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# Trauma-informed education: Creating and pilot testing a nursing curriculum on trauma-informed care

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ABSTRACT

*Background:* Trauma is a significant contributor to morbidity and mortality. Trauma-informed care (TIC) provides a safe and supportive healthcare environment for patients who have experienced trauma. Educating healthcare providers improves knowledge, attitudes, and skills related to TIC. However, nursing programs do not systematically integrate TIC education.

*Purpose:* To create, implement, and evaluate nursing content on TIC at the graduate and undergraduate levels at one university.

*Method:* A pretest-posttest survey was utilized to assess changes in TIC knowledge, attitudes, and skills related to the delivery of content on trauma and TIC to students in three courses at one large Midwestern university in January 2019. Safety, acceptability, and transferability were also measured.

*Findings:* The content improved nursing students' knowledge and skills related to providing TIC. Further, content on TIC is acceptable to both undergraduate and graduate students and is transferrable to non-nursing students.

*Discussion:* The current study provides a trauma-informed nursing education model that is safe, appropriate, acceptable, and efficacious.

## 1. Introduction

Trauma, defined by the Substance Abuse and Mental Health Services Administration (SAMHSA) as a health problem caused by "violence, abuse, neglect, loss, disaster, war, and other emotionally harmful experiences," is a significant contributor to morbidity and mortality (SAMHSA, 2014a; Centers for Disease Control and Prevention [CDC], 2016; Felitti et al., 1998). Trauma is associated with a myriad of mental and physical health outcomes, including post-traumatic stress disorder (PTSD), depression, cardiovascular disease, accelerated cellular aging, cancer, chronic lung disease, and liver disease (Felitti et al., 1998; Griffiths et al., 2007; Wolf and Schnurr, 2016). Further, individuals who have experienced trauma and have been diagnosed with PTSD have poor quality of life, especially individuals with PTSD and comorbid anxiety (Agorastos et al., 2014; Warsaw et al., 1993). Due to the adverse health effects of trauma, the need for trauma-informed healthcare has been well established in the literature (Machtinger et al., 2015; Butler et al., 2011).

The trauma-informed care (TIC) framework was developed in response to a growing body of evidence describing the lifelong detrimental physical, emotional, and mental health effects experienced by individuals with a history of trauma, including adverse childhood experiences (ACEs) (Felitti et al., 1998). TIC provides a framework for delivering care that realizes that any patient seeking healthcare could have a history of trauma and may need a safe environment to prevent re-traumatization (see Table 1; SAMHSA, 2014a). Educating healthcare providers on trauma and the core assumptions and principles of TIC has been shown to improve provider knowledge, attitudes, and skills (Choi and Seng, 2015; Ding et al., 2016). However, this education has been largely targeted at practicing nurses through continuing professional education (Choi and Seng, 2015; Ding et al., 2016). Despite the need for education on TIC, undergraduate and graduate nursing education lags behind the other health sciences, including psychology, psychiatry, and social work (Li et al., 2019).

## 2. Background

As the largest professional healthcare workforce, providing care in

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**Table 1**
Components of trauma-informed care as defined by the Substance Abuse and Mental Health Services Administration (SAMHSA).

Trauma-informed care is grounded in four core assumptions:
1. Realizing that trauma has widespread impacts and that there are various potential pathways to recovery.
2. Recognizing the signs and symptoms of trauma in patients, their family members, co-workers, and other system stakeholders.
3. Responding by integrating knowledge on trauma into system-wide practices, policies, and procedures.
4. Resisting the re-traumatization of patients, staff members, and family members.

Trauma-informed care incorporates six key principles:
1. Safety: Ensuring that patient and staff member safety is a top priority, both physically and psychologically.
2. Trustworthiness and Transparency: The system operates in a transparent manner with the intention of enhancing and sustaining trust among and between all levels of the system (i.e., administrators, staff, and patients).
3. Peer Support: Those who have experienced trauma are encouraged to heal together through mutual self-help.
4. Collaboration and Mutuality: Recognition that all individuals in an organization have a role to play in creating and maintaining a trauma-informed system. Partnerships are emphasized in an attempt to level power differentials.
5. Empowerment, Voice, and Choice: Strengths and experience are emphasized in an attempt to build resilience and promote healing. Shared decision-making is emphasized in the recovery process.
6. Cultural, Historical, and Gender Issues: Identity is recognized as a critical component of healing. Policies and procedures that are responsive to individual identities and intersectionality are integrated.

Note: See SAMHSA, 2014a for more information on the trauma-informed care framework.

all sectors to patients across the lifespan, nurses are in a unique position to provide TIC and impact the quality of care patients receive (National Council of State Boards of Nursing, 2018). One method for better preparing nurses is through the implementation of trauma and TIC education in nursing programs (Cannon et al., under review). Li et al. (2019) highlight the need for content on trauma and TIC in nursing education and provide suggestions for content and delivery methods derived from other health sciences. Additionally, our previous work with nursing faculty and students shows support for the implementation of TIC content at the undergraduate and graduate levels (Cannon et al., under review).

While the primary goal of TIC education is to provide better and more effective care for patients, nursing students may also benefit, as the TIC framework is grounded in the need to create a safe environment for all individuals working within a healthcare system. Just as patients who have experienced trauma may experience re-traumatization in a healthcare setting, healthcare providers are also at risk for re-traumatization when experiencing circumstances with sensory cues or salient emotions that cause the remembrance of their own past trauma(s) (Machtinger et al., 2015). This risk may be compounded by the fact that individuals drawn to helping professions have a higher incidence of trauma than the general population (SAMHSA, 2014b; Bercier and Maynard, 2015). Indeed, nursing is no exception, with one study at a large Midwestern university finding that nearly two-thirds of nursing students reported a history of trauma (Cannon et al., under review). Furthermore, healthcare providers without a history of trauma may experience secondary traumatic stress, or emotional duress caused by exposure to the traumatic experiences of their patients (Machtinger et al., 2015). Research suggests that educating healthcare providers on trauma may reduce the adverse effects of exposure to patient trauma (Sprang et al., 2007). Given the prevalence of trauma among nursing students and recommendations for delivery of sensitive content from other health fields, TIC content should be delivered using a safe approach to prevent secondary traumatic stress and re-traumatization in nursing students (Cannon et al., under review; Li et al., 2019).

Per prior research, TIC educational frameworks should be grounded in the creation of a safe environment for students (Agllias, 2012; Breckenridge and James, 2010; Li et al., 2019). In order to ensure student safety, seven key principles should be followed to prevent re-traumatization and secondary traumatic stress (Li et al., 2019). First, students should be prepared by being informed about secondary traumatic stress and re-traumatization. Second, ongoing assessment should be built in through check-ins throughout the learning process. Next, instructors should be prepared to respond to students' trauma disclosures, both in and outside of class. Instructors should also titrate students' exposure to the traumatic material and include positive or uplifting material in conjunction with content on trauma. Instructors should give students control over the class material so that they are able to engage to the degree they feel able and should work to build safety through clear boundaries, debriefing, being approachable, and building rapport. Finally, the importance of self-care should be emphasized and built-in self-care opportunities should be utilized, where possible.

## 3. Purpose

The purpose of the current project was to create, implement, and evaluate course content on TIC for nursing students using the seven key principles of a TIC educational framework (Li et al., 2019). The content was developed based on input from faculty and students at one large Midwestern university, as well as best practices derived from other health sciences. The project aimed to assess: 1) changes in knowledge, attitudes, and skills related to TIC among nursing students receiving the content, 2) safety and acceptability of the content, and 3) transferability of the content to non-nursing students.

## 4. Methods

A pretest-posttest multimethod study design was utilized to assess changes in knowledge, attitudes, and skills related to TIC following delivery of content on trauma and TIC to students in three courses at one large Midwestern university in January 2019. The three courses included an undergraduate pediatrics nursing course, a graduate primary care nursing course (required for nurse practitioner and nurse midwifery students), and an undergraduate course on gender-based violence cross-listed in nursing and women's studies. These three courses were identified as appropriate targets for content on TIC and trauma in semi-structured interviews undertaken in an earlier phase of this work (results not shown). The two nursing courses were chosen as they are required courses for undergraduate and graduate students, respectively, and our prior work indicates that content on trauma and TIC is seen as foundational for all nursing students (Cannon et al., under review). The gender-based violence course was included to assess transferability of the content. The course content was also developed as part of the study.

### 4.1. Ethical approval

This study was granted an exemption by the University of Michigan-Institutional Review Board under the federal exemption category regulating studies of existing educational methodology. Prior to the collection of any data, students were informed that their participation was voluntary, that the data would be used to assess the effectiveness of the curriculum related to TIC knowledge, attitudes, and skills, and that their responses were anonymous.

### 4.2. Course content development

Resources from the Substance Abuse and Mental Health Services Administration's (SAMHSA) National Center on Trauma Informed Care (NCTIC) were utilized as a contextual framework (SAMHSA, n.d.; SAMHSA, 2014a; SAMHSA, 2014b). The content was developed by a group of faculty at the School of Nursing working on methods of creating and studying a variety of interventions in order to address the physical and mental health effects of trauma.

**Table 2**
Cognitive interview sample characteristics ($N = 11$).

| | Faculty ($N = 5$) | Students ($N = 6$) |
|---|---|---|
| | % (n) | % (n) |
| Age in years, mean (range) | 49.0 (38–69) | 23.5 (21–27) |
| Gender identity | | |
| Female | 100.0% (5) | 83.3% (5) |
| Male | 0.0% (0) | 16.7% (1) |
| Race/Ethnicity | | |
| White | 80.0% (4) | 83.3% (5) |
| Asian | 20.0% (1) | 16.7% (1) |
| Level of education | | |
| Senior | – | 50.0% (3) |
| Masters student | – | 16.7% (1) |
| Doctor of Nursing Practice (DNP) student | – | 16.7% (1) |
| PhD student | – | 16.7% (1) |
| Degree | | |
| DNP | 20.0% (1) | – |
| PhD | 80.0% (4) | – |
| Experience working with individuals with a trauma history | | |
| Less than a year | – | 33.3% (2) |
| 1–2 years | – | 33.3% (2) |
| 2–5 years | – | 33.3% (2) |

Following development, the course content was tested using cognitive interviews with five nursing faculty and six nursing students (Beatty and Willis, 2007). The cognitive interviews allowed us to assess participant understanding of the material, points of confusion, things that should be changed or clarified, and effective content. Demographics for cognitive interview participants are presented in Table 2. Based on feedback from these cognitive interviews, revisions were made to the course content, including: a) the addition of a test bank of questions related to the content, b) the addition of discussion questions embedded throughout the lecture, c) changing the case study from a diagnostic focus (i.e., diagnosing PTSD) to an interactive one meant to stimulate discussion on how to implement TIC with patients and colleagues (i.e., identifying signs and symptoms of trauma, discussing how to create a trauma-informed environment for patients exhibiting trauma symptoms), and d) tailoring the content on trauma-informed organizations specifically to graduate students. The cognitive interviews confirmed that the content was presented in a logical format with helpful visuals and that the level of the content was appropriate. The cognitive interview participants described the content as "critically important" since information on mandatory reporting, self-care, and secondary traumatic stress trauma is not covered systematically in other nursing courses.

The final content included: a) three pre-reading articles (American Academy of Pediatrics, 2014; Felitti et al., 1998; The National Child Traumatic Stress Network, 2018); b) Dr. Nadine Burke Harris' TED Talk *How Childhood Trauma Affects Health Across a Lifetime* (Harris, 2014); c) an overview of trauma as defined by SAMHSA (SAMHSA, 2014a); d) an overview of adverse childhood experiences (ACEs) and associated health outcomes; e) the neurobiology of trauma; f) TIC principles, strategies for implementation, and approaches to patient care; g) an overview of resilience; h) trauma-informed organizations; i) mandatory reporting in nursing; j) information on re-traumatization, secondary traumatic stress, self-care, and burnout for providers; and k) a case study about TIC in practice. The course content also included a test bank of questions that could be used by course instructors for assessments. Students were provided with a packet of resources with tips for self-care and a list of university, local, and national resources related to mental health and healing from trauma. This resource packet was uploaded to the course learning website for each course to ensure accessibility. Due to feedback from the cognitive interview participants, the information on trauma-informed organizations was leveled for and presented only to graduate nursing students.

The seven key principles of TIC educational frameworks were also explicitly adhered to in the creation of the course content (Li et al., 2019). Students were provided with information on secondary traumatic stress and re-traumatization, both to prepare for the possibility of these reactions in class and in nursing practice. There were also brief check-ins built into the lecture and the presenters made themselves available to students after the class session. Instructors informed students that they were allowed to participate in the lecture to the degree that they were able, letting students know that it was okay to come and go from the classroom as needed. Instructors were prepared for the possibility of student disclosures and prefaced the material before the class session, including an acknowledgement that students themselves may be survivors of trauma. Additionally, a layout for the content to be covered in lecture was provided to students at the beginning of the lecture. Opportunities for discussion were built into the course session, in addition to content on resilience and self-care. Finally, all students were provided with a sheet of resources related to mental health and trauma.

### 4.3. Materials

The pretest and posttest surveys were adapted from an instrument developed by Choi and Seng (2015) to evaluate education on TIC for postgraduate nurses delivering perinatal care. Their 11-item instrument was designed to assess knowledge, attitudes, and skills related to TIC. Both pretest and posttest surveys had 10 Likert scale items asking the participant to rank their level of agreement with each statement, as well as 1 open-ended question.

In the current study, the adapted pretest survey consisted of 14 items (13 quantitative, 1 qualitative) and the posttest survey comprised 20 items (18 quantitative, 2 qualitative). All 10 quantitative items were retained from the Choi and Seng study (2015). Three quantitative items about knowledge of the neurobiology of trauma, ability to define TIC, and confidence in ability to provide TIC were added to both the pretest and posttest surveys. Acceptability was measured through four quantitative items about appropriateness, comfort, and safety of the content, which were added to the posttest survey. Additionally, the original qualitative item on the existing posttest survey was replaced with two new qualitative items, asking, "Please give an example of how you might apply what you learned about trauma-informed care in a patient setting," and, "What improvements would make the content or presentation method more effective for your learning?" Finally, standard demographic questions (including age, gender identity, race/ethnicity, and year in school) were asked in order to assess the representativeness of the sample for the population under study. Further, students answered a question assessing previous experience working with individuals who have experienced trauma.

All quantitative items were scored on a 5-point Likert scale ranging from 1 = strongly disagree to 5 = strongly agree. A "Not applicable" option was also added for the purposes of this study; however, "Not Applicable" responses were excluded from analyses. Scores were compared between pretest and posttest for each individual item. Additionally, mean scores were computed for the knowledge, attitude, and skills subscales. Higher scores indicate greater agreement for all quantitative items.

### 4.4. Procedure

Aside from the pre-reading articles, which were completed prior to the lecture, all study-related activities occurred in a single class session for each of the included courses. Students in each of the three courses completed the pretest survey at the beginning of the in-class period. Next, the course content on TIC was delivered via an in-person lecture by TIC experts at the university. The course content was delivered in

75 min for both of the undergraduate courses. With the addition of the trauma-informed organizations material for the graduate students, the content was delivered in 160 min. Students completed the posttest survey in the classroom following the presentation. All survey data were collected via Qualtrics. No identifying information was collected from participants. Instead, participants assigned themselves a unique coded identifier consisting of their father's first two initials, mother's first two initials, number of siblings, and birth order number which was used to connect pretest and posttest survey data. No unique coded identifiers were the same between participants. If an identifier was present only in pretest or posttest data, it was assumed that the individual did not complete the other survey and their responses were excluded from analyses. Participants were not given an incentive to complete the surveys.

### 4.5. Data analysis

#### 4.5.1. Quantitative data analysis

Data were analyzed in SPSS version 25 (IBM Corp., Armonk, NY). Descriptive statistics, including frequencies, means, and standard deviations, were computed for the demographics and knowledge, attitudes, and skills measures. Paired samples *t*-tests were used to assess changes in knowledge, attitudes, and skills between pretest and posttest. Two-tailed *p*-values of $p < .05$ were considered statistically significant. Mean differences, standard deviations, 95% confidence intervals, and Cohen's *d* effect sizes are reported. Cohen's *d* values larger than 0.8 indicate large effect sizes (Lakens, 2013). Data cleaning and analyses were conducted by the first author (LMC).

#### 4.5.2. Qualitative data analysis

Inductive content analysis was used to analyze the qualitative data (Elo and Kyngäs, 2008). Two authors (LMC & EMC) utilized open coding to categorize the responses from the qualitative questions (Elo and Kyngäs, 2008). Coding was completed independently, followed by a meeting during which codes were discussed, and concordance was sought in the categorization of each response. Differences in coding were settled through a process of discussion and code definition refinement.

Per Elo et al. (2014), trustworthiness of the content analysis must be addressed in preparation, organization, and reporting. In this study, trustworthiness was addressed at preparation by ensuring that we had an appropriate sampling strategy. By sampling from an undergraduate nursing course, a graduate nursing course, and a non-nursing undergraduate course we could compare data by level of education and major (which allowed us to assess transferability). Additionally, trustworthiness at the organizational phase was addressed by utilizing two independent coders who met and discussed any divergent opinions in the coding process. Finally, trustworthiness is addressed in reporting by connecting the questions generating data to the results that are reported, in addition to reporting illustrative quotations.

## 5. Findings

### 5.1. Quantitative data

Although 151 participants completed at least one survey, the final analytic sample was reduced to 128 participants that completed both pretest and posttest surveys. Table 3 describes the demographic characteristics of the study sample. The majority of participants were female (93.8%), white (73.4%), and nursing students (86.7%). Most students were third year undergraduates (59.4%) or Master's degree candidates (19.5%) and 12.5% were Doctor of Nursing Practice (DNP) candidates. The majority of students reported having no experience (43.0%) or less than one year of experience (34.4%) working with individuals with a history of trauma.

**Table 3**
Sample characteristics ($N = 128$).

| | % (n) |
|---|---|
| Age in years, mean (range) | 23.22 (18–46) |
| Course | |
| Undergraduate Pediatric Nursing | 52.3% (67) |
| Graduate Acute Care Nursing | 32.0% (41) |
| Undergraduate Gender-Based Violence Course | 15.6% (20) |
| Gender identity | |
| Female | 93.8% (120) |
| Male | 5.5% (7) |
| Prefer not to disclose | 0.8% (1) |
| Race/Ethnicity | |
| White | 73.4% (94) |
| Asian | 14.8% (19) |
| Black | 3.1% (4) |
| Latinx | 2.3% (3) |
| Middle Eastern/North African | 0.8% (1) |
| Native Hawaiian/Other Pacific Islander | 0.8% (1) |
| Multiple Ethnicities | 4.7% (6) |
| Level of education | |
| First year undergraduate | 0.8% (1) |
| Second year undergraduate | 4.7% (6) |
| Third year undergraduate | 59.4% (76) |
| Fourth year undergraduate | 3.1% (4) |
| Masters student | 19.5% (25) |
| Doctor of Nursing Practice (DNP) student | 12.5% (16) |
| Major | |
| Nursing | 86.7% (111) |
| Biological Sciences | 5.5% (7) |
| Women's Studies | 3.9% (5) |
| Social Sciences[a] | 1.6% (2) |
| Art | 1.6% (2) |
| Undeclared | 0.8% (1) |
| Experience working with individuals with a trauma history | |
| None | 43.0% (55) |
| Less than a year | 34.4% (44) |
| 1–2 years | 12.5% (16) |
| 2–5 years | 7.0% (9) |
| 5+ years | 3.1% (4) |

[a] Includes psychology and sociology.

#### 5.1.1. Knowledge, attitudes, and skills

Table 4 describes the change in participants' knowledge, attitudes, and skills between pretest and posttest using paired samples *t*-tests. Overall, there were significant increases in knowledge, ($M = 1.171$, $SD = 0.625$), $t(127) = 21.18$, $p < .001$, 95% CI [1.062, 1.280], Cohen's $d = 1.874$, attitudes, ($M = 0.161$, $SD = 0.405$), $t(121) = 4.39$, $p < .001$, 95% CI [0.088, 0.233], Cohen's $d = 0.397$, and skills, ($M = 0.784$, $SD = 0.716$), $t(125) = 12.29$, $p < .001$, 95% CI [0.658, 0.911], Cohen's $d = 1.095$, between pretest and posttest. Knowledge underwent the most significant increases between pretest and posttest. Specifically, knowledge increases with large effect sizes included confidence in understanding TIC, $t(127) = 15.20$, $p < .001$, 95% CI [1.087, 1.413], Cohen's $d = 1.343$, the ability to define TIC, $t(127) = 16.57$, $p < .001$, 95% CI [1.197, 1.522], Cohen's $d = 1.464$, the ability to identify trauma triggers and symptoms, $t(127) = 14.59$, $p < .001$, 95% CI [1.135, 1.490], Cohen's $d = 1.290$, and understanding the neurobiology of trauma, $t(127) = 22.64$, $p < .001$, 95% CI [1.667, 1.986], Cohen's $d = 2.010$. Lastly, we observed significant increases with large effect sizes in self-reported skills, specifically confidence in ability to provide TIC, $t(121) = 13.40$, $p < .001$, 95% CI [1.090, 1.468], Cohen's $d = 1.213$.

#### 5.1.2. Safety and acceptability

Table 5 presents the results related to the acceptability of the lecture content and presentation style. Students reported that both the level of the content ($M = 4.51$, $SD = 0.59$) and teaching method ($M = 4.41$, $SD = 0.63$) were appropriate. They also reported that they felt safe learning about the content ($M = 4.59$, $SD = 0.51$) and that they felt

**Table 4**
Paired samples *t*-tests of changes in knowledge, attitudes, and skills.

| | Full Sample (n = 128) | | | | Undergraduate Pediatric Nursing (*n* = 67) | | | | Graduate Acute Care Nursing (*n* = 41) | | | | Undergraduate Gender-Based Violence (*n* = 20) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Mean Difference (SD) | 95% Confidence Interval | | Cohen's d | Mean Difference (SD) | 95% Confidence Interval | | Cohen's d | Mean Difference (SD) | 95% Confidence Interval | | Cohen's d | Mean Difference (SD) | 95% Confidence Interval | | Cohen's d |
| Knowledge | 1.171 (0.625) | 1.062 | 1.280 | 1.874 | 1.296 (0.604) | 1.148 | 1.443 | 2.144 | 1.135 (0.717) | 0.799 | 1.471 | 1.582 | 0.985 (0.577) | 0.803 | 1.167 | 1.708 |
| Hope to learn a lot/Learned a lot | 0.079 (0.733) | −0.050 | 0.209 | 0.108 | 0.030 (0.627) | −0.123 | 0.183 | 0.048 | 0.611 (0.778) | 0.224 | 0.998 | 0.786 | −0.073 (0.787) | −0.322 | 0.175 | −0.093 |
| Confident in understanding of TIC | 1.25 (0.931) | 1.087 | 1.413 | 1.343 | 1.522 (0.894) | 1.304 | 1.740 | 1.703 | 0.850 (0.813) | 0.470 | 1.230 | 1.046 | 1.000 (0.922) | 0.709 | 1.291 | 1.085 |
| Can define TIC | 1.359 (0.928) | 1.197 | 1.522 | 1.464 | 1.448 (0.909) | 1.226 | 1.670 | 1.592 | 1.550 (1.099) | 1.036 | 2.064 | 1.410 | 1.122 (0.842) | 0.856 | 1.388 | 1.332 |
| Can identify triggers and trauma symptoms | 1.313 (1.018) | 1.135 | 1.490 | 1.290 | 1.463 (1.005) | 1.218 | 1.708 | 1.455 | 1.000 (1.170) | 0.453 | 1.547 | 0.855 | 1.220 (0.936) | 0.924 | 1.515 | 1.303 |
| Understand neurobiology of trauma | 1.827 (0.909) | 1.667 | 1.986 | 2.010 | 2.015 (0.896) | 1.796 | 2.233 | 2.249 | 1.526 (1.219) | 0.939 | 2.114 | 1.252 | 1.659 (0.693) | 1.440 | 1.877 | 2.393 |
| Attitudes | 0.161 (0.405) | 0.088 | 0.233 | 0.397 | 0.140 (0.375) | 0.049 | 0.232 | 0.374 | 0.371 (0.470) | 0.100 | 0.643 | 0.791 | 0.122 (0.417) | −0.010 | 0.254 | 0.293 |
| Important to practice TIC | 0.246 (0.719) | 0.117 | 0.375 | 0.342 | 0.239 (0.761) | 0.053 | 0.424 | 0.314 | 0.500 (0.650) | 0.124 | 0.876 | 0.769 | 0.171 (0.667) | −0.040 | 0.381 | 0.256 |
| TIC relevant to patients | 0.133 (0.501) | 0.043 | 0.224 | 0.265 | 0.119 (0.537) | −0.012 | 0.250 | 0.222 | 0.250 (0.452) | −0.037 | 0.537 | 0.553 | 0.122 (0.458) | −0.023 | 0.267 | 0.266 |
| Patients will benefit from TIC | 0.092 (0.430) | 0.014 | 0.169 | 0.214 | 0.075 (0.401) | −0.023 | 0.173 | 0.186 | 0.250 (0.452) | −0.037 | 0.537 | 0.553 | 0.073 (0.469) | −0.075 | 0.221 | 0.156 |
| TIC will improve patient outcomes | 0.140 (0.488) | 0.053 | 0.228 | 0.287 | 0.149 (0.500) | 0.027 | 0.271 | 0.298 | 0.231 (0.439) | −0.034 | 0.496 | 0.526 | 0.098 (0.490) | −0.057 | 0.252 | 0.199 |
| TIC will improve staff/patient communication | 0.149 (0.477) | 0.063 | 0.235 | 0.312 | 0.119 (0.445) | 0.011 | 0.228 | 0.269 | 0.308 (0.480) | 0.017 | 0.598 | 0.641 | 0.146 (0.527) | −0.020 | 0.313 | 0.278 |
| Skills | 0.784 (0.716) | 0.658 | 0.911 | 1.095 | 0.920 (0.697) | 0.751 | 1.090 | 1.321 | 0.806 (0.912) | 0.352 | 1.259 | 0.884 | 0.553 (0.604) | 0.362 | 0.743 | 0.916 |
| Prepared to respond to all patients as possible trauma survivors | 0.951 (1.043) | 0.764 | 1.138 | 0.912 | 1.075 (1.091) | 0.808 | 1.341 | 0.985 | 1.214 (1.424) | 0.392 | 2.036 | 0.853 | 0.659 (0.728) | 0.429 | 0.888 | 0.904 |
| Plan to use TIC strategies | 0.138 (0.631) | 0.025 | 0.251 | 0.219 | 0.149 (0.657) | −0.011 | 0.310 | 0.227 | 0.133 (0.352) | −0.062 | 0.328 | 0.379 | 0.122 (0.678) | −0.092 | 0.336 | 0.180 |
| Confident in ability to provide TIC | 1.279 (1.054) | 1.090 | 1.468 | 1.213 | 1.537 (1.035) | 1.285 | 1.790 | 1.486 | 1.214 (1.051) | 0.608 | 1.821 | 1.155 | 0.878 (0.980) | 0.569 | 1.187 | 0.896 |

Notes: Mean differences represent change in means between pretest and posttest. SD = Standard Deviation. Cohen's d is the effect size.

**Table 5**
Acceptability of the lecture content and presentation style.

| | Full sample (n = 128) | Undergraduate Pediatric Nursing (n = 67) | Graduate Acute Care Nursing (n = 41) | Undergraduate Gender-Based Violence (n = 20) |
|---|---|---|---|---|
| | M (SD) | M (SD) | M (SD) | M (SD) |
| Level of the content was appropriate | 4.51 (0.59) | 4.49 (0.56) | 4.39 (0.67) | 4.80 (0.41) |
| Teaching method was appropriate | 4.41 (0.63) | 4.36 (0.67) | 4.32 (0.61) | 4.75 (0.44) |
| Felt safe learning about the content | 4.59 (0.51) | 4.60 (0.49) | 4.44 (0.55) | 4.85 (0.37) |
| Felt comfortable engaging in discussion | 4.45 (0.63) | 4.45 (0.61) | 4.24 (0.66) | 4.85 (0.37) |

Note: M = Mean. SD = Standard Deviation.

comfortable engaging in discussion during the lecture (M = 4.45, SD = 0.63).

#### *5.1.3. Transferability*

According to sub-group analysis, there were significant increases on most knowledge items, as well as in overall knowledge, across all three groups. In contrast to the two groups of undergraduate students who demonstrated significant increases in overall attitudes, there were no changes in attitudes among graduate students. Further, all three groups reported significant increases in skills between pretest and posttest.

### *5.2. Scale reliability*

The internal consistency reliability for the scale was examined at both pretest and posttest. At pretest, Cronbach's alpha was 0.82 and at posttest, Cronbach's alpha was 0.92, indicating high internal consistency.

### *5.3. Qualitative data*

Students were asked open-ended questions to identify ways in which they would practically apply what they learned about TIC in patient care settings and to gather their suggestions for improving the course content, presentation, and content delivery.

#### *5.3.1. How students plan to apply what they learned*

Students described a number of ways in which they would practically apply what they learned about TIC in patient settings. Following the presentation of TIC content, twenty students described how they now conceptualized TIC as a "standard precaution" and would assume that all patients may have experienced trauma. Undergraduate student A stated, "I understand how important it is to treat trauma-informed care like standard precautions – to err on the side of assuming people may have sustained a trauma in their life because of how common it is." Thirteen students also reported that they would screen their patients for trauma, recognizing the importance of universal screening. Graduate student A explained that they could "apply trauma-informed care by assuming many or all patients have experienced trauma in their life, using screening tools, having open conversations, building rapport, etc." This student also highlighted the importance of building rapport with patients, an idea which was echoed by fifteen other students who described plans to provide sensitive and non-judgmental care. Graduate student B described how they would "not judge someone's behavior, but be more empathic and understand [how] previous experiences may inform their current behavior." Moreover, twenty-two students reported that they planned to reframe patient non-compliance by taking the time to understand how trauma may be impacting patients' behaviors and willingness to talk. Graduate student C explained that they "will take more time to wonder why [their] patients act the way they do with regard to non-compliance, instead of being so quick to write them off."

Further, forty-two students described how they felt more prepared to recognize signs and symptoms of trauma in their patients. Graduate student D stated that they would "recognize and identify behavioral patterns that might be associated with a traumatic event and create a safe environment to discuss a potential traumatic event." This student, as well as seven others, also recognized the importance of creating safe spaces for patients. Another strategy identified by thirteen students was providing resources to patients. Graduate student E stated that they would practice TIC by "providing appropriate resources and following up with the patient." Fourteen undergraduate students also learned that they are mandatory reporters of child and elder abuse and neglect. Finally, ten students reported how they would be more cognizant of the ways in which their own practices and those of organizations within which they work may contribute to patient re-traumatization. Graduate student F stated that they would "redesign the structure of the room [and] make sure to always ask for consent and give choices when possible."

#### *5.3.2. Suggestions for improvement of content and delivery*

Students detailed various suggestions for improving the course content and presentation logistics. First, thirty-six students suggested that the lecture could include additional interactive and engaging components, including more videos or opportunities for discussion. Graduate student G stated, "More interactive components. I really liked the TED Talk." Seven undergraduate students also stated that they would like to have a longer presentation, as some aspects of the content felt rushed. Undergraduate student B stated that they wished there was "enough time for debriefing at the end of the presentation." Four graduate students stated that additional breaks would also be helpful. Graduate student H stated, "two small breaks versus one long break would help to retain information."

Four students stated that they would be interested in getting the perspectives of trauma survivors. Graduate student I explained that "it would be interesting to hear stories from survivors of human trafficking or police/healthcare providers who have worked closely with human trafficking." Four students stated that they wanted more information about the neurobiology of trauma and that they would like to learn about additional research related to TIC and ACEs. Graduate student J suggested to "bring in more research done on the topic, even if they are much smaller than the ACE study." Finally, twenty-six students reported that they would like additional examples from practice, including more case studies related to how to respond to patients who have experienced trauma. Undergraduate student C stated, "I think more examples of how a nurse would interact with a traumatized patient would be helpful."

## 6. Discussion and recommendations

This study finds that education on TIC and trauma improved nursing students' knowledge, attitudes, and skills related to providing trauma-informed care. Since scores on most attitude measures were high on the pretest survey, there was less room for improvement on these items for both the full sample, and, in particular, for the graduate student subsample. Given the more robust changes observed in knowledge and skills, this suggests that students already recognize the need for TIC, but

do not have the corresponding knowledge or skills needed to provide this care prior to receiving education. Further, our study finds that content on TIC and trauma is acceptable to both undergraduate and graduate students. Finally, the findings suggest that content on trauma and TIC is transferrable to non-nursing students, who also had significant improvements in knowledge, attitudes, and skills and found the content acceptable.

Past research supports the need for expanded education on TIC in interdisciplinary health education and practice (Krosman and Levy-Carrick, 2019; Vasquez and Boel-Studt, 2017). In particular, this education is fundamental for nursing students and professionals who do not currently receive any systematic education on TIC, despite their role as frontline providers who are well-poised to recognize the signs and symptoms of trauma in their patients (Li et al., 2019). Research suggests that there are currently missed opportunities in identifying ACEs in pediatric populations (Oral et al., 2016), as well as deficiencies in pediatric nurses' ability to provide education on trauma to parents of children who have experienced ACEs (Kassam-Adams et al., 2015). Further, Kalmakis et al. (2017) find that nurse practitioners working with adult patients also lack confidence in their ability to screen for prior childhood trauma. The results of the current study support findings from past research indicating that education on TIC improves nurses' knowledge, attitudes, and skills related to providing trauma-informed care (Choi and Seng, 2015). As such, deficits in knowledge, confidence, and skills may be remedied by providing education on TIC to nursing students prior to entry into practice.

In this study, content was delivered in a style consistent with the current method of delivery for the undergraduate and graduate didactic courses at this university, with assigned pre-readings prior to the delivery of lecture content. Further, the content was delivered via guest lectures in established courses. This method was chosen in order to easily integrate the material into the existing nursing curriculum to bolster long-term adoption of the content. However, the methodology could be revised to fit different modalities for content delivery, including distance or online education utilizing adult learning principles using required readings, short voice-over PowerPoints, videos, group case study activities, and facilitated discussion boards.

This study focused on the impact of the delivery of content related to trauma and TIC on nursing student's knowledge, attitudes, and skills. While knowledge during school does not necessarily translate to changes in practice, it is a first step in changing the practice arena, particularly by teaching students to manage and prevent compassion fatigue, burnout, and secondary traumatic stress. Further research is needed to assess translation of education into practice and the effect on nursing compassion fatigue, burnout, and secondary traumatic stress.

### 6.1. Strengths and limitations

This study had a number of strengths. First, the sample size was large, allowing us to estimate the effect size of trauma-informed nursing education on knowledge, attitudes, and skills. Further, we were able to pre-test this content with nursing students and faculty to assess relevance and appropriateness prior to pilot testing. As we were able to pilot test the content in multiple courses, we were able assess the acceptability and efficacy at both the undergraduate and graduate level, as well as transferability to students in other subject areas. Finally, we were able to collect qualitative data that will allow us to improve and refine the content and delivery logistics for the future.

The current study has several limitations. First, the data was derived from a sample of students at one large, public Midwestern university. As such, the data may not be generalizable to other schools of nursing at private schools or smaller institutions in other geographic regions. Second, only pretest and posttest data were collected from this sample. Although we see significant effects of this education immediately following delivery, we are unable to assess if these changes are sustained long-term and applied in direct patient care. Future studies of the long-term impacts of trauma-informed nursing education on patient care and outcomes are warranted. Furthermore, as noted in the student feedback, due to time constraints, we were limited in the number of interactive components and the depth of discussion we were able to incorporate. In the future, content should be delivered in at least 120 min for undergraduate students and 180 min for graduate students. As this study involved data collection via a survey, participants may have been subject to social desirability bias and may have responded in a manner that they expected researchers to find favorable. Additionally, since self-reported measures of knowledge, attitudes, and skills were used, the effects of the educational content on nursing practice are unclear and warrant future longitudinal studies.

## 7. Conclusions

This study builds on prior work establishing the need for education on TIC for nursing students that is sensitive and resists student re-traumatization. The current study provides a model of trauma-informed nursing education that is safe, appropriate, acceptable, and efficacious. Future research should evaluate the acceptability, feasibility, and efficacy of integrating content on TIC and trauma throughout nursing programs, including models in which content is taught early in the curriculum (i.e., freshman year) and reinforced across multiple courses.

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## Ethical approval

This study was granted an exemption by the University of Michigan's Health Sciences and Behavioral Sciences Institutional Review Board under the federal exemption category regulating studies of existing educational methodology.

## Declaration of competing interest

None of the authors have conflicts of interest to disclose.

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