

ORIGINAL RESEARCH

A simulated experience for using the Adverse Childhood Experiences assessment tool in case management: A feasibility study

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ABSTRACT

Aims: To determine whether the Adverse Childhood Experiences assessment tool is feasible for case management to integrate into standard of case assessments, for nurse care managers.

Methods: A quality improvement, feasibility study. This nurse-led education program focused on improving knowledge and usability of the Adverse Childhood Experiences Assessment Tool for nurse case managers was implemented. We examined the usability, knowledge of, and self-reported benefits of using the Adverse Childhood Experiences Assessment Tool using a pre and posttest, usability survey, and word cloud for analyses.

Results: A total of 40 nurse case managers were simulated for use as participants in a pre- and post-test project design. There was a significant difference between pretest and posttest responses. Additional findings indicated that the nurse case managers were receptive to integrating the implementation of Adverse Childhood Experiences screening in their department.

Key Words: Adverse Childhood Experiences, Case management, Care management, Mental health

1. INTRODUCTION

Adverse Childhood Experiences (ACEs)^[1] are negative child experiences which include sexual abuse, loss of family members, physical abuse, witnessing violence, imprisonment of a family member, and substance abuse.^[2-4] Typically, the conversation concerning ACEs in healthcare is focused primarily on pediatric populations. The impact of ACEs in adults has only recently been discussed among healthcare providers in primary care settings.^[5] While concentrating on the impact of ACEs within the pediatric population may be important, much attention is needed to address the impact of ACEs that may not have previously been addressed in adults.^[6] Primary and secondary prevention is necessary to mitigate the

adverse childhood/posttraumatic experiences that can occur in adulthood.

Healthcare providers may be unaware of the impact of ACEs and their relevance to adults.^[7] Most importantly, providers such as nurse case managers (NCM) who are constantly engaging with adult patients who display risky adult health behaviors, experience mental health challenges and chronic disease, have little to no background on how ACEs could affect their patients. Studies have shown how traumatic experiences have significant impacts and highlight the imperative-ness of addressing this in healthcare settings.^[7,8] Research has shown that there is an association between ACEs, risky adult health behaviors, and chronic conditions such as hyper-

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tension and diabetes.^[1,7,9] Currently, patients seen by NCMs are not typically screened for adverse childhood/traumatic experiences. NCMs should be equipped with knowledge on how to effectively assess for ACEs among patients who may have experienced childhood or adult traumas.

Negative childhood experiences such as sexual abuse, psychological abuse, physical abuse, witnessing violence, imprisonment of a family member, loss of a family member, mental illness, and or exposure to substance abuse can create deleterious health and social consequences.^[3,7] In recent years, more focus has been placed on the influence of negative childhood experiences on the future of one's quality of health and the impact or progression of chronic diseases.^[3,7] However, the association between ACEs and poor health outcomes among adults remains understudied.^[7] The consequential health and social outcomes that stem from ACEs play a major role in the development of other subsequent poor health outcomes in addition to mental health disorders such as depression, anxiety, and post-traumatic stress disorders.^[2,10] With growing concerns of mental health problems in society, understanding how ACEs may be a major factor in the health outcomes of adults is imperative. Some healthcare providers have assessed the relevance of integrating assessment tools in practice to effectively identify needs and guide patients to necessary resources.^[11]

A standard definition of ACEs is well established in the U.S., however, in other countries, the concept of ACEs may vary due to the circumstances that are common to the culture, unraveling disparities in other countries. Although ACEs are identified differently across cultures, it does not eliminate the risk factors for the global impact of ACEs. Within the global context, ACEs can be identified based on the social norms in that culture, which could differ in regions with heightened exposure to violent crimes, poverty, and political or housing instability.^[12] Therefore, the lack of global information on the benefits of integrating ACE screenings into practice validates the need for further research into this issue especially because of the health impacts that stem from it.

1.1 Relevant literature

The literature on ACEs is limited, resulting in a scarcity of recent studies on this topic in the context of nursing case management. Prior studies suggest that ACEs can have detrimental effects on brain development, altering genetic expression and adversely impacting the immune and hormone systems due to early childhood stress. Furthermore, ACEs are cumulative in that they contribute to shortened life expectancy by 20 years and are associated 7 of 10 leading causes of death in the United States.^[7,13] There is limited data available to support the global impact of the ACEs assessments and its

correlations to health-harming behaviors. While there are limitations on the assessment of ACEs and health-harming behaviors, studies demonstrate that ACEs are common in adults and puts individuals at risk for physiological and psychological disorders that extend beyond adulthood.^[14]

Statistically, ACEs are common. Studies have shown that between 52% and 67.3% of American adults have expressed experiencing at least one ACE, and 6.2% have reported experiencing 4 or more ACEs.^[13,15] ACEs are linked to maladaptive behaviors including uses of substances or alcohol, tobacco use, depression, and anxiety disorders.^[4,13] Furthermore, approximately 35% of children nationally had experienced at least one ACE event.^[13] that could potentially lead to poor outcomes in adulthood.^[13,16]

Previous studies have consistently shown that poor health outcomes may stem from a history of ACEs; however, they often may not be detected until adulthood, or many years after the initial trauma.^[6,17] There is, therefore, an urgency to assess traumatic experiences sooner to prevent lasting impacts on health and mental health.^[4,8] There are several ACEs Assessment Tools and evidenced-based literature that support the use of these tools.

1.2 Purpose

The purpose of this project was to determine whether the ACEs assessment tool is helpful for NCMs to integrate into their standard of care assessments to improve the quality of mental health care for all adult patients referred to a case management department. Through the education provided on the integration of the ACEs assessment tool, NCMs can better coordinate care with a health behavior specialist and other referral agencies. For this quality improvement project, there were three aims: 1) Improve NCMs' knowledge of assessing ACEs in their patients 2) Evaluate NCMs likelihood of utilizing the ACEs assessment questions to identify and intervene with at-risk individuals 3) Evaluate NCMs' self-reported benefit of discussing ACEs with their patients.

2. METHOD

2.1 Project design

This quality improvement (QI) project was implemented over a 12-week period between August and December 2021. A convenience sample of (N = 40) simulated nurse case managers (NCMs) were included as participants in an evidence-based education program. This program focused on using an ACE Assessment Tool and its integration into the workflow. The usability of this tool was evaluated by using a 7-item Likert scale questionnaire, that included a free text option on a Qualtrics[©] survey.

2.2 Sample

For this QI project, a simulated learning dataset was used for analyses. Simulated datasets are developed to represent a process that occurs as people (participants) react and adopt to newly presented ideas.^[18] The study sample consisted of 40 NCMs which were simulated personas, representing those who typically provide care coordination services to patients with ACEs. In order to develop the simulated dataset, we followed the Diffusion of Innovations Theory, Principles, and Practice model, and the Theory in Nursing Informatics Column.^[18,19] This method is commonly used in nursing informatics, based on evidence-based frameworks to guide realistic methods of data collection. These approaches are based on Roger's Diffusion of Innovation Theory (1995), which guides the process that occurs as people (participants) respond to new information.^[20] Inclusion criteria included simulated NCMs who would be providing care coordination to patients in the Department of Population Health at a large urban medical center in the mid-Atlantic region of the United States. Exclusion criteria included any NCMs working outside of the population health center. To develop the personas, the Myers-Briggs Type Indicator[®] (MBTI[®]) was used because the initial site for the project often used the MBTI[®] to assess and develop the personality types of the NCM's, which was completed by a small group of nurses.^[21,22] Consequently, the MBTI[®] provided a simpler way to develop personas based on characteristics and traits of preexisting individuals that would have likely been recruited on site for this educational training. Following the development of the personas, other study team members completed the pre/posttest and usability surveys on behalf of each persona which had been provided.

The virtual department that was created for the purposes of this project had a total of 40 simulated NCM participants, who provided remote and onsite case management to patients throughout the various departments.

2.3 Setting

The QI/feasibility project was originally designed for an urban population health center. However, due to unforeseen circumstances during the COVID-19 pandemic, this site became unavailable to the principal investigator and a virtual site was created for learning purposes, contributing to the limitations of this project.

2.4 Theoretical framework

This project used the Ottawa Model of Research Use (OMRU), developed by Graham and Logan (2010) as the translational framework.^[23] This model consists of interre-

lated phases: assessment, monitoring, and evaluation with six key elements. The assessment phase is the first, which consists of three elements: 1) the evidenced-based innovation or change in practice, 2) practice environment or specific setting, and 3) potential adopters or practitioners involved in the change. Second, is the monitoring phase and consist of two elements: transfer strategies or the steps taken to integrate intervention into clinical practice, and adoption of new knowledge or the strategies used by practitioners to understand the knowledge behind the intervention.^[24] Evaluation is the final phase and consists of monitoring the intervention and integrates the final key element: outcome, which can be related to the patient, the practitioners, or the system itself.^[23,24] Essentially, this model incorporates a multidisciplinary framework that aids in assisting with the transfer of knowledge.

The structure of the OMRU model is reflective of work done in clinical practice as it relates to the integration of innovative changes. For this project, we followed all four phases and steps of the OMRU model (see Figure 1). In the assessment phase, pretest to assess knowledge of ACEs and the ACEs Assessment Tool was provided to the NCMs. Following the pretest, the NCMs received education on ACEs and the ACEs Assessment Tool and how they can apply it to their practice in the outpatient ambulatory case management setting. The potential adopters are an additional key element in the assessment phase, and this involves identifying the key individuals that would play a role in the change. In this project, the NCM served as critical healthcare providers who would be responsible for implementing this change, which is why the emphasis is placed on educating this specific group. The second phase involved using a usability survey questionnaire that assessed the NCMs perspective on how this tool could be transferred into their practice. In addition to the usability survey, the third phase included the provision of a posttest to assess the knowledge that was gained from the education the NCMs had received. After completing the first three phases, the final step was implemented by evaluating outcomes of the pre and posttest and usability survey to determine the impact of the education and gauge the NCMs perception of how using the ACEs Assessment Tool would impact their practice if it were adopted. The steps of using the OMRU model for this project are illustrated in (see Figure 1).

2.5 Ethical considerations

This QI project was reviewed and acknowledged by the (Johns Hopkins University School of Nursing) Project Ethical Review Committee (PERC).

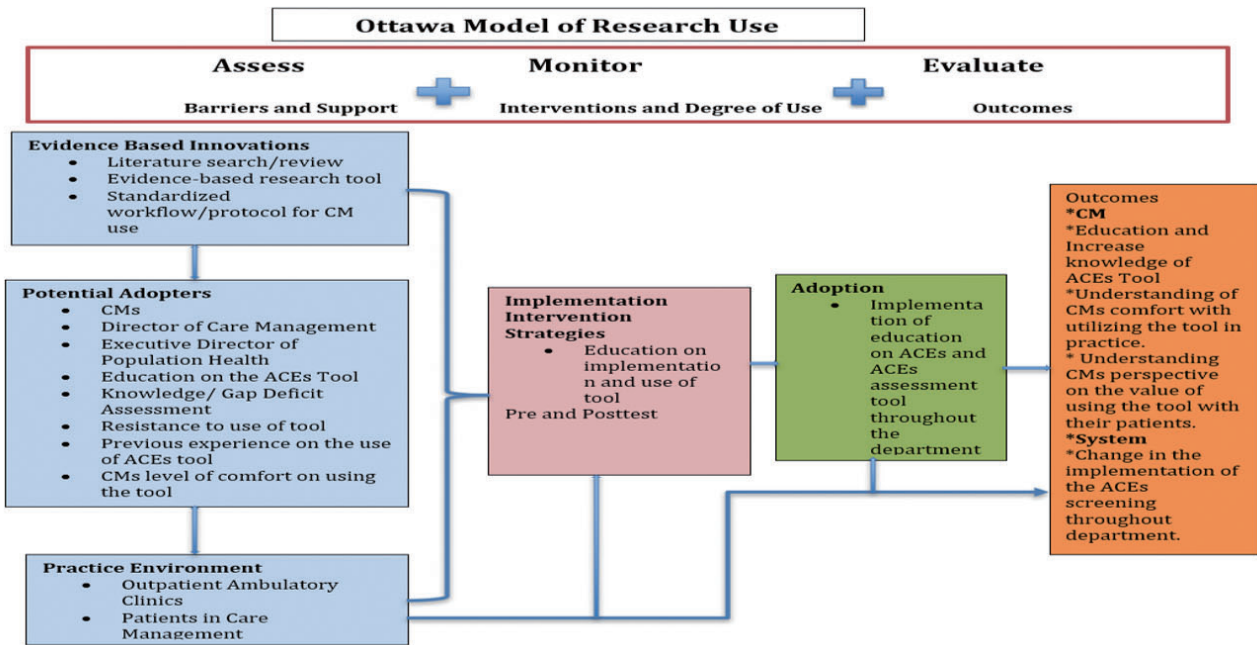


Figure 1. Ottawa model of research use

2.6 Measures

This quality improvement project aimed to measure the changes in the pre, and post intervention education and the knowledge acquired based on the scores achieved after taking both the ACEs Assessment Screening Tool Pre/Posttest (see Figure 2). The ACEs Assessment Screening Tool Pre/Posttest is composed of eight multiple choice questions, where only 6 of the questions relates to the knowledge of ACEs and the screening tool. The project also aimed to measure the likelihood of staff being comfortable with using the tool. The ACEs Assessment Usability Survey consisted of a 7-item questionnaire and the last question consisted of a comment section to identify the benefit or lack of benefit of the tool. The usability survey has a 5-point Likert scale, which ranges from strongly disagree to strongly agree. Responses were measured based on how each simulated participant responded.

For the purpose of this study, the Adverse Childhood Experience Questionnaire (ACE-Q) developed by Felitti et al. was used as the screening tool for ACEs.^[9,25] Studies have demonstrated that the ACE-Q has provided considerable epidemiological indication concerning the association between adverse childhood experiences and adult mental and physical illnesses.^[25,26]

The ACE-Q provides an overview of widespread mental health, substance disorders, and medical conditions that are linked to high ACE-Q scores.^[25] Additionally, using the ACE-Q has exemplified that highlighting the diverse populations and certain vital scientific applications the ACE-Q

instrument has been implemented using this tool.^[25] The ACEs has shown an increase in ACE scores paralleled to greater degrees of adult illness burden.^[27] The ACE-Q has the ability to demonstrate the analytical relationship and how it is based on the augmented number of different types of adverse experiences that a person was exposed to, and not by the harshness of any one kind of adverse childhood event.^[27]

Overall, the ACE-Q was not developed to quantify the events that one has experienced; yet it was designed to measure the impact of the event. The ACE-Q is easy to use because it is quick and can measure the overall degree of convergence.^[28] However, the ACE-Q, does not provide insight on the degree, duration, severity, timing, or quality of each of the ACE components for the individual being assessed. Despite the impact of ACEs on health outcomes, studies have also shown that few providers are aware of how impactful ACEs are to their patients.^[26] Providers may not have the knowledge on how to screen for ACEs and have demonstrated discomfort in screening patients.^[26] In previous studies, the ACEs-Q has proven to be an efficient way for healthcare providers, including NCMs, to assess and measure ACEs among adults. The use of this tool can be used to support clinical decisions for directing necessary resources for those who have experienced ACEs or demonstrate risky behaviors in adulthood.^[11] The higher the score on the assessment, the larger the number of health problems the person experienced in adulthood.^[17] Therefore, NCMs must be educated and equipped to administer the ACE-Q and allow the opportunity to integrate the tool and recommendations into their patient’s care plan.

1. The ACEs tool is:
 - a. A tool used to assess for adverse childhood experiences
 - b. Used in practice all over the world
 - c. Used to screen for mental health issues
 - d. Used as a treatment intervention
2. Which city is ranked number one with the highest number of positive ACEs scores of 4 or more?
 - a. Chicago
 - b. Brooklyn
 - c. Philadelphia
 - d. Baltimore
3. Which of the following are examples of ACEs?
 - a. Divorce
 - b. Drug Addiction
 - c. Family with Mental Health Issues
 - d. All of the above
4. ACEs is a major contributing factor for:
 - a. Chronic Conditions
 - b. Environmental Factors
 - c. Increase Primary Care
 - d. Family Issues
5. What effect does ACES have on an individual?
 - a. Increase risk of incarceration
 - b. Poor Health Behaviors
 - c. Increased Risk of Mental Health Conditions
 - d. All of the Above
6. Screening for ACEs in Case Management will help by:
 - a. Identifying underlying mental health issues
 - b. Increase referrals for medical conditions
 - c. Identifying social determinants
 - d. Assisting patients with resources for social determinant

Figure 2. The ACEs assessment screening tool pre/posttest

2.7 Intervention

Beginning in August through October 2021, the review of literature needed to draft the educational module, pre/posttest and usability survey was completed. The educational program was designed with the goal of improving the NCMs knowledge of ACEs and to promote the appropriate use of the ACE-Q with adult patients. The questions were developed based on the module objectives which included knowledge of ACEs, prevalence of ACEs reported in that region, the various types of ACEs including its impact on the adult population and implications of screening for ACEs in case management. The educational module also included details on how the ACE-Q could be integrated into practice. The educational module also included information on the action plans; in the event the NCM yields a positive result after administering the ACE-Q (anyone scoring 4 or more) they are to refer the patient to a health behavior specialist for further screening. The intervention also included a drafted usability survey using the Post-Study System Usability Questionnaire validated survey adopted by IBM[©] to develop questions applicable to the project.^[27] The ACEs Assessment Usability Survey had questions that assessed the NCMs comfort with

using the ACEs screening tool and the value of adding this tool to their practice.

After completing these steps, the information was provided to content experts for feedback and any recommended revisions were made. Upon completion of revisions, the pre/posttest and usability surveys were loaded into Qualtrics[®]. The educational module was presented in a virtual setting to six content experts for additional feedback. A QR code was provided during the presentation so the experts could sample the surveys. The content experts provided valuable input for improving the survey and ensuring accessibility. The final months of implementation involved the development of 40 personas for the simulated NCM participants by the study team and content experts. The personas were an innovation of the project team that were completed online.

2.8 Analysis

Data were analyzed using SPSS 25 IBM[©] to examine frequencies and differences (IBM, Armonk, NY). The independent *t*-test was used to evaluate the differences in the pre- and post-test scores. We examined frequencies of responses for the usability survey and MTBI characteristics.

Adverse Childhood Experience (ACE) Questionnaire
Finding your ACE Score ra bbr 10 24 06

While you were growing up, during your first 18 years of life:

1. Did a parent or other adult in the household **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?
Yes No If yes enter 1 _____
2. Did a parent or other adult in the household **often** ...
Push, grab, slap, or throw something at you?
or
Ever hit you so hard that you had marks or were injured?
Yes No 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
Try to or actually have oral, anal, or vaginal sex with you?
Yes No If yes enter 1 _____
4. Did you **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?
Yes No If yes enter 1 _____
5. Did you **often** feel that ...
You didn't have enough to eat, had to wear dirty clothes, and had no one to protect you?
or
Your parents were too drunk or high to take care of you or take you to the doctor if you needed it?
Yes No If yes enter 1 _____
6. Were your parents **ever** separated or divorced?
Yes No If yes enter 1 _____
7. Was your mother or stepmother:
Often pushed, grabbed, slapped, or had something thrown at her?
or
Sometimes or often kicked, bitten, hit with a fist, or hit with something hard?
or
Ever repeatedly hit over at least a few minutes or threatened with a gun or knife?
Yes No If yes enter 1 _____
8. Did you live with anyone who was a problem drinker or alcoholic or who used street drugs?
Yes No If yes enter 1 _____
9. Was a household member depressed or mentally ill or did a household member attempt suicide?
Yes No If yes enter 1 _____
10. Did a household member go to prison?
Yes No If yes enter 1 _____

Now add up your "Yes" answers: _____ This is your ACE Score

Figure 3. ACEs assessment screening tool

3. RESULT

A total of 40 NCMs were simulated for use as participants in a pre- and post-test project design. Results were recorded for each of the three aims for this project. The ages of the simulated NCMs ranged from 28-65 years and clinical experience ranged from more than one to 25 years. The MBTI® generated personas represented a diverse group of personality types within the sample (see Table 1).

3.1 Knowledge of ACEs tool

Improve NCMs' knowledge of assessing ACEs in their patients. There was a significant difference between pre, and post-test correct ($p \leq .05$) scores (see Table 2). Overall marks were improved in the post-test where a majority of the NCMs scored five or greater. The overall mean scores showed a significant improvement in the post-test scores among the among the NCMs in comparison to the pretest scores. The

results indicate that following the education, there was improved knowledge of assessing ACEs with patients.

Table 1. Summary Persona types for usability and knowledge survey

Persona Types	Attributes of this persona (May include backstory, goals, fears, strengths, challenges and general enough that it could represent multiple individuals)
MBTI® (21)	List of attributes
ISTJ	Responsible, sincere, analytical, hardworking and trustworthy with sound judgment
ESTP	Action-focused, outgoing, realistic, curious, versatile, spontaneous, pragmatic problem solvers and skillful negotiators
ESTJ	Efficient, outgoing, analytical, systemic, dependable, realistic, like to run the show and get things done in an orderly fashion
ISFJ	Warm, considerate, gentle, responsible, pragmatic, thorough, devoted and enjoy helping others
ISFP	Gentle, sensitive, nurturing, helpful, flexible, realistic, seek to create a personal environment that is both beautiful and practical
ESFP	Playful, enthusiastic, friendly, spontaneous, tactful, flexible. Have strong common sense, enjoying helping people in tangible ways
ESFJ	Friendly, outgoing, reliable, conscientious, organized, practical, seek to be helpful and please others, enjoy being active and productive
INFJ	Idealistic, organized, insightful, dependable, compassionate, gentle, seek harmony and cooperation, enjoy intellectual stimulation
INFP	Sensitive, creative, idealistic, perceptive, caring, loyal. Value inner harmony and personal growth, focus on dreams and possibilities.
INTP	Imaginative, intellectual, logical, precise, reserved, creative problem solvers, original thinkers, and enjoys speculation

Note. Myers, I. B. (1962). The Myers-Briggs Type Indicator®: Manual (1962). Key: Extraversion (E) – Introversion (I), Sensing (S) – Intuition (N), Thinking (T) – Feeling (F), Judging (J) – Perceiving (P)

Table 2. ACEs assessment screening tool knowledge scores

	Mean/SD	p-value	CI 95%
Pretest	3.63 (1.750)	< .005	(3.088-4.172)
Posttest	4.22 (1.349)		(3.802-4.638)

Note. p-value < .05 is considered statistically significant.

3.2 Usability of ACEs tool

Evaluate NCMs likelihood of utilizing the ACEs assessment questions to identify and intervene with individuals at risk measured by using a Usability Survey. Following the administration of the usability survey a mean of 23.24 and a standard deviation of 5.21. From the results of the group for Q1 on the likelihood of the group finding the tool useful, 48.78% strongly agreed. Q2, 39.0% strongly agreed that the tool was not complex to use. In Q3, 39.02% disagreed that the tool would be cumbersome to their workload. In Q4, 48.78% agreed that the tool would be well integrated into their workflow. In Q5, 58.74% strongly agreed that the tool would improve patient care and outcomes. In Q6, 39.02% strongly disagreed that it would be hard to have the conversation of ACEs with their patients. In the final question, Q7, 63.74% strongly agreed that it is valuable to have the ACEs conversation with their patient.

3.3 Self-reported benefits of ACEs tool

Evaluate NCMs’ self-reported benefit of discussing ACEs with their patients. For the third aim, a word cloud was generated for analysis and capturing of words most commonly used by NCMs who completed the free text questionnaire. Words most commonly used in the free text were “innovative”, “impactful”, “beneficial” and “needed” (see Figure 4). Other words, less commonly used but captured in the word cloud were “resourceful”, “useful”, “challenging” among others that depicted a positive viewpoint about the benefits of discussing ACEs with their patients.



Figure 4. Results from word cloud

4. DISCUSSION

For years, it has been noted that negative childhood experiences such as sexual abuse, psychological abuse, physical abuse, witnessing violence, imprisonment of a family member, loss of a family member, mental illness, and or exposure to substance abuse can create deleterious health and social consequences.^[2-4,7] Findings from this study support the need for assessing ACEs among patients. The NCMs in this study demonstrated improvement in knowledge of ACEs, increased usability, and recognized several benefits of the ACE-Q for use and integration in case management. Previous studies consistently support the need for enhanced education programs to improve knowledge of ACEs, specifically among nurses.^[2] Practice change is needed to support the use of ACEs screening tools during all provider visits for patients across the life span. The standardization of using the ACEs tool for healthcare providers is imperative, for capturing adverse events that may have a negative impact on health outcomes.

An often-understudied area for nurses, this study offers insight into how ACEs impact health outcomes and highlights the importance of using ACEs tools for assessment. The benefits of understanding the impact of ACEs are evident; the significant health and social consequences resulting from ACEs contribute to the development of various poor health outcomes, including mental health disorders such as depression, anxiety, and post-traumatic stress disorder.^[2,10] Additionally, ACEs are known to have a negative impact on brain development, specifically when experienced during childhood.^[10,11] Furthermore, a greater concern is how ACEs shorten life expectancy because it is often not detected until adulthood.^[17] Improved knowledge of ACEs, professional awareness, and usability of tools is necessary to ensure that patients' physical, social and emotional well-being are being addressed. Additionally, results from the ACEs tool can be used to direct patients and families to the appropriate resources that will help meet their health care needs.^[2]

4.1 Strengths

The main strength of this quality improvement project is that it identifies a significant gap in the literature. There is currently a paucity of literature that supports the assessment of ACEs for adults, especially in case management. This project provides the foundation for raising awareness and a framework for integrating the ACEs assessment in the specialty of case management. This project also lays a foundation to be able to replicate this in other areas, using non-simulated participants. This project also lays the foundation for the development of guidelines to ensure that sustainability and dissemination efforts are successful. The content experts

who were responsible for reviewing the presentation were all from pediatric backgrounds and provided feedback on the value of integrating the awareness of ACEs not only in case management, but in other departments as well. The content experts validated how the conversation is occurring in the pediatric population and needs to occur more in the adult population.

4.2 Limitations

There were some limitations associated with this study. Due to the challenges that occurred with the original study site, a simulated environment was generated to gain the data needed for this project. Additionally, personas were developed to simulate the responses of the individuals. Developing a project in a simulated environment poses a challenge in obtaining the actual perception of live participants and still limits the understanding of the NCMs knowledge and awareness of ACEs. Another limitation is that this project was designed to be replicated in the department of nursing case management. However, the project would need to be modified to be able to replicate in other specialty areas.

4.3 Recommendations

To expand upon the findings in this study, future initiatives should focus on providing education to NCM's and other providers on ACEs. Currently, education on ACEs is not provided and therefore the association of ACEs and the health outcomes and mental health of patients is not known. The lack of awareness, therefore, causes the NCM's to be ill-prepared for identifying undiagnosed mental health issues and behavioral health conditions along with physical conditions that can all be associated to ACEs. NCMs play an important role in assessing and coordinating the care of patients, therefore ensuring the NCM's awareness will help lay a foundation and begin the integration of trainings that will help raise the awareness to other healthcare providers as well.

5. CONCLUSION

This project demonstrated the added value of the education provided to the NCMs. The findings of this quality improvement project demonstrate that the education NCMs received was useful and based on the results of the pre and posttest, the results showed added value to the education. NCMs play an integral role in managing resources, underscoring the need to assess for ACEs and further understand how they have an impact on patients. The results from the usability survey demonstrated that the NCMs agree that there would be added value in integrating the ACEs Assessment Tool and the ACE-Q into their practice. The NCMs found that this tool was a feasible approach improving the outcomes of the

patients that they service. Further investigation is needed to examine provider's comfortability with using the ACEs tool for assessment and to evaluate the integration of the tool into clinical practice; exploring its impact on patient health outcomes.

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AUTHORS CONTRIBUTIONS

LP served as the PI, carried out the study, participated in the conception, design, and coordination, acquisition of data, interpretation of data, performed statistical analysis, drafted and revised the manuscript. DB provided writing assistance, critically revised the manuscript for important scholarly content. JA and JTW helped draft and revised the manuscript.

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The authors declare that there is no conflict of interest.

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Obtained.

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DATA SHARING STATEMENT

No additional data are available.

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