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Original Study

Developing Trauma-Informed Capacities in Healthcare Students Staffing Free Clinics

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Abstract

Background: Adverse childhood experiences (ACEs) are common traumatic events experienced during childhood that can have significant and cumulative lifelong impact on health, mental health, and life opportunities. Individuals with marginalized identities experience more ACEs and have greater ACEs-related health burden. Free clinics provide free or low-cost ambulatory care to largely underserved or marginalized communities. Student-staffed free clinic volunteers should be knowledgeable about ACEs and should possess attitudes and engage in practices that promote trauma-informed care.
Methods: Two medical students were trained as ACE Interface Master Trainers and administered a training based on the ACEs N.E.A.R. Science curriculum to medical and nursing student free clinic volunteers and leaders. The 1.5-hour training included the Neurobiology and Epigenetics of trauma, health consequences associated with ACEs, and the impact of Resilience in mitigating health consequences of ACEs. Pre-/post-surveys were utilized to measure changes in collective hope, perceived trauma knowledge, and trauma-informed attitudes.
Results: The training was administered virtually to one group of medical students and three groups of nursing students (N = 89) between May and October 2020. Two-sample t-tests of the pre-/post-surveys demonstrated statistically significant increases in two of the six collective hope items, six of the six perceived trauma knowledge items, and six of the seven trauma-informed attitudes items.
Conclusions: Our study demonstrated that healthcare students volunteering at free clinics have high baseline levels of collective hope, perceived trauma knowledge, and trauma-informed attitudes. A brief and purposeful training on ACEs by peers or near-peers can be effective to further promoting trauma-informed capacities for student-run free clinic volunteers. Future work is needed to ascertain the sustainability of trauma-informed care growth from this training and to measure the effects on care practices.

Introduction

Adverse childhood experiences (ACEs) are traumatic events that occur during childhood which can have broad consequences on health, mental health, quality of life, and life opportunities.[1-2] In the original Centers for Disease Control and Prevention (CDC)-Kaiser ACE study administered in the late 1990s, which sampled largely middle-/upper-class White participants in California, 64% of participants reported at least one of ten ACEs and 14% experienced four or more.[3] In the original study, ACEs were investigated as 10 household-items in three categories (abuse, neglect, and household challenges), however, community-level ACEs also exist.[4-5] While exposure to stress initially causes adaptive physiological responses, such as “fight or flight”, to survive,

escape, or overcome the stressful situation, excessive or prolonged stress can cause pathological consequences to health.[6-8] Moreso, during childhood, toxic stress interferes with critical periods of brain development leading to impairments in emotional regulation, susceptibility to illness, and early mortality.[9-12]

The Philadelphia ACEs study broadened the original ACEs study to encompass a socioeconomically and racially diverse urban population in Philadelphia, Pennsylvania, and found comparatively higher exposure to ACEs, with 72% of adults having at least one ACE and 21% experiencing four or more.[4] Importantly, the Philadelphia ACEs Study expanded ACEs to include community-level traumas, such as experiencing racism or witnessing violence.[4,13] The ACEs sociodemographic disparity is observed nationally within various marginalized communities including racial/ethnic, sexual, and gender minorities, as well as lower income, and less educated populations.[14] Social determinants of health can begin to explain these disparities as inequality of resources, lack of opportunities, and increased racism and abuse facilitate traumatic experiences in youth of marginalized communities.[15-16] Generational trauma occurs when the toxic stress leads to epigenetic alterations that is then passed down from victim to their offspring.[17-18] However, the consequences of toxic stress can be reduced through exposure to positive childhood experiences such as community engagement, positive caregiver support, feeling safe, and resilience factors.[19-20]

Equipped with the knowledge of ACEs, community-level interventions have begun to treat communities most afflicted by the consequences of ACEs. Matlin and colleagues (2019) engaged in a multi-level (individual, relational, organizational, community/systems) approach to trauma-informed practices in Pennsylvania.[21] Their community-academic partnership approach led to both healing of ongoing consequences of trauma and promoting trauma-informed capacity to reduce future consequences of trauma. In Washington State, community networks were equipped with trauma-informed capacity interventions which led to a reduction in the number of ACEs.[22] Specific outcomes associated with trauma exposure can be treated with access to primary care services, ACEs screening and education, and improved parent-child relationships.[23] Collaborative care models, which integrate primary care providers, care managers, and behavioral health professionals, can serve as an important healthcare model to deliver trauma-informed ACEs treatment and prevention, especially for racially/ethnically diverse communities.[24]

Free clinics provide free ambulatory healthcare services to underserved and marginalized communities. Student-staffed free clinics (SSFCs), staffed with healthcare student and clinical provider volunteers, have been shown to improve access to care and reduce rates of hospitalization.[25] In addition to healthcare services, SSFCs have administered community needs-based public health interventions such as coronavirus disease 2019 (COVID-19) vaccinations and asylum services.[26-27] As SSFCs largely serve marginalized communities, it is especially important for volunteers to develop trauma-informed capacities. For healthcare students, providing volunteer clinical care at SSFCs under clinical supervision provides important training experiences with underserved populations.[28] However, to our knowledge, no studies have investigated the impact of trauma-informed care education in free clinic healthcare student volunteers. In our study, we conducted a training session on ACEs for undergraduate nursing and medical student free clinic volunteers and measured changes in collective hope, perceived trauma-informed knowledge and trauma-informed attitudes.

Methods

Setting and Participants

Our institution sponsored six interdisciplinary urban community-based SSFCs serving individuals experiencing homelessness, refugees, families transitioning-from-homelessness, women experiencing homelessness, and lesbian, gay, bisexual, transgender, and queer (LGBTQ+) communities. Healthcare students at our institution, including medical, nursing, physician assistant, and nurse practitioner students, may sign up to provide volunteer clinical care under the supervision of volunteer licensed healthcare faculty. In each clinic, 2-4 elected student leaders have a year-

Table 1. Adverse Childhood Experiences (ACEs) training curriculum structure, content, and activities

Structure	Content	Activities
Section one: Neuroscience of Trauma	Neurobiology; impact of trauma on the human nervous system; human development with the effects of trauma; behavioral adaptations to trauma throughout development and early adulthood; gene expression; impact of trauma on epigenetics; ACEs definition	10-item ACEs survey administered after the ACEs definition followed by reflection and group discussion on its impact on patients
Section two: CDC-Kaiser ACE study	The CDC-Kaiser ACE study; prevalence of ACEs; interrelatedness of ACEs; dose-dependent relationship between ACEs and health and life outcomes: smoking, lung disease, HIV, alcoholism, marrying an alcoholic, liver disease, depression, suicide attempt, homelessness, co-existing health conditions, poverty	Group discussion on the utility of using ACEs as a screening tool in free clinics after learning about ACEs health outcome associations
Section three: Protective factors and community resilience	Overview of protective systems and resilience; individual capabilities to protect against trauma; community capabilities to protect against trauma including attachment and belonging; community, faith, and cultural processes; community capacity development; shared learning in communities; decision making and future planning; associations between ACEs, health outcomes, and hope; four community examples of trauma-informed practices and its outcomes; six guiding principles to trauma-informed approaches	Group discussion on trauma-informed care approaches that can be implemented in free clinics after learning the six principles of trauma-informed approaches

Pre-/post-survey administered immediately before/after the session.
CDC: Centers for Disease Control and Prevention; HIV: human immunodeficiency virus.

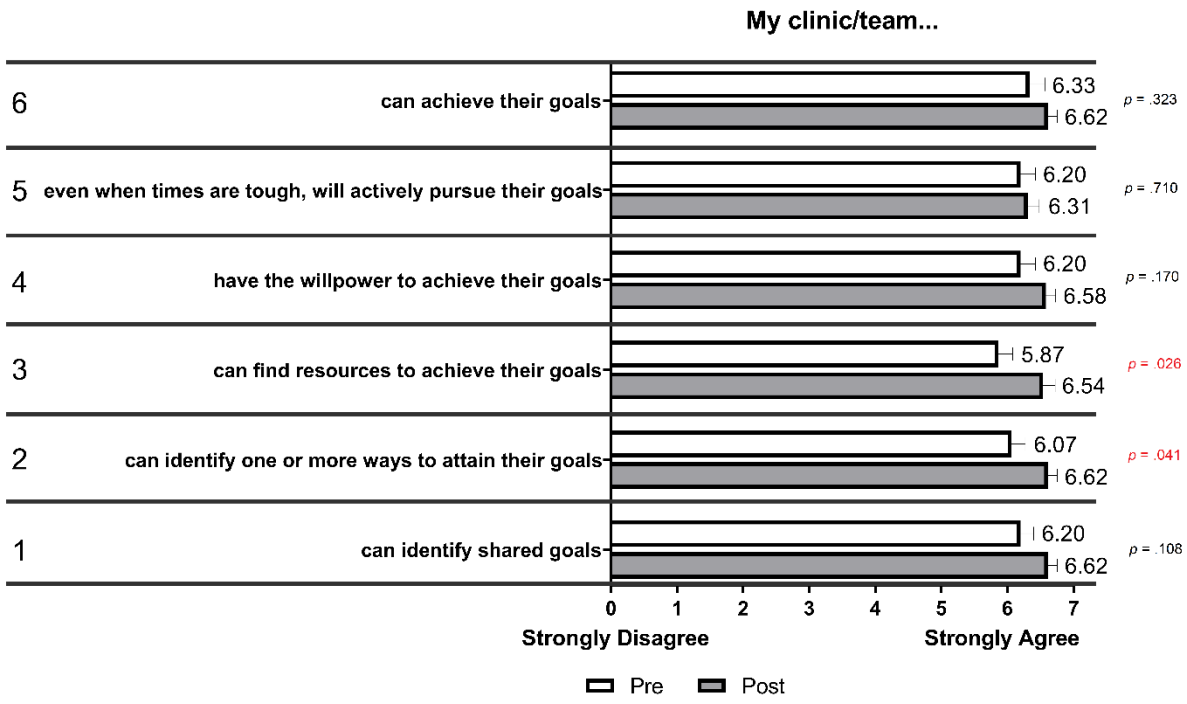
long position to manage their clinics. Undergraduate nursing students and medical students at our institution who were involved in volunteering and/or held leadership roles at the six institution-led free clinics were invited to participate in the training.

Training Development and Training Session

The ACEs presentation and activities utilized in our training session were adapted from the ACE Interface Master Trainer program. ACE Interface is an organization that provides ACEs education, trainings, and services to organizations and communities.[29] The Master Trainer program is a two-full-day Train-the-Trainer workshop led by Robert Anda, one of the co-investigators of the original ACEs study, and Laura Porter to train individuals to both present the sciences of ACEs to communities and train other presenters. During the workshop, the participants learned to present and adapt predesigned ACEs presentation slides and activities for specific community needs. The ACEs lecture content was based on the N.E.A.R. (Neuroscience, Epigenetics, ACEs, and Resilience) Science curriculum and was separated into three sections. In the first section, the curriculum detailed how traumatic stress influences early brain development, impacts emotional regulation and executive skills function, and lead to longstanding epigenetic and generational changes in individuals and communities. In the second section, associations between ACEs and key health outcomes were described. In the third section, preventative and protective systems, such as resilience, community, and faith, against ACEs were detailed. Several community examples of trauma-informed care and resilience were highlighted to demonstrate their effectiveness in protecting against individual and community-level trauma. After the two-day workshop, trainees must present the ACEs curriculum to at least three groups under supervision to be certified in the Master Trainer program. In February 2020, two second-year medical students and co-authors of this manuscript (PY & JH) were certified as ACEs trainers in the Master Trainer program.

The 1.5-hour training session utilized in this work included the three sections of the N.E.A.R. curriculum and three group discussion activities (Table 1). Due to the high background science knowledge of our participants, less emphasis was placed on background science information. Additional examples of community resilience were added in the third section on protective systems in ACEs. After learning the definition of ACEs at the end of the first section, participants took the 10-question ACEs survey. The participants then shared thoughts and reactions about the survey and how it related to patient care. After learning about the health consequences of ACEs,

Figure 1. Pre-/Post-survey Change in Collective Hope among medical students free clinic leaders



Pre-survey n = 16; post-survey n = 13. Error bars are standard error of the mean (SEM).

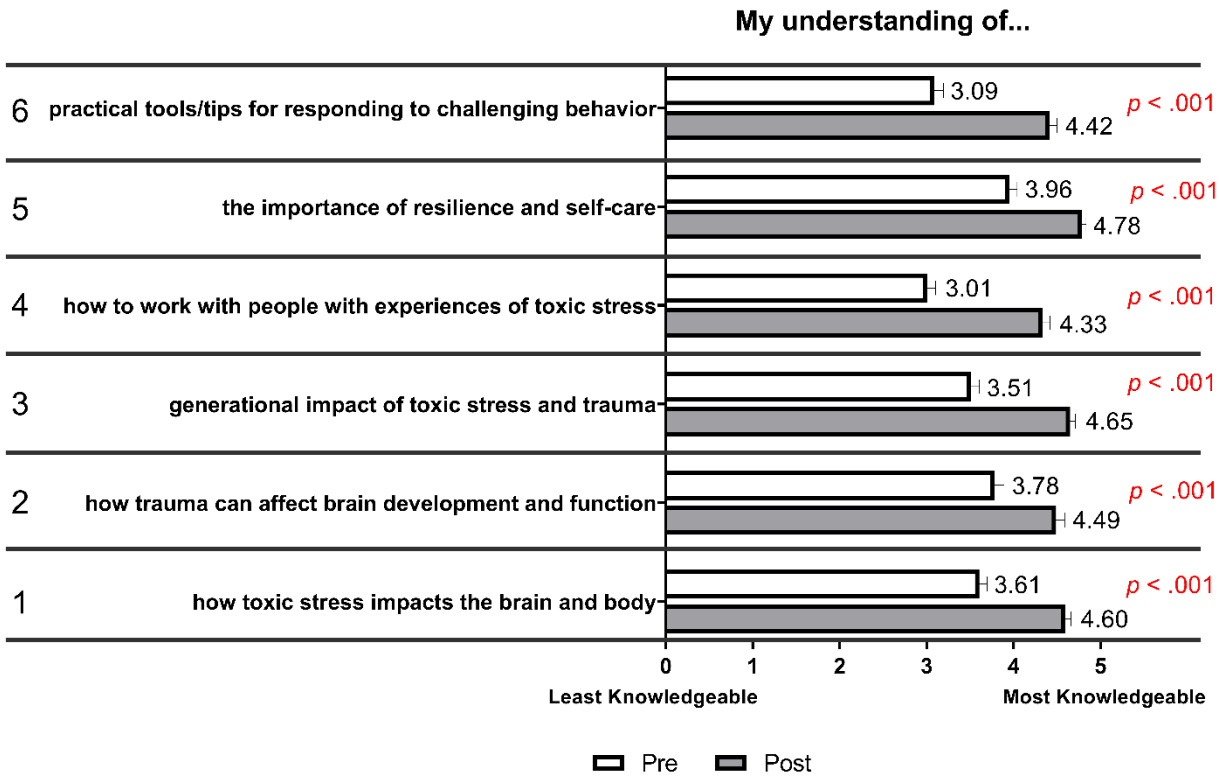
participants had a group discussion on the advantages and disadvantages of screening for ACEs. After listening to the examples of community trauma-informed practices and learning the six guiding principles of trauma-informed practices in the third section, participants discussed trauma-informed changes that could be incorporated at the free clinics.

Survey Instrument and Data Analysis

A pre-/post-survey with up to three measures on collective hope, perceived trauma knowledge, and trauma-informed care attitudes were administered to the participants immediately before/after the session. The Collective Hope Scale is a 6-item scale to assess the belief that teams can identify common goals, find pathways to collective goal attainment, and collectively pursue those on a 7-point Likert scale from strongly disagree to strongly agree.[30] The perceived trauma knowledge measure was developed to reflect the content in the ACE Interface N.E.A.R. curriculum. The measure included six items measured on a 5-point Likert scale from least knowledgeable to most knowledgeable. The Attitudes Related to Trauma-Informed Care (ARTIC) instrument is a 7-factor bipolar Likert scale that measure participants' subjective perception and reaction to trauma-informed attitudes.[31] The ACE Interface team chose seven items to represent the seven factors of the ARTIC instrument. Three of the seven items were reverse coded such that "more trauma-informed" statements were on the same side of the scale as "less trauma-informed" statements. The scale was unmixed for analysis. Only the student clinic leaders were administered the Collective Hope Scale to assess the hopefulness of the clinic teams to manage their clinic and implement initiatives.

Survey responses were captured using Qualtrics (2020, Qualtrics, Provo, UT and Seattle, WA). Statistical analysis and graphical representation were conducted using Prism (v9.3, GraphPad Software Inc., La Jolla, CA). Pre-/post-surveys were analyzed by two-sample t-test (α=.05). Missing data were excluded from analysis. This study was determined exempt by our institutional review board.

Figure 2. Pre-/post-survey Change of Perceived Trauma Knowledge among nursing and medical students



Pre-survey N = 89; post-survey N= 70. Error bars are standard error of the mean (SEM).

Results

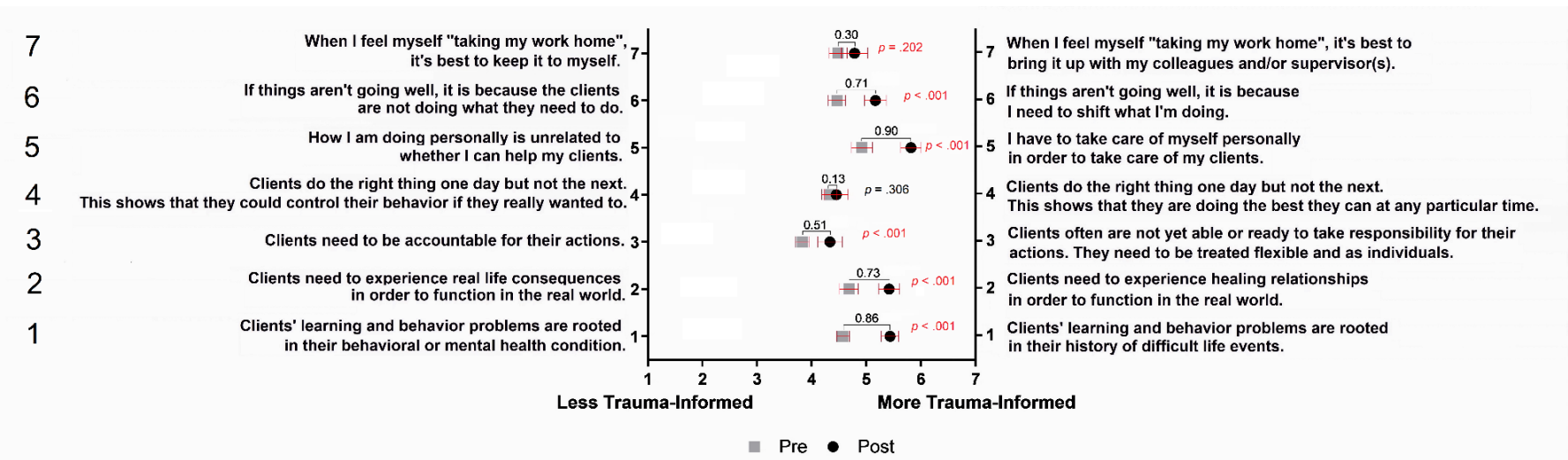
Three groups of nursing students (n=73) and one group of medical students (n=16) attended the virtual training session between May and October 2020. In total, 89 participants completed the pre-survey, and 70 participants completed the post-survey. Sixteen free clinic student leaders completed the collective hope measure pre-survey and 13 completed the post-survey.

For collective hope, illustrated in Figure 1, the mean pre-survey score was 6.14 out of 7 (standard deviation [SD]=0.15) and the mean post-survey score was 6.55 (SD=0.11). The two items with the lowest baseline score were on finding resources to achieve goals (5.87) and identifying ways to attain goals (6.07) which were also the only two items with statistically significant improvements after the session (6.54, p=.026; 6.62, p=.041, respectively). The three items with the highest scores after the training were identifying shared goals (6.62), identifying ways to attain goals (6.62), and achieving goals (6.62).

For perceived trauma knowledge, illustrated in Figure 2, the mean pre-survey score was 3.49 out of 5 (SD=0.34) and the mean post-survey score was 4.55 (SD=0.15). Each item in perceived trauma knowledge had statistically significant (p<.001) increases after the session. The two lowest baseline scores were in how to work with people who experienced toxic stress (3.01) and practical tools/tips for responding to challenging behaviors (3.09), which also had the greatest mean improvement after the session, 1.32 and 1.33 respectively. The two items with the highest scores after the session were the importance of resilience and self-care (4.78) and the generational impact of toxic stress and trauma (4.65).

For trauma-informed attitudes, illustrated in Figure 3, the mean pre-survey score was 4.47 out of 7 (SD=0.31) and the mean post-survey score was 5.06 (SD=0.51). Six of the seven items had

Figure 3. Pre-/Post-survey Change in Trauma-Informed Attitudes among nursing and medical students



Pre-survey n = 89; post-survey n = 70. Error bars are standard error of the mean (SEM).

statistically significant increases in trauma-informed attitudes after the session; only the item on patients' perceived control of behavior (item 4) did not have a statistically significant change. The item on patient accountability had the lowest mean baseline score (3.83) and had a statistically significant improvement of 0.51 (p<.001) after the session. The two items with the highest scores after the session were on self-care (5.82) and understanding of patients' learning and behavioral problems (5.43), which also had the greatest mean improvement after the session, 0.90 (p<.001) and 0.86 respectively (p<.001).

Discussion

The Substance Abuse and Mental Health Services Administration (SAMHSA) defines trauma-informed practice as practices that realize the widespread impact of trauma and paths for recovery, recognize signs and symptoms of trauma, respond by integrating knowledge about trauma into procedures and practices, and actively resist re-traumatization.[32] Promoting these four tenants of trauma-informed work is crucial to providing empathetic care to individuals and communities who experienced childhood trauma and related consequences. Our work suggests that a concise and purposeful training on ACEs and trauma-informed practices may enhance trauma-informed knowledge and attitudes in student volunteers who work in free clinics serving marginalized communities. Additionally, fostering trauma-informed capacities may promote collective hope in free clinic student leaders.

SSFCs are challenged by limited funding and availability of faculty supervisors.[33] We measured collective hope in the SSFC leaders to assess confidence in achieving clinic goals and serving their clinic community.[34] Unsurprisingly, the baseline scores for the collective hope items were high. Due to the high workload of SSFC leadership positions in addition to school responsibilities, SSFC leadership positions typically self-select driven students. Despite there not being any specific team-oriented content or activities in the training, collective hope items on identifying ways to attain their goals and finding resources to achieve their goals

significantly increased after the session. One explanation could be that student leaders felt empowered after listening to stories of community resilience and then sharing their reflections on interventions that could be incorporated to support their free clinic patients.

Our training session led to significant increases in all items in perceived trauma knowledge. The participants' baseline scores were highest in the understanding of the physiological consequences of toxic stress and lowest in the understanding of applying the knowledge to practice. A significant portion of early medical and nursing education is spent on understanding disease pathology. Our study demonstrated that implementation of specific training material to promote confidence in working with patients is necessary for healthcare students. The need for trauma-informed practical tools aligns with the collective hope item on identifying resources to achieve shared goals. This highlights the importance of providing practical tools to facilitate student volunteer confidence and success to serving in free clinics.

Unlike the perceived knowledge measure, the trauma-informed attitude measure was not explicitly discussed in the training session. Nonetheless, the training demonstrated statistically significant shifts towards more trauma-informed attitudes for all items but one. Participants had notable growth in empathy towards patients' difficult life experiences and need for healing relationships. Interestingly, participants valued self-responsibility in their trauma-informed attitude shifts. The items on participants' personal responsibility towards patients had the greatest mean shifts towards trauma-informed attitudes. The items on patients' personal responsibility towards self had both the lowest baseline scores and the lowest mean shifts towards more trauma-informed attitudes. That is, participants partially retained an attitude that imparted personal responsibility to patients for health behaviors that may in fact be manifestations of childhood trauma. To enhance empathy towards patient responsibility, future training sessions could include a panel of free clinic patients to share their experiences with social and structural determinants of health, including childhood trauma.[35]

Peer or near-peer instruction in medical education has been shown to be an effective model of teaching, with learners being more comfortable with near-peers than faculty/expert teaching. However, compared to faculty/expert instructors, peer or near-peer instructions had more concerns about teaching skill and knowledge base.[36] When providing ACEs education with peers and near-peers, intentional content development with trauma-informed approaches is necessary to minimize risk of retraumatization. While other forms of trauma-informed care approaches have described, the train-the-trainer approach may be more useful for student-run free clinics as it relieves already limited time of staff and faculty which can then be used for clinical supervision or administrative duties.[37]

Implementation of trauma-informed care has been shown to improve organizational and patient outcomes in several settings. In a residential addiction treatment center, Hales et al. (2018) found that following trauma-informed care implementation, there were improvements in workplace satisfaction, workplace climate, workplace procedures, client satisfaction, and number of planned discharges.[38] In the child and adolescent unit of a state psychiatric hospital, implementation of trauma-informed care practices led to decreased utilization of seclusion and restraints.[39] Further work is needed to investigate organization and patient benefits in free clinic settings following trauma-informed care implementation.

Our project has several limitations to note. Our measure assessed participants' confidence in their trauma knowledge as opposed to actual trauma knowledge. Second, the post-survey had a dropout rate of approximately 21% which may be attributed to challenges of post-survey participation in a virtual setting as well as student scheduling conflicts. Third, due to the limited medical student sample, we were unable to assess differences in medical students' and nursing students' trauma-informed growth and needs. Fourth, we did not inquire about the sociodemographics of the participants and were unable to comment on participant context associated with trauma-informed capacity growth. Fifth, the adapted ARTIC instrument used in our work, while widely used by the ACE Interface team, has

not been psychometrically validated. These results should be carefully interpreted. We contacted the authors of the Collective Hope instrument, who stated the psychometric validation of the instrument is currently being peer-reviewed for publication. Finally, the time course of our project limits our understanding of whether trauma-informed growth is sustained over time.

Future research measuring the training session's effects on care practices will be an important next step in further characterizing its impact on patients. Furthermore, longitudinal assessment of retrained knowledge and care practices following the student-led train-the-trainer approach would be important to characterize and compare with other training approaches, such as traditional professional-to-student didactics. A qualitative assessment of students involved as trainers in train-the-trainer programs can be helpful to better understand students' reasons for and benefits gained from participating as trainers. Students educating patients on adverse childhood experiences and protective factors at SSFCs is another next step toward advancing community trauma-informed care.

To the authors' knowledge, our work is the first to report characterization of trauma-informed training for free clinic healthcare student volunteers. Student-run free clinics are common among medical schools with 75% of schools having at least 1 clinic.[33] Our study demonstrated that a brief virtual, student-led training session on the science of ACEs paired with patient-centered group discussions promoted free clinic volunteers' perceived trauma-informed knowledge, trauma-informed attitudes, and collective hope. Additionally, our pilot model establishes the Train-the-Trainer approach in training medical students to deliver effective training sessions on trauma-informed care. Measuring the training session's effects on care practices will be an important next step in further characterizing its impact. Students educating patients on adverse childhood experiences and protective factors at SSFCs is another next step toward advancing community trauma-informed care. SSFCs may provide an important opportunity for preclinical healthcare students to incorporate learned trauma-informed care approaches with patients from marginalized communities under close faculty supervision.

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Disclosures

The authors have no conflicts of interest to disclose.

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