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Primary Care Screening for Adverse Childhood Experiences (ACEs) in the Adult
Population

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Abstract

Problem: Exposure to Adverse Childhood Experiences (ACEs) is associated with chronic diseases in adulthood. Several studies found over 60% of adults have had exposure to one or more ACEs. While guidelines for ACEs screening exist, most primary care practices do not perform screening at this time. This results in a lack of referrals for adults with history of ACEs for proper behavioral health (BH) intervention.

Methods: This quality improvement (QI) initiative utilized a descriptive observational design. The Centers for Disease Control and Prevention (CDC) ACEs screening tool was administered to a convenience sample of adult patients aged 18 years and older, seeking routine care. Quantitative data was collected during primary care visits. Data collected during the time period of this quality improvement project included the number of screenings administered, ACEs score and the number of BH referrals generated.

Results: Following implementation of this QI effort, a total of 111 ACE screenings were administered. Of those screened, 47% ($n= 52$) of individuals had an ACE score of two or greater. Eighteen new BH referrals were initiated, resulting in a percentage increase of 260%.

Implications for Practice: Widespread utilization of the ACEs screening tool in primary care settings could further identify and refer at risk populations for BH intervention.

Primary Care Screening for Adverse Childhood Experiences (ACEs) in the Adult Population

Five of the ten leading causes of mortality including type 2 diabetes, cardiovascular disease, cancer, stroke, and suicide, are linked to childhood adversity (Centers for Disease Control and Prevention [CDC], 2019). Negative emotional, physical or social exposures such as abuse, domestic violence, parental disunion, substance use, mental illness, incarceration, and neglect are identified as adverse childhood experiences (ACEs) (Felitti et al., 1998). In 1998, researchers sought to reveal the association between chronic ACE exposure and subsequent chronic diseases in adults (Felitti et al., 1998). This landmark study generated further scientific investigations which reinforce the detrimental impact long-standing ACEs exposure has on neurological, hormonal and immunological development, cardiovascular disease, respiratory diseases and cancer (Basu, McLaughlin, Misra, & Koenen, 2017; Pierce et al., 2020). During childhood and adolescence, ineffective coping strategies manifest in unfavorable psychological and behavioral consequences such as depression, anxiety, suicidality, hazardous sexual behavior, disordered eating, excessive smoking and alcohol intake (Hughes et al., 2017; Shonkoff et al., 2012; Suglia et al., 2018). The maladaptive responses and physiologic stressors increase risk for poor health conditions in early adulthood, disability and premature death (Pierce et al., 2020; Sonu et al., 2019). These negative ramifications affect far too many.

National prevalence rates report 656,000 documented victims of child abuse or neglect with over 84% exposed to one form of maltreatment and almost 16% experienced two or more (U.S. Department of Health & Human Services [USDHHS], 2021). Over

60% of adults have experienced at least one ACE in their lifetime and almost 16% have experienced four or more (Merrick et al, 2019). Long-term sequelae beginning with childhood maltreatment and documented prevalence associate with increased financial burden.

Adults with a history of ACE exposure more commonly struggle with psychopathology, arduous doctor-patient relationships and utilize emergency department services more frequently (Porcerelli, Jones, Klamo & Heeney, 2017). In 2019, the total annual estimated costs credited to ACE related conditions was \$748 billion in North America, with over 82% of costs generated by adults with a history of two or more ACEs (Bellis et al, 2019). Understanding the physiological, psychological and financial threat ACEs pose to public health, providers are encouraged to screen every patient (Anda, Butchart, Felitti, & Brown, 2010; Garner et al., 2012). While guidelines for ACEs screening exist, routine screening is uncommon (Kalmakis, Chandler, Roberts, & Leung, 2017; Kerker et al., 2016; Maunder, Hunter, Tannenbaum, Le, & Lay, 2020). Recent studies support feasibility of screening processes in primary care settings (Glowa, Olson, & Johnson, 2016; Kalmakis, Shafer, Chandler, Aponte & Roberts, 2018).

The purpose of this QI project is to screen, identify and refer for BH care. Patients will be screened in a primary care setting. Patients whose ACE scores are two or greater will be offered referral to BH. The Plan-Do-Study-Act (PDSA) is the evidence-based frameworks chosen to guide this project. The aim of this project is to have at least 50% of patients seen by the advance practice registered nurse practitioner (APRN) in a primary care internal medicine practice receive an ACE screening for the identification of and referral to BH services for scores of two or greater. Primary outcome measures (OM) of

interest include ACE screenings, ACE scores and referrals to BH. A study question was developed to guide review of literature: Does identification of ACE scores in patients aged 18-years and older seen in a primary care internal medicine clinic increase referrals to BH in order to treat behaviors that contribute to chronic illness?

Literature Review

A search of literature was conducted to explore the progressive effects of traumatic experiences during childhood and chronic disease in adults. The Cumulative Index of Nursing and Allied Health Literature (CINAHL), PubMed and Medline (EBSCO), Summon and Google Scholar databases were investigated. Key search terms “adverse childhood experiences” AND “chronic disease” AND “coping” were used, which yielded 3,502 results. Refined search settings included peer reviewed journals, randomized controlled trials (RCT), research articles, systematic reviews, meta-analyses, written in English, from 1/1/2012 to 11/07/2020, were applied. Studies prior to 2012 were excluded, with the exception of two seminal references. Males and females 18-years of age or older and participants reporting a history of ACEs were selected as inclusion criteria. Exclusion criteria were males and females less than 18-years of age and participants without a history of ACEs. Articles were assessed and deduplication was performed manually by visual inspection, resulting in 457 full text articles. Then abstracts of articles were reviewed for correct population, age group, gender and setting of healthcare delivery resulting in 50 articles for further review. After full text reading to check for suitability, 13 were selected for final inclusion in this literature review.

Original findings revealing the negative association between ACE exposure and poor health outcomes resulted in an enormous amount of subsequent scientific inquiry.

Due to the nature of this topic and upholding ethical standards, most studies are retrospective, cross-sectional, and collection of data is in the form of surveys and self-reports. Consistent themes identify the need for prevention, implementation of screening, and strategies to mitigate long-term pathogenic consequences.

The original ACE study collected confidential surveys from over 17,000 participants in two waves of research. The Felitti et al (1998) project was the first to recognize the direct relationship between childhood adversity and adult illness. Results revealed over half of the respondents experienced at least one ACE and one-fourth of respondents had been subjected to over two categories of childhood exposure. Categories were interrelated and a strong graded relationship was noted between the number of exposure categories and risk factors for diseases in adulthood leading to death. The large sample size contributed to study strength (Felitti et al, 1998). Limitations of this retrospective survey include accuracy, recall bias and lack of generalizability due to the sample being mainly a white, college educated, healthcare seeking, insured population in Southern California. A framework was not identified.

Other investigators explored relationships between ACE scores and health conditions with larger, more representative adult samples in the United States, utilizing the CDC's Behavioral Risk Factor Surveillance System (BRFSS) ACE adopted questionnaire. Cross-sectional retrospective, self-reported survey data collected via BRFSS consistently produce findings similar with those from the Felitti et al., (1998) seminal study (Campbell et al., 2016; Sonu et al., 2019). Recent BRFSS survey results of 144,017 adults revealed over 60% experienced at least one ACE and almost 16% experienced four or more (Merrick et al., 2019). These investigations recruited large

sample sizes which strengthened results. Limitations of retrospective self-reported studies include potential for under or over reporting by participants leading to recall bias and answer accuracy. BRFSS data is cross-sectional, showing association but unable to establish causation. Although these studies were more generalizable than the Felitti et al. study (1998), they lack generalizability for lower to middle-class communities, individuals without landline or cellphone access, incarcerated adults, persons unwilling to participate in telephone surveys, and were limited to populations in the United States. Future implications include incorporating data into prevention strategies, furthering work toward universal screening, and the need for health systems to invest in efforts toward mitigating the long-term detrimental effects of ACEs (Merrick, 2019; Sonu et al., 2019). Results were not presented in a guided framework. Studies exploring screening practices have emerged.

Investigations directed at provider knowledge and screening practices have been collected via surveys. Kerker et al (2016), examined pediatrician familiarity with the landmark ACE study and screening practices (Kerker et al, 2016). A sample of 302 practicing pediatricians were included following completion of the quarterly Periodic Survey from the American Academy of Pediatrics (AAP). Results suggest most pediatricians were unaware of the landmark ACEs study, 49% had not heard of a screening instrument and only 4% asked about all ACEs. Study limitations include poor response rate and cross-sectional selection. Future implications include pediatrician education and repeating the survey (Kerker et al, 2016). Other researchers looked at types of barriers to screening in primary care.

Maunder and associates (2020) investigated if lack of physician screening for ACEs related to knowledge base or specialty, and assessed for barriers (Maunder et al., 2020). Utilizing an online anonymous survey, 184 physicians from Ontario, Canada participated. Statistical analysis included analysis of variance (ANOVA) and Chi² tests which indicated knowledge was unrelated to specialty or screening practice. Results revealed less than 28% of primary care providers from this sample routinely screened for history of exposure to ACEs. Perceived barriers to ACE screening were lack of available psychiatric resources, time constraints, concern for causing patient distress and lack of confidence wording questioning. ACEs screening was most commonly performed by psychiatrists and less frequently by family physicians. Study limitations include survey methods, possible bias induced by participant self-selection, relatively small sample size, and lack of generalizability for all practicing physicians (Maunder et al., 2020). Future implications include provider education and evidence of time sensitivity (Maunder et al., 2020). In addition to physicians, barriers can also be faced by nurse practitioners (NP).

Kalmakis and colleagues' (2017) used a sequential transformative mixed-method approach to examine NP attitude, perceived barriers and ACEs screening practices (Kalmakis et al., 2017). Utilizing a cross-sectional, correlational design, a convenience sample of 188 Massachusetts State NP Organization members revealed only one third routinely screen adult patients for childhood trauma (Kalmakis et al., 2017). Perceived barriers were identified as time constraints, concern for retraumatizing patients, lack of confidence in screening, and lack of skills and resources to manage patients with positive scores (Kalmakis et al., 2017). No frameworks were mentioned. Understanding that

failure to screen equates to missed chances for improving population health, investigations began to study feasibility of ACEs screening in primary care.

In 2016, Glowa and colleagues investigated the feasibility of using the 10-item ACE questionnaire as a screening tool for adults during annual physicals or routine follow-up visits (Glowa et al., 2016). The New England Dartmouth CO-OP Primary Care research Network enlisted seven providers from three rural primary care practices to conduct this study. Over a two week period, clinicians completed screening to a convenience sample of patients aged 18 years or older. Results from 111 patients were analyzed and 62% of respondents had an ACE score of one or greater and 22% had greater than four, similar to the landmark study (Felitti et al., 1998). All patients approached completed the screening process without indication of evoked distress or office disruption. Nurses rooming patients administered screening, then scores were reviewed by the provider during the visit. This process extended the office visit by 5 minutes or less in 90% of the encounters with 3% requiring longer, due to higher risk scores. Feasibility and time sensitivity were supported. Limitations include lack of racial diversity or indication that screening affected patient management (Glowa et al., 2016).

In 2018, Kalmakis and another group of associates investigated the feasibility of screening adults for history of ACEs in a primary care setting (Kalmakis et al., 2018). Data was collected via one-on-one interview from seventy one adult patients aged 21-years or older utilizing a adapted 19-item ACEs questionnaire. Results revealed one-on-one interview techniques as a feasible option (Kalmakis et al, 2018). Limitations include lack of ethnic diversity, and generalizability. Future implications address the NP role in

facilitating patient-centered care collaborations, and utilizing effective strategies to reduce the long-term impact of ACEs to improve societal health.

The evidence-based framework selected to guide this project is Plan-Do-Study-Act (PDSA). PDSA is a four-stage scientific method. A specific modification is planned, implemented, and findings are studied to determine the impact on a desired outcome. Action or revisions take place based on results and the process is repeated for ongoing QI (Fineout-Overholt & Stevens, 2019).

Traumatic events during childhood associate with ill health. Many studies explore the effects of individual and multiple ACEs, dose-dependent responses, biological processes and associated costs. Gaps in the literature include interventions and screening practices for adult patients. Common recommendations from this review of literature reinforce the need to strengthen prevention strategies, increase healthcare provider training and incorporate routine screening into the primary care setting. PDSA is the evidence-based framework selected to guide this project.

Methods

Design

This QI project utilized a descriptive observational design. Quantitative data regarding the number of BH referrals three months prior to the initiation of the project was collected via retrospective chart review. Data collection also included the number of screenings administered, ACEs score and the number of BH referrals generated.

Setting

This project took place in an adult primary care clinic with approximately 3500 patients. This clinic is part of a physician owned healthcare organization with approximately 1000 employees located in the metropolitan St. Louis area.

Sample

This project used a convenience sample of adult patients aged 18 years and older, seeking routine care. Patients younger than 18 years of age and patients seeking care for acute reasons were excluded. All medical records of clients receiving care from the APRN from January 14, 2021 through March 31, 2021 were included in analysis. A unique alphanumeric identifier was created and applied to each patient for deidentification purposes. The identifier was a combination of the patients first and last initials and date of birth (eight digits -month/day/year), generating a unique ten digit identifier. A master list of coded identifiers and patient names was stored in a password protected file on the primary investigator's clinic provided laptop.

Procedures

Transition to ACEs screening versus current practice without screening was a QI project selected by the healthcare organization and led by the Doctor of Nursing Practice (DNP) candidate/student primary investigator (PI) who is a board certified APRN. The CDC ACEs screening tool was uploaded into the EHR utilized by the clinic healthcare system. The student PI obtained education on ACEs and the CDC ACEs screening tool prior to project implementation. Administration of the screening tool was performed within a routine health assessment visit. ACEs scores were calculated and entered into the EHR by the student PI. The student PI offered BH referral for patients with ACEs scores

of two or greater. At the predetermined timeframe conclusion, all data was transferred into an Excel spreadsheet and analyzed using descriptive statistics.

Data Collection/Analysis

Deidentified patient data from the first PDSA cycle of ACEs screening was collected prospectively during the project time period. Demographic variables included age, gender, race/ethnicity, and zip code. Client data included ACEs screening, ACEs score, and BH referral. To assess the effect of ACEs screening on BH referrals, descriptive statistics were analyzed using IBM SPSS Statistics (Version 27).

Approval Processes

Formal, written approval was sought and obtained from the participating clinic's healthcare system Chief Medical Officiate (CMO) on 11/04/2020, and the University of Missouri- St. Louis (UMSL) Institutional Review Board (IRB) on 1/13/2021. The project protocol was assessed and determined not to be human subjects research.

Results

Demographics

The sample included 111 patients aged 19 to 83 years, with a mean of 54 years ($SD= 16.46$). There were 97 female (87%) and 14 male (13%) participants. The most predominant race/ethnicity was African American (54%), followed by Caucasian (44%). The most frequent zip code identified was 63031 (14%) (Appendix A).

ACE screenings

A retrospective chart review of 210 primary care patient encounters from October 13, 2020 through January 13, 2021, showed zero ACE screenings were conducted and five ($n=5$, 2%) BH referrals were initiated preceding the QI project implementation.

During the implementation period of January 14, 2021 through March 31, 2021, 171 patient visits met the inclusion criteria of being primary care visits, with a total of 111 ACE screenings administered ($n=111$). Hence screenings were conducted with 64.9% of the patients seen by the provider/PI. Of those screened, 73% ($n=81$) individuals had an ACE score of one or greater. Most participants screened did not have a previous BH referral from this office setting. Following implementation of the QI effort, 18 ($n=18$, 10.5%) new BH referrals were initiated, resulting in an percentage increase of 260%.

Fifty-three percent of the participants' ACE scores were either a 0 or 1. These scores did not meet inclusion criteria and BH referrals were not generated. Referrals were offered to the remaining 47% of individuals whose screenings resulted with ACE scores of two or greater, meeting inclusion criteria for a BH referral. Of those referred to BH, 20 declined (18%), four were currently receiving BH services (3.6%), and 10 patients had a history of receiving therapy from BH (9%).

Discussion

Implementation of this QI effort accomplished the purpose to screen, identify, and refer adults with ACE scores of two or greater for BH care. Of the patients seen during the QI timeframe, 64.9% of patients who presented for primary care visits were screened, achieving the stated goal of a 50% screening rate. Descriptive data was collected during this first phase of a PDSA cycle in order to better understand the demographics and initiate screening. A second PDSA cycle may be able to obtain more data appropriate for further univariate statistical tests.

There was a positively skewed distribution of female participants (87%). This finding may be explained by established patient panels and provider transition.

Simultaneous with project implementation, the full-time physician decreased hours in preparation for retirement. This predominantly male panel was reallocated to new providers thus several of these patients experienced their first encounter with the NP during this period. Due to the nature of this change, establishing patient-provider rapport upstaged screening.

Scores from the screening showed that 73% of patients had a screening score of one or greater. These findings are consistent with CDC BRFSS survey results (Campbell et al., 2016; Merrick et al, 2019; Sonu et al., 2019). This suggests that the sample was likely a typical sample that could yield generalizable results if repeated in future PDSA cycles.

Time constraints and provider concern for patient discomfort are commonly perceived barriers to ACE screening (Kalmakis et al., 2017; Maunder et al., 2020). While not a part of the QI project, ACE administration was monitored by an NP student in order to provide feedback to the provider. The average time to administer an ACE screening was found to be three minutes, with a few exceptions such as patients with higher ACE scores who required more provider/patient discussion. While this ancillary information was not an outcome measure, findings are consistent with studies by Glowa et al. (2016) and Maunder et al. (2020) which showed high quality screenings could be administered in less than 5 minutes (Glowa et al., 2016; Maunder et al, 2020). All screenings were administered without participants expressing or indicating undue distress. One patient halted screening after answering three positive questions citing her discomfort with continuation of screening.

Limitations of this QI project include patients with hearing impairment and patients with learning disabilities. Elderly patients with hearing impairments had difficulty completing the screenings, and patients with learning disabilities accompanied only by a non-

family caregiver faced too many challenges to complete the screenings properly.

Additionally, an increased time period, longer than three months, would allow for a larger amount of screenings to be completed increasing the amount of data analyzed.

Recommendations for future endeavors include widespread utilization of the ACEs screening tool within the healthcare organization supporting this QI effort. Consideration of administering ACE screening by written means may address missed opportunities for hearing impaired patients. Findings from this novel effort may guide future PDSA cycles, which would include data parameters, that may increase the ability to do more data analysis tests. Doctoral level APRNs, prepared to translate data into evidence based innovations, could be utilized for ongoing QI implementation, and to oversee succeeding PDSA rotations (Trautman, Idzik, Hammersla, & Rosseter, 2018).

Conclusion

In this QI effort, implementation of ACEs screening in patients aged 18-years and older seen in a primary care internal medicine clinic increased referrals to BH. Due to the novel nature of this project, future PDSA cycles and data collection should take place for ongoing QI analysis.

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Appendix A

Table 1
Demographic Characteristics of Participants, n = 111

Characteristics	<i>n</i>	%	<i>M</i>	<i>SD</i>
Age	111		53.69	16.46
Gender				
Female	97	87.4%		
Male	14	12.6%		
Race/Ethnicity				
African American	60	54%		
Asian	0	0		
Caucasian	49	44%		
Hispanic/Latino	1	.9%		
Other	1	.9%		
Zip code				
63031	16	14.4%		

Note. Output obtained using *IBM SPSS Statistics for Windows, version 27.0*