping (Cameron, 2018). Using skill development can lead to improved mood regulation and PTSD symptoms, decrease in risky health behaviors, decrease in anxiety symptoms, and improved anger expression (Korotana, 206; McDonnell & Garbers, 2018). Skill development can also lead to significant improvement in emotional regulation, resilience, mental well-being, quality of life and symptoms of illness (Cameron et al., 2018).

Mindful Based Therapy

Mindfulness is a practice whereby an individual focuses on the present situation without judgement. Mindfulness can incorporate mediation, thankfulness, prayer, or calming techniques

(Aces aware, 2020). Mindfulness based therapy was shown to produce significant improvement in symptoms of depression, anxiety, PTSD, sexual distress, and improve emotional regulation for those who had an ACE score of one or greater (Kortana et al., 2016). Mindfulness interventions are incorporated in the Aces aware (2020) clinical workflow to provide protection from toxic stress related to childhood trauma.

Social Support

Increased perceived social support was discovered to decrease depression symptoms for adults with positive ACE scores (Cheong et al., 2017). Social support is believed to be a protective factor of toxic stress on the patient's health (Aces aware, 2020). Interventions suggested to improve social support with healthy relationships are: spending more high-quality time together with loved ones, making time to see friends and create a healthy support system, connecting with members of the community, and asking for help if feeling unsafe in relationships (Aces aware, 2020).

Best Practice Model Recommendation

An algorithm approach to categorize risk based on ACE score and current health problems was the best practice evidence recommendation for survivors of ACEs. Evidence showed that a dose-response coloration exists between increasing number of ACE events and increasing risk of adverse health outcome; therefore, risk was categorized as low, intermediate, or high based on the ACE score and evidence of ACE-associated adverse health problems to provide a tailored framework for recommended interventions.

The reviewed evidence demonstrates that a variety of interventions can be used to treat adults with ACEs in the primary care setting. The synthesis of literature identifies CBT as the most highly studied with the most statistically and clinically significant outcome improvements for adult survivors of one or more ACEs. The versatility of CBT allows for a flexible implementation by trained medical providers, in an integrated health care practice, or it can be coordinated as a referral to mental health services. The goal of CBT for those with one or more

ACEs is to decrease the symptoms of the adverse health outcomes, thus decreasing the overall long-term health effects of childhood trauma. CBT was recommended to all individuals with an intermediate or high risk ACE score.

Mindfulness-based therapy and strengthening social support produced similar outcomes of decreasing adverse health stress symptoms and improving the long-term consequences of adverse health conditions. Mutual goal setting directed at the two interventions of mindfulness and increased social support was implemented for all survivors of ACEs, regardless of risk level. In conclusion, mental health interventions, mindfulness, and strengthening social support provide a holistic recommendation of a multicomponent intervention that is tailored to the patient through collaborative, mutual goal setting.

CHAPTER 3

IMPLEMENTATION OF PRACTICE CHANGE

The implementation of practice change commenced with the Iowa model's fifth step entitled: *design and pilot a practice change* (The Iowa Model Collaborative, 2017). A categorization tool was implemented to identify individuals according to their ACE score risk (low, intermediate, or high). A multicomponent intervention was developed for each level of risk. The intervention focused on patent education and mutual goal setting with an emphasis on adverse health outcome prevention and referral to behavioral health services for intermediate and high-risk scores. Implementation of the practice change was designed to answer the PICOT question: In primary care adult patients who have survived ACEs (P) does a tailored, multicomponent intervention (I) affect the level of perceived stress (O), from time of intervention (C), over a 12-week period (T)? The purpose of this EBP project was to combat the long-term adverse health outcomes related to ACEs. The desired outcome for all the participants was a statically significant decrease in perceived stress.

Participants and Setting

The setting for the EBP project implementation was a FQHC in West Michigan. The medical providers participating in the practice change were three nurse practitioners and a physician who provided direct medical care at the clinic. In addition, the integrated behavior health staff assisted in the practice change by providing support to the medical providers and behavioral health services to the identified and agreeable patients who were at an intermediate or high-risk based on their ACE score and associated health conditions.

The target patient population for the intervention was all patients over 18 years of age who had an ACE score of one or greater. The participant population excluded pregnant individuals, but did not exclude based on additional comorbid conditions, such as health problems or mental health conditions.

Pre-Intervention Group Characteristics

The clinic had been documenting ACE screenings on patients starting in January of 2019 (See Appendix A for the ACE screening tool). However, a consistent approach to interventions for ACE survivors had not been implemented. The ACE screening documented from January, 2019, to July, 2020 were comprised of 32.91% individuals with an ACE score of zero, 39.7% with an ACE score of one to three, and 27.39% with an ACE score of four or greater. Using the stratified random sample of individuals (n = 40) and applying the ACE risk algorithm, 1 individual would be categorized as low risk, 15 individuals as intermediate risk, and 11 individuals as high risk.

Intervention

Education was provided to the physicians, nurse practitioners, and behavior health providers on the best practice recommendation of interventions to treat survivors of ACEs in the categories of low, intermediate, and high-risk. Individuals that were seen in the clinic for a health maintenance exam, new patient physical, or at the request of the provider, and had an ACE score of 1 or greater were provided the ACE intervention by the project leader. Patients were categorized with a risk level based on their ACE screening tool and ACE-associated adverse health conditions (see Appendix B for risk algorithm and Appendix C for ACE-associated adverse health outcomes). Education on ACEs was provided for all intervention participants, and based on the ACE risk level (see top portion of the patient handout in Appendix D for the education). Patient goals and a plan of care were developed using mutual goal setting. Low risk patients were provided mutual goal setting with interventions to make healthy lifestyle changes focused on increasing resiliency by strengthening social support and increasing mindfulness practices (see middle portion of the patient handout in Appendix D). Intermediate and high risk patients were provided the same intervention as low risk patients, but they had an additional mental health intervention (see bottom portion of the patient handout in Appendix D).

After the intervention, the patient was asked if they agreed to a 12-week follow-up phone call to assess perceived stress level and report progress achieved on social support, mindfulness, and mental health goals. Once individuals agreed to the follow-up, they completed the PSS (see Appendix E for the PSS and Appendix F for permission to use the PSS). The ACE score, risk level, and mutual goals were recorded in the patient's EMR in a patient case titled "ACE INT". Patient demographics of age, gender, ethnicity, and number of health issues related to ACEs were collected from the EMR.

The follow-up period consisted of the project leader calling the enrolled individuals to obtain the post-intervention PSS, perceived satisfaction and helpfulness of the intervention, and patient reported progress on the mutual goal setting activity (see Appendix G). A portion of the participants were followed-up in person if they had an already scheduled appointment while the project leader was on site.

Comparison

The participants operated as their own comparison group by completing the initial PSS and post-intervention PSS. The intervention PSS was collected when the participants were provided the intervention and agreed to participate in the project follow-up. The subsequent PSS and follow-up data were completed after a 12-week latent period post intervention. Due to patient scheduling, university calendar, and some individual participants requiring several phone calls before they were reached, the follow-up time range was between 9 weeks and 21 weeks, with the mean of 14.2 weeks (*SD* = 3.28).

Outcomes

The primary outcome collected was the PSS (see Appendix E). The intervention PSS and post-intervention PSS were collected and analyzed with a paired samples *t*-test. The PSS has support for reliability and validity for the measurement of perceived stress (Lee, 2012). In addition, higher measures of stress, as evidenced by a higher score on the PSS has been correlated with higher cortisol levels (Pruessner et al., 1999). Secondary outcomes included

satisfaction with the intervention, perceived helpfulness of the intervention, and self-reported progress with strengthening of social support, mindfulness practices, and mental health (see Appendix G).

Time

The intervention period began September 2nd, 2020, when final approval was given by the clinical agency and DNP faculty advisor. The intervention was completed over a 6-week period. Total project implementation included the intervention period, a latent period between the intervention and follow-up, and a period of participant follow-up. The final two steps of the Iowa model, which are identify and sustain the practice change, and disseminate the results, began during the latent phase and continued until April of 2021.

Protection of Human Subjects

The project leader completed Collaborative Institutional Training Initiative training for the ethical treatment of human subjects. The project was classified as exempt by the Valparaiso University institutional review board (IRB), due to the nature of the project as an implementation of EBP. Approval for the EBP implementation was given by the agency medical director and did not require an agency-specific IRB review process. Patient data with an assigned identification number were kept in a locked office at the clinic. Electronic data were numbered, de-identified, and kept on a password protected computer. The patient list of medical record numbers matched with the de-identified, assigned numbers were kept in a separate electronic file. Only the project leader had access to the password protected computer.

CHAPTER 4

FINDINGS

The purpose of this EBP project was to implement interventions to reduce the adverse health outcomes related to ACEs. Based on the theory of toxic stress as a consequence of childhood trauma, lowered perceived stress level was identified as the target outcome for the post-intervention follow-up. The PICOT asked: Does implementing a tailored, multicomponent intervention in primary care decrease perceived stress levels over a 12-week period?

The intervention was administered to individuals with an ACE score of one or greater. At the time of the intervention, a PSS was administered. Following an average 14-week latent period, a post-intervention follow-up was completed. At the follow-up, a second PSS was administered along with assessing reported progress on the intervention and perceived satisfaction and helpfulness of the intervention. The primary outcome measured was change in PSS scores from intervention to post-intervention. Secondary outcomes were identified as reported progress on the interventions of social support, mindfulness practices, and mental health. Additional secondary outcomes were individual satisfaction with the intervention and reported helpfulness of the intervention.

Participants

Prior to the project implementation, the clinic had 796 (N = 796) completed ACE screenings in the EMR, with 32.91% of individuals having a score of zero, 39.7% having a score of one to three, and 27.39% having a score of four or more. To further identify demographic characteristics, a stratified random sample of 40 (n = 40) was selected. The stratified random sample was comprised of 45% males and 55% females, with a median age of 42 years and a mean of 43.7 years (SD = 14.4). The percentages of identified race were: 70% White, 17.5% Black, 5% Latino, 2.5% Asian, 2.5% American Indian/Alaska Native, and 2.5% Other. Individuals with an ACE score of one to three had an average of 2.44 health problems

associated with ACEs, and those with an ACE score of four or greater had an average of 4.36 ACE-associated health problems.

The intervention group contained 50 individuals who had an ACE score of one or greater, received the intervention, and agreed to a 12-week follow-up phone call. The intervention group was comprised of those who had an ACE score of one to three (36%, *n* = 18) and those who had an ACE score of four or more (64%, *n* = 32) (see Figure 4.1 for a distribution of ACE scores in the intervention group). The majority of the intervention group was female (82%) and white (66%) with the average age being 44.1 (*SD* = 12.3) (see Table 4.1 for the demographic description of the intervention group). The intervention group with ACE scores of one to three had an average of 5.11 health problems associated with ACEs, and individuals with an ACE score of four or greater had an average of 6.19 associated health problems.

The attrition rate was 32%, with a total of 34 individuals completing the follow-up data collection, and 16 individuals who were lost to follow-up. The attrition was due to individuals: not answering their phone, being discharged from the office, seeking care elsewhere, or having a disconnected phone. At least three attempts were made to reach each individual that did not answer their phone. The post-intervention follow-up group was also comprised of the majority of individuals who was female (73.5%) and white (62%). The mean ACE score of the post-intervention follow-up group was 4.15 (*SD* = 2.4) and the mean number of ACE associated health problems was 5.74 (*SD* = 2.6).

Testing was completed to ascertain if differences existed between the stratified random sample group and the intervention group. Chi-square test of independence was completed on gender and race. Independent-samples *t* tests were conducted to analyze differences in age, ACE score, and number of ACE-associated health problems. A significant difference between the groups was found only in the category of number of health problems associated with ACEs. The independent-samples *t* test for number of health problems associated with ACEs found a significant difference (t (75) = 4.842, $p < .001$) between the stratified random sample of

individuals with an ACE of one or greater (*n* = 27) and intervention group (*n* = 50). The mean number of problems associated with ACEs in the stratified random sample group was significantly lower at 3.22 (*SD* = 1.85) than in the intervention group, which was 5.8 (*SD* = 2.41). No significant differences were found in gender, race, age, and ACE score.

Similar testing was also completed to determine if differences existed between the post-intervention follow-up group and the 16 individuals who were lost to follow-up. Chi-square test of independence was completed on gender and race. Independent-samples *t* tests were conducted to analyze differences in age, ACE score, and number of ACE-associated health problems (see Table 4.1 for the results). The chi-square test of independence was calculated and a significant difference was found (X^2 (1) = 5.165, *p* = .023) between the two groups in gender. No significant differences were found in race, age, ACE score, and number of ACE associated health problems.

Figure 4.1

Intervention ACE Scores

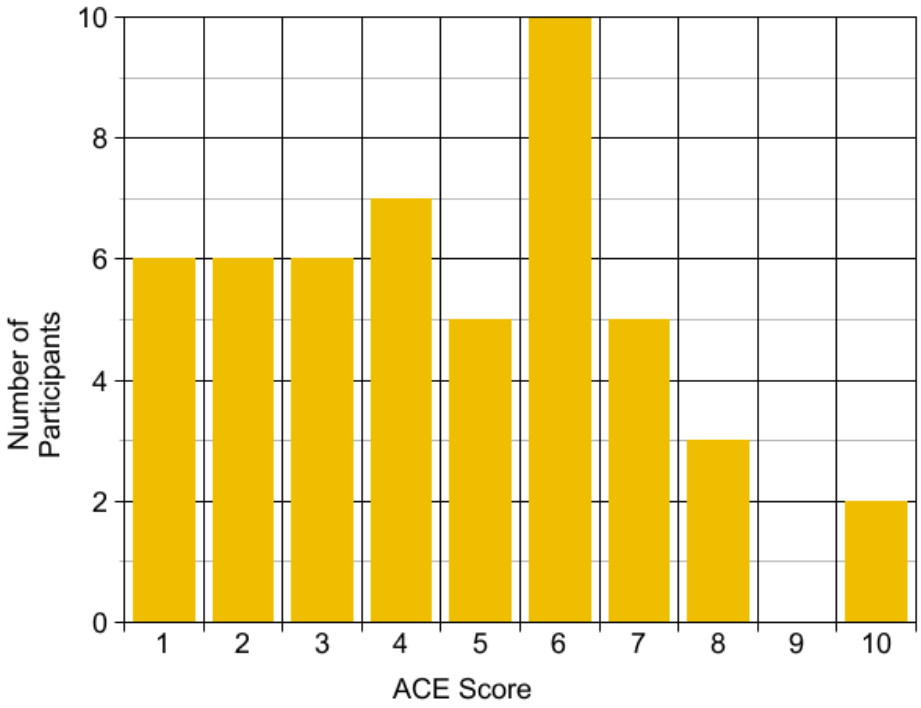


Table 4.1

Demographic Characteristics of the Participants

	Intervention		Post-Intervention		Test Statistic/*p*-value
	N(%)	*M(SD)*	*N(%)*	*M(SD)*	
Age		44.1(12.3)		42.9(12.2)	0.007/0.340
ACE score		4.56(2.38)		4.15(2.4)	0.102/0.074
Number of ACE Associated Problems		5.8(2.41)		5.74(2.6)	0.903/0.785
Gender					5.17/0.023
Female	41(82%)		25(73.5%)		
Male	9(18%)		9(26.5%)		
Race					2.78/0.427
Black	9(18%)		8(23%)		
White	33(66%)		21(62%)		
Hispanic	4(8%)		2(6%)		
Other	4(8%)		3(9%)		

Analysis of the Instrument

The PSS was used to measure perceived stress at the time of the intervention and an average of 14-weeks after the intervention. A Cronbach's alpha was conducted on the intervention PSS and post-intervention PSS to measure internal consistency. The intervention PSS Cronbach's alpha was .842 and the post-intervention PSS Cronbach's alpha was .907. Both of these represent high internal consistency and demonstrate reliability (Melnyk & Fineout-Overholt, 2019).

Changes in Outcomes

Statistical Testing and Significance

Following the completion of data collection, the primary outcome was evaluated using the paired-samples *t* test. The primary outcome answered the PICOT question of: In primary care adult patients who have survived ACEs does a tailored, multicomponent intervention affect the level of perceived stress, from time of intervention, over a 12-week period (T)? The paired-samples *t* test compared the means of the intervention PSS and post-intervention PSS, in which the participants served as their own comparison. Secondary outcomes were measured to evaluate clinical significance and were analyzed with descriptive statistics.

Findings

Primary Outcome

The primary outcome of change in PSS scores from intervention to post-intervention was evaluated with the paired-samples *t* test. The mean intervention PSS was 21.09 (*SD* = 6.77), and the mean post-intervention PSS was 18.71 (*SD* = 8.22). A significant decrease from intervention PSS to post-intervention PSS was found (t (33) = 2.229, p = .033).

Secondary Outcomes

The secondary outcomes were measured using descriptive statistics and evaluated for clinical significance. Figure 4.2 identifies the frequency of the satisfaction ratings and Figure 4.3 displays the frequency of the helpfulness rating. The results show that 94% (*n* = 32) of the participants rated their satisfaction as agree or strongly agree and 94% (*n* = 32) rated the intervention helpfulness as agree or strongly agree. On both of the satisfaction and helpfulness follow-up questions, no participants rated strongly disagree or disagree and for each question only 2 participants (6%) rated their satisfaction and helpfulness as neither agree or disagree.

Reported progress on strengthening social support, mindfulness practices, and mental health are listed in Figure 4.4. Eighty-eight percent (*n* = 30) of the individuals reported progress on at least one of the three identified areas of interventions. Figure 4.4 depicts the number of participants who made progress versus the number of participants who did not make progress

on the three suggested interventions: (a) strengthening social support, (b) mindfulness, and (c) mental health. The percentage of individuals who reported making progress on strengthening social support was 44.1% (*n* = 15), mindfulness practices were 64.7% (*n* = 22), and mental health was 73.5% (*n* = 25).

Figure 4.2

Satisfaction with the Intervention

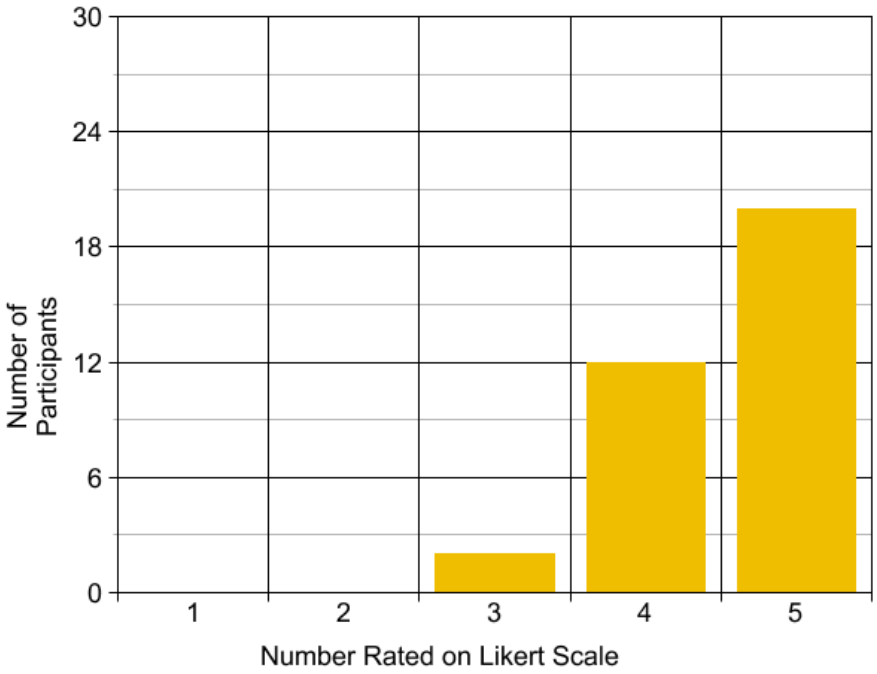


Figure 4.3

Helpfulness of the Intervention

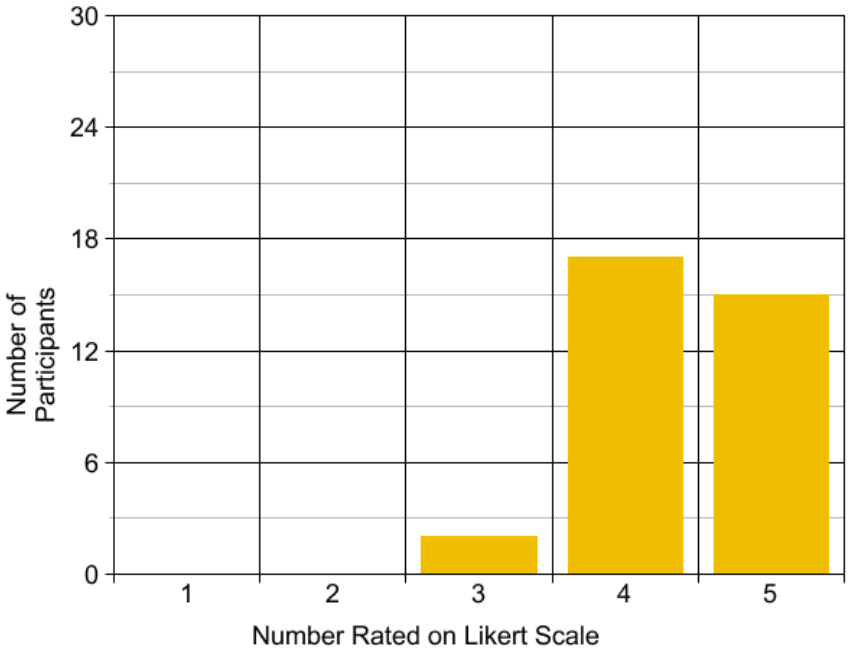
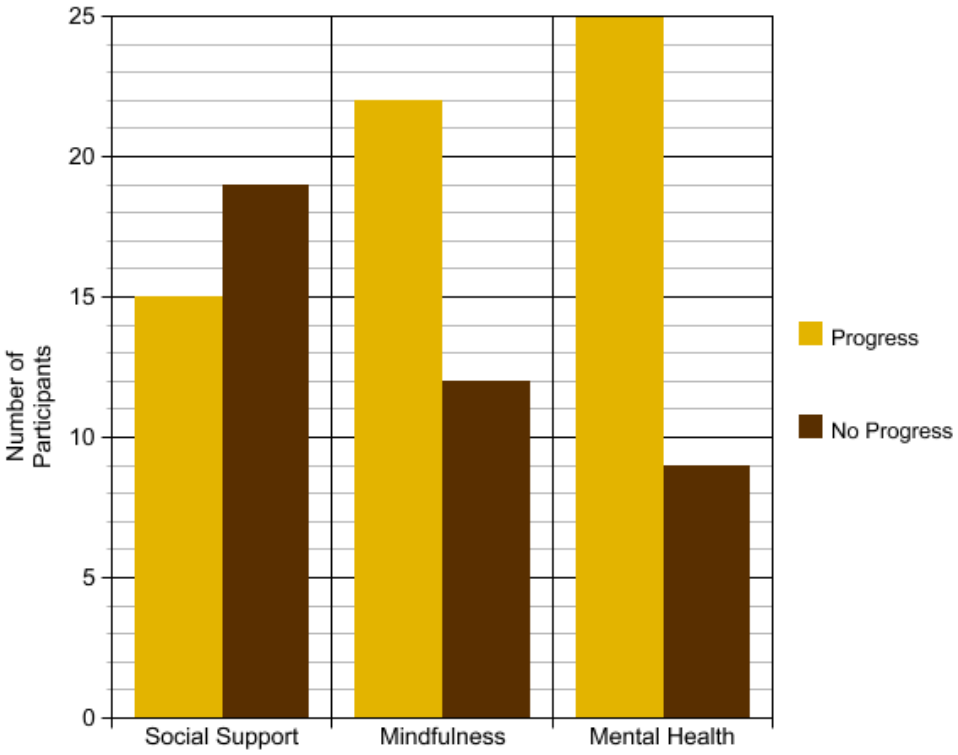


Figure 4.4

Progress on Interventions



CHAPTER 5

DISCUSSION

The purpose of the EBP project was to answer the question: Does implementing a tailored, multicomponent intervention in primary care decrease perceived stress levels over a 12-week period? The primary outcome of perceived stress was chosen due to the understanding of the long-term adverse consequences of ACEs related to the theory of toxic stress. Toxic stress occurs in childhood in which the child, due to adverse childhood experiences, develops a dysregulated stress response that causes alterations throughout developing body systems. These alterations are believed to be the foundational cause of the long-term adverse health outcomes associated with ACEs (Burke-Harris, 2018). The goal of the short-term primary outcome of reduced stress would result in the decrease of the sequala of the effects of ACEs over time. This chapter will provide a discussion of the findings, the strengths and limitations of the EBP project, and review implications for the future.

Explanation of Findings

Primary Outcome

The primary outcome of the project resulted in a significant decrease in perceived stress as indicated on the PSS (t (33) = 2.229, p = .033). The mean scores of the PSS from the pre-intervention to post-intervention resulted in a decrease of 2.38 points. The primary outcome finding demonstrates the effectiveness of the interventions to decrease perceived stress levels. Similarly, a decrease in perceived stress was observed in the study by Cameron et al. (2018), in which a significant decrease in perceived stress ($p < .05$) was found in adult survivors of ACEs who attended a 12-week ACE Overcomers program which promoted emotional regulation, self-awareness, resilience, and social functioning. Goldstein et al. (2019) also observed a statically significant drop in PSS scores after a MI intervention paired with a behavioral health referral of 6.11 points from baseline to post-intervention ($p < 0.001$). The decrease was sustained at 6.56

points from baseline to follow-up ($p < 0.001$). The primary outcome of a statistically significant reduction in PSS level cannot be viewed independently without the context of the secondary outcomes.

Secondary Outcomes

The EBP tailored, multicomponent intervention encompassed three areas: strengthening social support, implementation of mindfulness practices, and continuation or commencement of mental health interventions. Over 88% of the participants reported progress on one or more of the three focused areas. Fifteen participants (44.1%) reported making progress on strengthening social support; 22 participants (64.7%) reported progress on mindfulness practices; and 25 participants (73.5%) reported progress on mental health. The high self-reported progress rate in the three categories of the intervention correspond with the statically significant decline in the PSS.

Strengthening Social Support

As seen in the cohort study by Cheong et al. (2017), the stronger the perceived social support, the lower levels of depressive symptoms. In addition, evidence-based support for social support is identified in the study of the ACE Overcomers program, which was delivered in group-style classes (Cameron et al., 2018), the focus on group trauma therapy (McDonnell & Garbers, 2018), and group-based CBT interventions (Korotana et al., 2016). All four pieces of evidence demonstrate the effectiveness of social support for survivors of ACEs.

Mindfulness Practices.

In addition to strengthening social support, implementation of mindfulness practices was a part of the recommendation for resilience interventions to combat ACE sequala (Aces aware, 2020) and were part of the EBP project intervention. Cameron et al. (2018) included mindfulness practices as part of the ACE Overcomers program intervention. This program not only showed a statically significant decrease in PSS, but also an improvement in mental well-being, quality of life, resiliency measures, and physical illness symptoms. Therefore, the

implementation of mindfulness practices in the ACE Overcomes Program not only displayed a similar outcome in PSS but had additional health benefits. Korotana et al. (2016) reviewed five studies of mindfulness practices for adult survivors of ACEs. The intervention of mindfulness was found to decrease symptoms of anxiety, depression, and PTSD.

Mental Health

Multiple studies show that mental health interventions for individuals with ACEs, particularly CBT, improve symptoms of ACE associated adverse health outcomes. Examples include: CBT decreasing irrational beliefs and thoughts (Eseadi et al., 2016), CBT delivered through multiple formats, focused on trauma, increase overall mental health and decrease symptoms of PTSD (McDonnell & Garbers, 2018); and CBT reduces symptoms of depression, anxiety and PTSD (Korotana et al., 2016). Goldstein et al. (2019) found that 37.5% of their participants who had an ACE score of one or greater were receiving psychological counseling at baseline, and throughout the study, 12 participants (30%) were connected with behavioral health services. The participants in the Goldstein et al. (2019) study also exhibited a statistically significant decrease in PSS, which was sustained to follow-up and decreased health risk behaviors.

When looking at the EBP project outcomes holistically, the PSS, which has been correlated with cortisol levels which are implicated in the long-term adverse health outcomes associated with ACEs (Pruessner et al., 1999), had a statistically significant reduction, because of the follow-through with the tailored, multicomponent interventions. The PSS cannot be viewed alone, without the implications of the secondary outcomes: increasing social support, mindfulness practices and mental health. The tailored, multicomponent intervention not only targets perceived stress, but also targets symptoms that impact stress, such as depression, anxiety, and PTSD symptoms. Therefore, as the rate of participation in the intervention recommendations increased, the perceived stress (as measured in the PSS) decreased.

Participant Satisfaction and Perceived Helpfulness

Additional secondary outcomes match relevant literature in which participants are satisfied with ACE interventions and find them to be helpful. At the completion of the EBP project, 94% (*n* = 32) of the participants rated their satisfaction as agree or strongly agree and 94% (*n*=32) rated the intervention helpfulness as agree or strongly agree. In the qualitative study by Purkey (2018), participants, who were women with an ACE score of four or greater and had at least two chronic illnesses, believed it was important that their medical provider have an awareness of their abuse history. The article stated that, “Participants conveyed a clear and consistent message that asking about abuse is acceptable and appropriate” (Purkey et al., 2018, p. 207).

In a literature review of 13 articles which evaluated ACE screening, Rariden et al. (2021) found that the majority of patients believed that ACE screening is acceptable, and even enhanced the relationship with their medical clinician. Similarly, Goldstein et al. (2019) reported 94% of participants endorsed moderately or were extremely satisfied with a motivational interviewing intervention coupled with a mental health referral to address ACEs in adult primary care patients. Based on the ACE intervention satisfaction and perceived helpfulness along with the similar findings in the literature, medical providers can be assured that assessing for childhood traumatic events and providing interventions will only enhance the perception of care and not upset or trigger the patient. Therefore, it need not be a taboo topic.

Testing was completed to discover if there were differences between the intervention group and the stratified random sample group, to determine if the intervention group was representative of the population of individuals who seek care the site. The only significant difference that was found was a difference in number of health problems associated with ACEs (t (75) = 4.842, $p < .001$). Because the participants in the intervention group were recruited while they were seeking care, many for ongoing health issues, it is reasonable to assume that their number of health problems associated with ACEs would be higher, due to individuals that have

a higher number of health problems are at the site with a greater frequency to seek ongoing medical care.

Due to an attrition rate of 32% (*n* = 16), testing was completed to determine if differences existed between the post-intervention follow-up group (*n* = 34) and the 16 individuals who were lost to follow-up. A chi-square analysis was completed on gender and race and independent-samples *t* tests were conducted to analyze differences in age, ACE score, and number of ACE-associated health problems. A significant difference was found in only gender (X^2 (1) = 5.165, *p* = .023). Possible explanations are that the women in the study had busier schedules and more responsibilities and as such were lost to attrition at a higher rate. Additionally, it is noted that the females in the intervention group had a mean ACE score of 4.85 (*SD* = 2.34), whereas the males had a mean ACE score of 3.22 (*SD* = 2.22). An independent-samples *t* test was conducted to determine if this was a statistically significant difference. It was found that the difference was not significant (*t* (48) = 1.909, *p* = .062). However, it has been shown that with higher ACE scores there is disrupted access to medical care preventing follow-up; therefore, the difference in ACE scores related to gender could result in the clinical impact of reduced follow-up (Filitti et al., 1998; Miller-Cribbs et al., 2016).

EBP Model

The Iowa model depicts a step-by-step process to implement an EBP project. The essential components of the Iowa model provide *stopping points* in which the process is stopped and evaluated to see if it should continue, or circle back to a previous step (The Iowa Model Collaborative, 2017). In addition, the Iowa model is a good-fit for an EBP project that will have a pilot implementation before proceeding to full adoption of the practice (The Iowa Model Collaborative, 2017). The Iowa model was used to guide the EBP project and was found to be a fantastic fit. The project progressed easily from one step to the next and the model provided a framework to advance or stop to address barriers and obstacles.

The most important key to success for this EBP project was the Iowa model's step in which a practice change was designed and piloted. The design and pilot stage gave the project leader a period of implementation that could be tested and modified before full implementation and sustainability. During the pilot stage, key practice changes were identified: (a) a change in the ACE screening form, (b) additional education for medical providers on mindfulness practices, (c) location change of where the screening takes place, and (d) the preference of directly providing ACE interventions after the initial screening (rather than screen at one visit and provide interventions at a separate visit). In addition, the linear model was intuitive for both the project leader and the site medical providers, three of which were NPs. Finally, the Iowa model emphasized a multi-disciplinary team approach, which was a key feature of this project site which employed a team of many disciplines involved in the ACE screening and intervention: NPs, physicians, behavioral health social workers, nurses, a wellness coach, and medical assistants.

Strengths and Limitations of the DNP Project

Strengths

The strength of the project was that the design, implementation, and follow-up flowed smoothly throughout the project. The facility was open, supportive, and welcoming of the project, and it fulfilled an identified need for the organization. The organization had been screening for ACEs since January of 2019, completing 796 screenings; however, the agency did not have a defined education or intervention process. Of the original screenings, 534 (67.1%) reports identified that individuals had an ACE score of one or greater. Integrated behavioral health is one of the primary features of this site, which made it a perfect fit for support during the sustainability period and to provide mental health interventions for the participants. The entire agency was supportive, including the medical director, medical providers, integrated behavioral health social workers, site facilitator, patient population, and support staff. Because of the identified need and the supportive environment, sustainability was a priority.

As discussed previously, an additional strength of the project was the natural fit of the Iowa model for implementation of ACE interventions. By using the Iowa model, the project transitioned through each step and progressed to the final stage of dissemination. The interventions have been disseminated at a partner clinic, to the Valparaiso community, and will be presented at an international conference.

Limitations

The largest barrier that was encountered was the 32% (*n* = 16) attrition of the participants. Attrition was an anticipated barrier, due to general attrition that can occur in any sample population, compounded by both the expected attrition due to the population of participants who seek care at a FQHC and participants who had an ACE score of one or greater. An FQHC serves an underserved area or population, must take Medicaid and Medicare, and must offer a sliding fee scale (FQHC.org, n.d.). Due to the FQHC qualifications, the patient population is underserved and potential barriers that the population experiences are employment, finances, health benefits, and transportation. Secondly, the inclusion criteria for the project were an ACE score of one or greater. Increasing ACE scores are correlated with increasing difficulty in accessing health care, greater interruptions in care, and a decrease primary care office visits (Hargreaves et al., 2019; Miller-Cribbs et al., 2016). Due to both the common barriers experienced by patients who receive care at an FQHC and the health care barriers experienced by the inherent disadvantage of a positive ACE score, the expected attrition was high. Additionally, attrition in similar patient populations were reported as 12.5% (Goldstein et al., 2019), 13.3% (Purkey et al., 2018) and 36% (Cameron et al., 2018).

A barrier that was not anticipated was that COVID-19 continued to be a confounding factor throughout the entire project. COVID-19 affected the project by causing additional environmental and physical stress. Two participants reported that they were sickened by COVID-19 throughout the follow-up period, which they reported significantly increased their stress level. One participant was infected with COVID-19, then lost her job due to illness, and

subsequently entered a deep depression. The second participant reported on the follow-up phone call that she had been recently diagnosed with COVID-19, along with her husband and all of her children, and they were in the process of recovery. She reported that due to this illness, her stress level was abnormally high.

The COVID pandemic additionally affected the project because one of the multicomponent interventions was strengthening social support. Of the three secondary outcomes measured in this EBP project, social support saw the least improvement following the multicomponent intervention. During this time of the pandemic, when the medical recommendation was to maintain social distance, it was difficult for individuals to strengthen social support if they were living alone or in a dysfunctional home environment. Finally, COVID-19 highlighted some of the accessibility difficulties of mindfulness practices and mental health resources, such as in-person yoga classes and mental health resources that had been traditionally offered were not being offered.

The final limitation occurred during the second to last step of the Iowa model in which the practice change is identified and sustained (The Iowa Model Collaborative, 2017). In the midst of the implementation and sustainability period, a new NP was hired who had not previously screened for ACEs and did not have the background or buy-in that the other medical providers had. Because of this barrier, the sustainability was not as comprehensive as desired.

Implications for the Future

Practice

The findings of this EBP project have direct implications for nurse practitioners caring for adult primary care patients who have experienced childhood trauma. The findings indicate that a tailored, multicomponent intervention can significantly reduce perceived stress and that the majority of patients will follow-up with recommended interventions pertaining to mindfulness practices, and mental health. In addition, patients find the intervention to be satisfying and helpful. Education provided on adverse childhood experiences and how they affect health is

necessary and beneficial to the primary care population who are survivors of childhood trauma. Providing ACE interventions provides holistic health care that recognizes the synergy between past experiences, emotional, physical, environmental, mental, and spiritual health.

Throughout the sustainability period, the project leader was able to address a simple barrier of a NP who was not familiar with mindfulness practices. Because of this identified need, an education handout on mindfulness practices was developed to provide the medical providers with the tools needed for the intervention. Due to the multicomponent nature of the project, additional resources could be required for a successful implementation. One recommendation that was made by the project leader during the sustainability period was the benefit of having a community health worker; this individual could provide additional community resources to the complex patients who are survivors of ACEs.

In a repeated literature review after the implementation was completed and during the sustainability period of the project, no new evidence was found. However, there were multiple studies in progress that focused on the evaluation interventions for individuals who are survivors of ACEs, particularly in the pediatric population.

Research

Additional research is needed on the effects of ACE interventions and decreasing perceived stress on long-term health outcomes associated with ACEs. The existing evidence provided on ACE interventions focuses on short-term results of less than one year. Longitudinal studies which demonstrate results that are sustained and decrease ACE associated health outcomes (such as cancer, obesity, stroke, and asthma) are needed. Moreover, research must be conducted on additional interventions that reduce the long-term impact of ACEs on health. Possible interventions include treatments such as eye movement desensitization and reprocessing therapy (EMDR) or dialectical behavior therapy which are both used for PTSD and recurrent depression (Ehring et al., 2014; Ostacoli et al., 2018), or the impact of additional resilience interventions such as diet and exercise (Aces aware, 2020). Furthermore, ACE

prevention strategies that strengthen families, prevent childhood trauma, and provide children with interventions that buffer trauma and stress, need to be identified and researched.

Education

The educational impact of interventions for ACEs are broad. First, the health care community is in need of basic education on the effects of childhood trauma on long-term health outcomes. By understanding the precipitating causes of ACE associated health outcomes, paired with ACE screenings, health care providers can identify appropriate and effective interventions. For example, addressing the childhood trauma of an individual with an elevated ACE score has the potential to be a more effective and appropriate intervention for an obese adult, than strictly diet and exercise (Felitti, 2017). In addition, once there is an understanding on how ACEs affect health, the health care provider needs knowledge of the EBP interventions which aim to decrease long-term health outcomes of ACEs. While it is essential that all health care providers are knowledgeable about the effects of ACEs on health and the EBP interventions; the tailored, multicomponent interventions for ACEs highlight the unique skills of a nurse practitioner, who specializes in the holistic health care of a person: physical, mental, emotional, and spiritual.

Conclusion

The purpose of the EBP project was to provide interventions in the primary care setting for adults who are survivors of childhood trauma. The goal of the intervention was to decrease perceived stress, thereby targeting a decrease in the long-term health consequences associated with ACEs. A paired-samples *t* test was used to compare the pre-intervention PSS to the post-intervention PSS. The primary outcome of reduction in PSS was accomplished with a statically significant decrease of the mean of the PSS from time of intervention to post-intervention (t (33) = 2.229, p = .033). By using approaches to strengthen social support, mindfulness practices and mental health services, participants in this EBP project were able to achieve reduced perceived stress. In addition, the participants were overwhelmingly satisfied

(94%) and believed the intervention was helpful (94%). The EBP project was implemented and sustained in an FQHC, leading to improvement in perceived stress. Finally, the project provides support for the broader implementation of interventions that are aimed at adult survivors of childhood trauma in a primary care setting.

REFERENCES

Aces aware. (2020, April). *ACE screening clinical workflows, ACEs and toxic stress risk assessment algorithm, and ACE-associated health conditions: For pediatrics and adults.* Aces aware. https://www.acesaware.org/wp-content/uploads/2019/12/ACE-Clinical-Workflows-Algorithms-and-ACE-Associated-Health-Conditions.pdf

American Academy of Family Physicians. (2020). *Adverse childhood experiences*. https://www.aafp.org/about/policies/all/adversechildhood-experiences.html

American Academy of Pediatrics. (2021). *The science*. https://www.aap.org/en-us/advocacy-and-policy/aap-health-initiatives/EBCD/Pages/The-Science.aspx

American Heart Association. (n.d.). Screening for adverse childhood experiences (ACEs) and referral pathways. https://www.heart.org/-/media/files/about-us/policy-research/policy-positions/social-determinants-of-health/aces--screening-and-referral-pathways.pdf?la=en&hash=6CDCD7CCD68604390A79DF081E100CF31DAADD20

Anda, R. F., Felitti, V. J., Bremner, J. D., Walker, J. D., Whitfield, C., Perry, B. D., Dube, S. R., & Giles, W. H. (2006). The enduring effects of abuse and related adverse experiences in childhood: A convergence of evidence from neurobiology and epidemiology. *European Archives of Psychiatry and Clinical Neuroscience, 256*(3), 174-186. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3232061/

Burke Harris, N. (2018). *The deepest well: Healing the long-term effects of childhood adversity*. Mariner Books.

California Office of Health Care Services. (2020). *Trauma screenings and trauma-informed care provider trainings*. https://www.dhcs.ca.gov/provgovpart/Pages/TraumaCare.aspx

Cameron, L. D., Carroll, P., & Hamilton, W. K. (2018). Evaluation of an intervention promoting emotion regulation skills for adults with persisting distress due to adverse childhood experiences. *Child Abuse & Neglect, 79*, 423-244.

Center for Youth Wellness. (n.d.). *White paper: An unhealthy dose of stress. The impact of adverse childhood experiences and toxic stress on childhood health and development*. https://drive.google.com/file/d/1RD50llP2dimEdV3zn0eGrgtCi2TWfakH/view

Centers for Disease Control and Prevention. (n.d.). *Behavioral risk factor surveillance system ACE data*. https://www.cdc.gov/violenceprevention/childabuseandneglect/acestudy/ace-brfss.html

Chapman, D. P., Wheaton, A. G., Anda, R. F., Croft, J. B., Edwards, V. J., Liu, Y., Sturgis, S. L., & Perry G. S. (2011). Adverse childhood experiences and sleep disturbances in adults. *Sleep Medicine, 12*(8). 773-799. https://doi.org/10.1016/j.sleep.2011.03.013

Cheong, E. V., Sinnott, C., Dahly, D., & Kearney, P. M. (2017). Adverse childhood experiences (ACEs) and later-life depression: Perceived social support as a potential protective factor. *British Medical Journal (BMJ) Open, 7*(9), e013228. http://doi.org/10.1136/bmjopen-2016-013228

Ehring, T., Welboren, R., Morina, N., Wicherts, J. M., Freitag, J., & Emmelkamp, P. M. (2014). Meta-analysis of psychological treatments for posttraumatic stress disorder in adult survivors of childhood abuse. *Clinical Psychology Review, 34*(8), 645-657. http://doi.org/10.1016/j.cpr.2014.10.004

Eseadi, C., Anyanwu, J. I., Ogbuabor, S. E., & Ikechukwu-Ilomuanya, A. B. (2016). Effects of cognitive restructuring intervention program of rational-emotive behavior therapy on adverse childhood stress in Nigeria. *Journal of Rational-Emotive Cognitive-Behavioral Therapy, 34*, 51-72. http://doi.org/10.1007/s10942-015-0229-4

Felitti, V. J., Anda, R. F., Nordenberg, D., Williamson, D. F., Spitz, A. M., Edwards, V., Koss, M. P., & Marks, J. S. (1998). Relationship of childhood abuse and household dysfunction to many of the leading causes of death in adults. The Adverse Childhood Experiences (ACE) Study. *American Journal of Preventive Medicine, 14*(4), 245-258.

FQHC.org. (n.d.). *What is an FQHC?* https://www.fqhc.org/what-is-an-fqhc

Goldstein, E., Topitzes, J., Birstler, J., & Brown, R. L. (2019). Addressing adverse childhood experiences and health risk behaviors among low-income, Black primary care patients: Testing feasibility of a motivation-based intervention. *General Hospital Psychiatry, 56*, 1-8.

Hargreaves, M. K., Mouton, C. P., Liu, J., Zhou, Y. E., & Blot, W. J. (2019). Adverse childhood experiences and health care utilization in a low-income population. *Journal of Health Care for the Poor and Underserved, 30*(2), 749-767. http://doi.org/10.1353/hpu.2019.0054

Herzog, J. I., & Schmahl, C. (2018). Adverse childhood experiences and the consequences on neurobiological, psychosocial, and somatic conditions across the lifespan. *Frontiers in Psychiatry, 9*, 1-8. https://www.frontiersin.org/articles/10.3389/fpsyt.2018.00420/full

Iowa Model Collaborative. (2017). Iowa model of evidence-based practice: Revisions and validation. *Worldviews on Evidence Based Nursing, 14*(3), 175-182. doi: 10.1111/wvn.12223

Kalmakis, K. A., & Chandler, G. E. (2013). Adverse childhood experiences: Towards a clear conceptual meaning. *Journal of Advanced Nursing (John Wiley & Sons, Inc.), 70*(7), 1489-1501. https://doi.org.ezproxy.valpo.edu/10.111/jan.12329

Korotana, L. M., Dobson, K. S., Pusch, D., & Josephson, T. (2016). A review of primary care interventions to improve health outcomes in adult survivors of adverse childhood experiences. *Clinical Psychology Review, 46*, 59-90.

Lee, E. (2012). Review of the psychometric evidence of the perceived stress scale. *Asian Nursing Research, 6*(4), 121-127.

McDonnell, C. J., & Garbers, S. V. (2017). Adverse childhood experiences and obesity: Systematic review of behavioral interventions for women. *Psychological Trauma: Theory, Research, Practice, and Policy, 10*(4), 387-395.

Melnyk, B. M., & Fineout-Overhold, E. (2019). *Evidence based practice in nursing and healthcare* (4th ed.). Wolters Kluwer.

Merrick, M. T., Ford, D. C., Ports, K. A., Guinn, A. S., Chen, J., Klevens, J., Metzler, M., Jones, L. M., Simon, T. R., Daniel, V. M., Ottley, P., & Mercy J. A. (2019). Vial signs: Estimated proportion of adult health problems attributable to adverse childhood experiences and implications for prevention – 25 states, 2015–2017. *Morbidity and Mortality Weekly Report, 68*(44), 999-1005. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6837472/pdf/mm6844e1.pdf

Miller-Cribbs, J. E., Wen, F., Coon, K. A., Jelley, M. J., Foulks-Rodriguez, K., & Sterns, J. (2016). Adverse childhood experiences and inequities in adult health care access. *International Public Health Journal, 8*(2), 257-270.

Ostacoli, L., Carletto, S., Cavallo, M., Baldomir-Gago, P., Di Lorenzo, G., Fernandez, I., Hase, M., Justo-Alonso, A., Lhnung, M., Migliaretti, G., Oliva, F., Pagani, M., Recarey-Eiris, S., Torta, R., Tumani, V., Gonzalez-Vazquez, A., I., & Hofmann, A. (2018). Comparison of eye movement desensitization reprocessing and cognitive behavioral therapy as adjunctive treatments for recurrent depression: The European depression EMDR network (EDEN) randomized controlled trial. *Frontiers in Psychology, 9*, 74. https://doi-org.ezproxy.valpo.edu/10.3389/fpsyg.2018.00074

Pruessner, J. C., Hellhammer, D. H., & Kirschbaum, C. (1999). Burnout, perceived stress, and cortisol responses to awakening. *Psychosomatic Medicine, 61*(2), 197-204. https://doi-org.ezproxy.valpo.edu/10.1097/00006842-199903000-00012

Public Sector Consultants. (2019). *Adverse childhood experiences in Michigan: Findings from the 2016 behavior risk factor survey*. https://mihealthfund.org/wp-content/uploads/2020/01/HealthFund_ACEsFinalReport.pdf

Purkey, E., Patel, R., Beckett, T., & Mathieu, F. (2018). Primary care experiences of women with a history of childhood trauma and chronic disease. *Canadian Family Physician, 64*(3), 204-211.

Rariden, C., SmithBattle, L., Yoo, J. H., Cibulka, N., & Loman, D. (2021). Screening for adverse childhood experiences: Literature review and practice implications. *Journal for Nurse Practitioners, 17*(1), 98-104. https://doi-org.ezproxy.valpo.edu/10.1016/j.nurpra.2020.08.002

Substance Abuse and Mental Health Services Administration. (2014). *SAMHSA's concept of trauma and guidance for a trauma-informed approach.* https://ncsacw.samhsa.gov/userfiles/files/SAMHSA_Trauma.pdf

Valeras, A. B., Cobb, E., Prodger, M., Hochberg, E., Allosso, L., & VandenHazel, H. (2019). Addressing adults with adverse childhood experiences requires a team approach. *The International Journal of Psychiatry in Medicine, 54*(4-5), 352-360. https://doi.org/10.1177/0091217419860359

BIOGRAPHICAL MATERIAL

Ms. Peterson graduated from Dordt University in 1997 with a Bachelor of Arts in Psychology and from Bellin College of Nursing in 1999 with a Bachelor of Science in Nursing. She has worked primarily at Mercy Health St. Mary's in an adult intensive care unit, where she has fulfilled many roles such as, staff nurse, preceptor, charge nurse, and rapid responder. In addition to acute care nursing, Ms. Peterson enjoys working as a camp nurse during the summer months. She is currently pursuing her Doctor of Nursing Practice from Valparaiso University, with expected graduation in May of 2021. Rebecca is a member of Sigma Theta Tau International, American Association of Nurse Practitioners, and Michigan Council of Nurse Practitioners. She has presented a poster at the *Institute for Health Care Improvement* on the topic of rapid response teams and a webinar for Michigan Council of Nurse Practitioners on trauma-informed care. Additionally, Ms. Peterson's abstract, "A Tailored, Multicomponent Intervention for Survivors of Adverse Childhood Experiences (ACEs)" has been accepted at the Sigma 46th Biennial Convention as a poster presentation. Rebecca became interested in trauma and how it affects health after becoming a foster parent and engaging in refugee services. Due to the recent pandemic, Ms. Peterson serves on a COVID-19 medical advisory board for a non-profit organization. She has previously served as a member of the health and wellness committee at her church and has traveled to India to serve in medical missions.

ACRONYM LIST

AAFP: American Academy of Family Physicians

ACE: Adverse Childhood Experience

ACEs: Adverse Childhood Experiences

CBT: Cognitive Behavioral Therapy

CDC: Centers for Disease Control and Prevention

DHCS: California Department of Health Care Services

DNP: Doctor of Nursing Practice

EBP: Evidence-Based Practice

EMDR: Eye movement desensitization and reprocessing therapy

EMR: Electronic Medical Record

FQHC: Federally Qualified Health Center

Iowa Model: The Iowa Model Revised: Evidence-Based Practice to Promote Excellence in Health Care

IRB: Institutional Review Board

NP: Nurse Practitioner

MI: Motivational Interviewing

PSS: Perceived Stress Scale

PTSD: Post Traumatic Stress Disorder

RCT: Randomized Control Trials

ANA: American Nurses Association

APA: American Psychological Association

CDC: Centers for Disease Control

Appendix A

ACE Screening

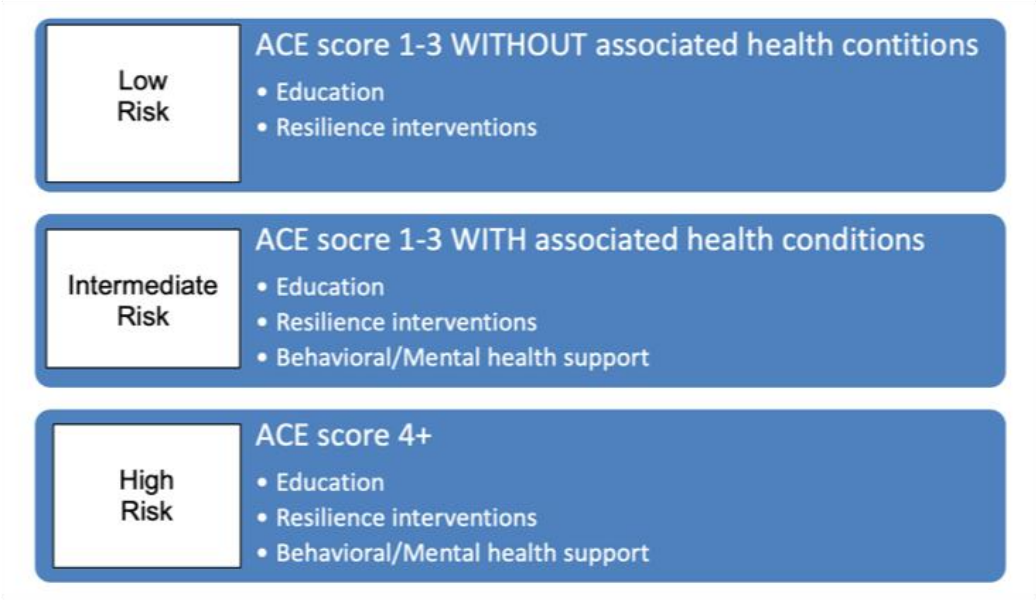
Prior to your 18th birthday:

1. 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 hurt? If yes, enter 1___
2. 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? If yes, enter 1___
3. 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
   Actually have oral, anal, or vaginal intercourse with you? If yes, enter 1___
4. 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
   If yes, enter 1____
5. Did you often or very often feel that
   You didn't have enough to eat, hard 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?
   If yes, enter 1___
6. Were your parents ever separated or divorced? If yes, enter 1___
7. 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 a knife?
   If yes, enter 1___
8. Did you live with anyone who was a problem drinker or alcoholic, or used street drugs?
   If yes, enter 1___
9. Was a household member depressed or mentally ill, or did a household member attempt suicide?
   If yes, enter 1___
10. Did a household member go to prison? If yes, enter 1___

(Catherine's Health Center, 2020)

Appendix B

Risk Algorithm



Appendix C

ACE Associated Health Conditions

Cardiovascular disease (coronary artery disease, myocardial infarction, ischemic heart disease)
Tachycardia
Stroke
Chronic obstructive pulmonary disease (emphysema, bronchitis)
Asthma
Diabetes
Obesity
Hepatitis or jaundice
Cancer (any type)
Arthritis
Memory impairment (all causes, including dementias)
Kidney disease
Headaches
Chronic Pain, any
Fibromyalgia
Unexplained somatic symptoms, including somatic pain, headaches
Skeletal fracture
Physical disability requiring assistive equipment
Depression
Suicide (attempts or ideation)
Sleep disturbance
Anxiety
Panic
Post-traumatic stress disorder
Illicit drug use (any)
Alcohol use
Cigarettes or e-cigarettes use
Cannabis use
Teen pregnancy
Sexually transmitted infections, lifetime
Violence victimization (intimate partner violence, sexual assault)

(Aces aware, 2020)

Appendix D

ACE Education and Mutual Goal Setting

Adverse Childhood Experiences (ACEs)

Adverse childhood experiences are traumatic events that happen before a person is 18 years old. The screening tool for ACEs asks about: physical abuse, emotional abuse, sexual abuse, physcial neglect, emotional neglect, household substance abuse, domestic violence, household mental illness, household incarceration, and parental divorce or separation.

Important things to know about ACEs:

- They are very common! 61% of adults experience at least one type of ACE and 1 in 6 adults experience 4 or more.
- They have lasting effects on health, due to toxic stress, and can lead to physical and/or mental health problems. They affect the way our body systems develop and are associated with conditions such as heart disease, cancer, alcohol abuse, depression, and many others.

Goals

Building Social Connections. I've set a goal of…

- ❑ Spending more high-quality time together with loved ones, such as:
  - ❑ Having regular meals together
  - ❑ Having regular "no electronics" time for use to talk and connect with each other
- ❑ Making time to see friends and create a health support system for myself
- ❑ Connecting regularly with members of my community to build social connections
- ❑ Create your own goal: _____

Mindfulness. I've set a goal of…

- ❑ Taking moments throughout the day to notice how I'm feeling, both physically and emotionally
- ❑ Practicing mindful breathing or other calming techniques during stressful situations
- ❑ Finding at least one thing to be thankful for each day
- ❑ Creating a regular routine of prayer, meditation, and/or yoga
- ❑ Downloading a mindfulness app and doing mindfulness practice 20 minutes per day
- ❑ Create your own goal:_____

Mental Health. I've set a goal of…

- ❑ Connecting with the Behavioral Health Staff at Catherine's Health Center
- ❑ Scheduling an appointment with a local mental health professional or support group
- ❑ Create your own goal: _____

Portions of this handout are adapted from resources at www.ACEsAware.org

Appendix E

PSS

PSS

INSTRUCTIONS:

The questions in this scale ask you about your feelings and thoughts during THE LAST MONTH. In each case, please indicate your response by placing an "X" over the circle representing HOW OFTEN you felt or thought a certain way.

	Never	Almost Never	Sometimes	Fairly Often	Very Often
	0	1	2	3	4
1. In the last month, how often have you been upset because of something that happened unexpectedly?	○	○	○	○	○
2. In the last month, how often have you felt that you were unable to control the important things in your life?	○	○	○	○	○
3. In the last month, how often have you felt nervous and "stressed"?	○	○	○	○	○
4. In the last month, how often have you felt confident about your ability to handle your personal problems?	○	○	○	○	○
5. In the last month, how often have you felt that things were going your way?	○	○	○	○	○
6. In the last month, how often have you found that you could not cope with all the things that you had to do?	○	○	○	○	○
7. In the last month, how often have you been able to control irritations in your life?	○	○	○	○	○
8. In the last month, how often have you felt that you were on top of things?	○	○	○	○	○
9. In the last month, how often have you been angered because of things that were outside your control?	○	○	○	○	○
10. In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?	○	○	○	○	○

Appendix F

Permission for Use of PSS

PERMISSION FOR USE OF THE PERCEIVED STRESS SCALE

I apologize for this automated reply. Thank you for your interest in our work.

PERMISSION FOR USE BY STUDENTS AND NONPROFIT ORGANIZATIONS: If you are a student, a teacher, or are otherwise using the Perceived Stress Scale (PSS) without making a profit on its use, you have my permission to use the PSS in your work. Note that this is the only approval letter you will get. I will not be sending a follow-up letter or email specifically authorizing you (by name) to use the scale.

PERMISSION "FOR PROFIT" USE: If you wish to use the PSS for a purpose other than teaching or not for profit research, or you plan on charging clients for use of the scale, you will need to see the next page: "Instructions for permission for profit related use of the Perceived Stress Scale".

QUESTIONS ABOUT THE SCALE: Information concerning the PSS can be found at https://www.cmu.edu/dietrich/psychology/stress-immunity-disease-lab/index.html (**click on scales on the front page)**. Questions about reliability, validity, norms, and other aspects of psychometric properties can be answered there. The website also contains information about administration and scoring procedures for the scales. Please do not ask for a manual. There is no manual. Read the articles on the website for the information that you need.

TRANSLATIONS: The website (see URL above) also includes copies of translations of the PSS into multiple languages. These translations were done *by other investigators*, not by our lab, and we take no responsibility for their psychometric properties. If you translate the scale and would like to have the translation posted on our website, please send us a copy of the scale with information regarding its validation, and references to relevant publications. If resources are available to us, we will do our best to post it so others may access it.

Good luck with your work.

Sheldon Cohen
Robert E. Doherty University Professor of Psychology
Department of Psychology
Baker Hall 335-D
Carnegie Mellon University
Pittsburgh, PA 15213

Appendix G

Satisfaction and Goal Progress

On a scale of 1-5, where (1) Strongly disagree; (2) Disagree; (3) Neither agree nor disagree; (4) Agree; (5) Strongly agree.

1. I was satisfied with the ACE intervention. 1, 2, 3, 4, 5
2. I found the ACE intervention to be helpful. 1, 2, 3, 4, 5

I made progress on strengthening social support? Yes/No

I made progress on mindfulness practices? Yes/No

I made progress on behavioral/mental health support? Yes/No