Trauma-Informed Care Initiative in the NICU

Nurse Perspectives

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INTRODUCTION

Trauma is a distressing event or circumstance experienced by an individual that results in adverse effects, impacting function and well-being.[1] Trauma-informed care (TIC) is an emerging intervention approach in health care that recognizes the impact of trauma and, in turn, provides environments that are safe, respectful, and welcoming for infants, family, and staff.[2]

The stressful environment of the neonatal intensive care unit (NICU), while supporting vulnerable children, can be negatively impactful on nurses working in this setting; they are primary caregivers of a vulnerable population.[3,4]

Daily NICU stressors for infants include separation from parents, repetitive painful procedures, constant change of caregivers, continuous noise, harsh lighting, and noxious smells.[5] Parents and families may experience trauma as they fear for their infants' survival, are deprived of a "normal" start to their children's lives, and feel uncertainty and a lack of control regarding the future. The stress from this trauma may impact a parent's health and well-being during the NICU experience.[1,6] Parents may feel overwhelmed by the technologically advanced equipment, tubes, and medical procedures, and may experience emotional challenges or disruptions in roles and occupations.[7-9]

Increasing health care providers' knowledge about TIC in the NICU may increase the quality of care and promote better outcomes for those involved in the treatment process. Nurses are uniquely positioned to play a role in the implementation of a TIC approach with infants and families in the NICU.

This is a two-part study in which we:

1. Aimed to determine by a *quantitative analysis* if an educational intervention could improve NICU nurses' awareness of trauma and perspectives about TIC.
2. Assessed by a *qualitative analysis* if NICU nurses incorporate a TIC approach into their practice after completing the TIC educational intervention.

METHODS

Study Design

Part one of our study utilized a quantitative, one-group pretest-posttest design that collected participant demographics, ascertained participants' familiarity and utilization of TIC, and tested participants' knowledge of TIC. Pretesting began in March 2021 and posttest was completed in May 2021. The goal was for participants to take the pretest, complete the educational module, and complete the posttest in one sitting; while not all participants were able to do that, they all completed these tasks within three weeks of initiating them. We compared scores on the knowledge portion of the pretest to results on the posttest.

Part two used a qualitative phenomenological design to solicit perspectives of NICU nurses one year after participating in the TIC educational intervention using interview transcriptions and fieldnotes. The interviews took place in February 2022. Interviews were conducted by student researchers and lasted approximately 30 minutes. The interviews were audio recorded and transcribed via Zoom.

All participants gave informed consent to take part in the study, which was reviewed and approved in March 2021 by both the collaborating institution's (Protocol Number: 2021-13) and Elizabethtown College's (IRB Net ID:1729146-1) institutional review boards.

Materials

Materials for the first part of the study included a pretest that contained three questions about work demographics, asking how many years the participant

worked as a nurse, how many years they worked in the NICU, and what shift they worked most of their hours. The pretest continued with 15 questions, including 10 knowledge-based questions, one familiarity question, and three utilization questions. Questions followed multiple-choice, true/false, and five-point Likert-scale formats (see Fig. 1). Participants completed the pretest, TIC educational intervention, and posttest during working hours.

Upon completing the pretest, participants viewed a 30-minute TIC educational intervention in the form of a self-guided PowerPoint presentation with 39 slides designed by the NICU Developmental Care Team (DCT). The Developmental Care Team is a team of health care professionals who specialize in infant development. The team — which is chaired by NICU therapists, includes nursing staff, and exists independently of this study — regularly provides staff education and trainings, and creates new NICU initiatives.

Content of the PowerPoint presentation was based on current literature and included the definition of TIC, physiological symptoms of stress, and trauma that infants, parents, and professionals may face in the NICU setting.

Finally, participants completed a 16-question posttest, including 15 questions identical to the pretest: 10 knowledge-based questions, one familiarity question, three utilization questions, and one interest question. One additional question gauged participant perception of the educational intervention (see Fig. 1). The cooperating institution's NICU, DCT, and researchers collaborated to create the pretest and posttest.

Participants

We recruited participants for part one of the study using purposeful sampling. The inclusion criteria required participants to be NICU nurses employed by the institution.

The DCT recruited volunteers as participants for part two of the study using purposeful sampling. The part two inclusion criteria required participants to be nurses who participated in the first part of the study and continue to be employed by the institution and work in the NICU.

Emails with links were sent to all the nurses currently working in the NICU. The DCT shared the importance of the information via the nurse manager's weekly email and through personal interactions, yet the timing was challenging because the census in the NICU was very high at that time and there had been tremendous turnover. There were no incentives.

Data Collection

Each participant in part one of the study received an email with a link to access the pretest via Research Electronic Data Capture (REDCap®), a highly secure platform designed to build and manage online surveys and databases.[10] After pretest submission, REDCap® granted participants access to a TIC educational training module link designed by the DCT and researchers. Participants received a third link with access to the posttest after completion of the training module.

In part two of the study, four qualitative unstructured interviews were the primary means of obtaining participants' perspectives of TIC in the NICU. Zoom interviews, which occurred in February 2022, one year after participants completed the educational intervention, were audio recorded and transcribed. We assigned participants with unique identifiers to maintain confidentiality.

Verification Strategies

The scarcity of validated tools that would fulfill our research question resulted in the development of an instrument unique for this study.[11] The DCT and researchers reviewed the survey to confirm all questions were relevant, mutually exclusive, and had comprehensive response scales.

We used a team-based approach to code the interview transcriptions.[12,13] Triangulation of data analysis in this case means we used:

1. Member checking to ensure that our results represented participants' experiences and perspectives.
2. Reflexivity to help verify our interpretation of findings.
3. Bracketing to reduce the potential harmful effects of unidentified preconceptions that may have been related to the research topic.

Data Analysis

For part one of this study, we analyzed the data using paired sample t-tests in the Statistical Package for the Social Sciences (SPSS) software, calculated each subject's score for the pretest and posttest, then used SPSS to convert data into a histogram to determine whether data achieved the criteria for normality.[14] Paired sample t-tests assessed the change and the statistical significance between scores. We labeled results as statistically significant if $p < .05$.

For part two we discovered emergent themes from participant interviews using manual, open coding to analyze the data through the interview transcriptions.

Fig. 1. Pretest and Posttest Questions

1. What are the four Rs of trauma-informed care?
   a. Realize, Recognize, Respond, Replay
   b. Realize, Recognize, Respond, Resist
   c. Realize, Recognize, React, Replay
   d. Read, Rest, Relax, Run
2. In relation to trauma-informed care, ACE stands for:
   a. Adverse childhood experiences
   b. Advanced clinical education
   c. Adverse chronic effects
   d. Attitude care encourage
3. Studies have reported that preterm infants experience about __ stressful procedures per day.
   a. 3 b. 6
   c. 10 d. 16
4. It is important to provide visual stimulation for preterm infants in order to facilitate brain development.
   a. True b. False
5. NICU stress can result in:
   a. Changes in brain structure
   b. Changes in biological set-point circuitry (i.e., HPA axis), aberrations in stress responsivity and stress-sensitive behaviors
   c. Predisposition to a number of neuropsychiatric and behavioral disorders
   d. a and b
   e. a, b, and c
6. Research has identified negative developmental effects of NICU stress in infants through the age of:
   a. 3 years old b. 12 months old
   c. 7 years old d. 6 months old
7. Which of the following are the core measures for age-appropriate care in the NICU?
   a. The healing environment, pain and stress prevention, protected sleep, activities of daily living, family collaborative care
   b. Thermoregulation, pain and stress prevention, respiratory management, nutrition, skin protection
   c. Thermoregulation, nutrition, protected sleep, family-centered rounds, clustered cares
   d. Thermoregulation, family-centered rounds, clustered cares, infant-driven feeding, promoting skin to skin
8. Research shows that signs and symptoms of PTSD experienced by parents of infants in the NICU can be delayed up to __ months after the infant's birth.
   a. 1-3 b. 13-18
   c. 2-5 d. 6-12
9. Nurses experiencing high levels of personal stress are at greater risk for developing which of the following?
   a. Post-traumatic stress disorder
   b. Compassion fatigue
   c. Depression
   d. Chocolate-dependency
10. Moral distress is a precursor to clinician burnout.
    a. True b. False
11. How familiar are you with trauma-informed care in the NICU?
    1-Not familiar at all, 2-Vaguely familiar, 3-Somewhat familiar, 4-Familiar, 5-Very familiar
12. When caring for *infants* in the NICU, I incorporate a TIC approach.
    1-Rarely, 2-Seldom, 3-Occasionally, 4-Frequently, 5-Always
13. When interacting with *parents* of infants in the NICU, I incorporate a TIC approach.
    1-Rarely, 2-Seldom, 3-Occasionally, 4-Frequently, 5-Always
14. I am intentional in using strategies to manage *my* work-related stress.
    1-Rarely, 2-Seldom, 3-Occasionally, 4-Frequently, 5-Always
15. How interested are you in learning more about trauma-informed, age-appropriate care in the NICU?
    1-Not interested, 2-If necessary, 3-Slightly interested, 4-Interested, 5-Very interested

Additional Pretest Questions

- How many years have you worked as a nurse?
- How many years have you worked as a NICU nurse?
- What shift do you work (majority of your hours)?

Additional Posttest Question

16. How much did this PowerPoint increase your understanding of trauma-informed care in the NICU?
    a. Unchanged
    b. Somewhat
    c. Unsure
    d. Very significantly

Answers to knowledge-based questions: 1-b; 2-a; 3-d; 4-False; 5-e; 6-c; 7-a; 8-d; 9-b; 10-True

We used descriptive field notes to supplement and support our understanding of the emergent themes, along with thematic content analysis to analyze transcribed interview data and field notes. An inductive/open coding approach to data analysis allowed us to provide a description of the entire dataset and all potential themes that emerged.

RESULTS

Participant Demographics

The final analysis for part one of the study included a total of 45 nurses who completed both the pretest and posttest; the only institution NICU nurses who did not participate were those who were part of the Developmental Care Team and three participants who were excluded from the demographic analysis due to not completing the demographic survey. Years of experience as a nurse ranged from one to 10-plus, with 53.3% of participants working for more than 10 years. Nurses had a wide range of experience working in the NICU, with one participant working less than one year to 42.2% of participants working over 10 years. Over half the nurses (55.6%) primarily worked during the night shift, while the rest (44.4%) were employed during the day.

Participants in part two of the study included four nurses. Years of experience ranged from six to nine years, and NICU experience ranged from two to seven years. Three participants worked full time, while one worked part time. Three participants worked the day shift, and one worked the night shift.

Part One Findings

Results are based on answers from the pretest and posttest questions. We disseminated findings categorically in the following areas: familiarity, knowledge, utilization, and interest.

After completion of the educational intervention, posttest results indicated increases in familiarity. In response to the question, *How familiar are you with trauma-informed care in the NICU?*, posttest scores increased from 2.2% to 44.4%, revealing a gain of 42.2%.

Ten knowledge-based questions on the pretest and posttest addressed the educational module content. The results highlight a significant increase in the number of correct answers selected in the posttest compared to the pretest. The mean score on the pretest was 50.2%, whereas the mean score on the posttest was 86%, resulting in a change of 35.8%. The paired sample t-tests revealed that the difference between the pretest and posttest scores was statistically significant at $p < .001$.

Regarding utilization, there was a self-reported increase in incorporating a TIC approach with both infants and parents. An equal number of participants in the pretest reported they occasionally and frequently (37.8%) used a TIC approach when working with infants, whereas 66.7% of participants reported in the posttest that they frequently did, a 28.9% gain. Additionally, 26.7% of participants noted in the pretest that they frequently use a TIC approach when working with parents, and in the posttest 64.4% noted that they frequently do, a gain of 37.7%. Because of caregivers' susceptibility to trauma, we asked participants how often they use strategies to mitigate their stress in the workplace. In the pretest 33.3% reported they frequently do, and in the posttest 48.9% indicated they frequently do, a 15.6% increase.

The final question on the posttest gauged subject perception of personal growth in understanding TIC

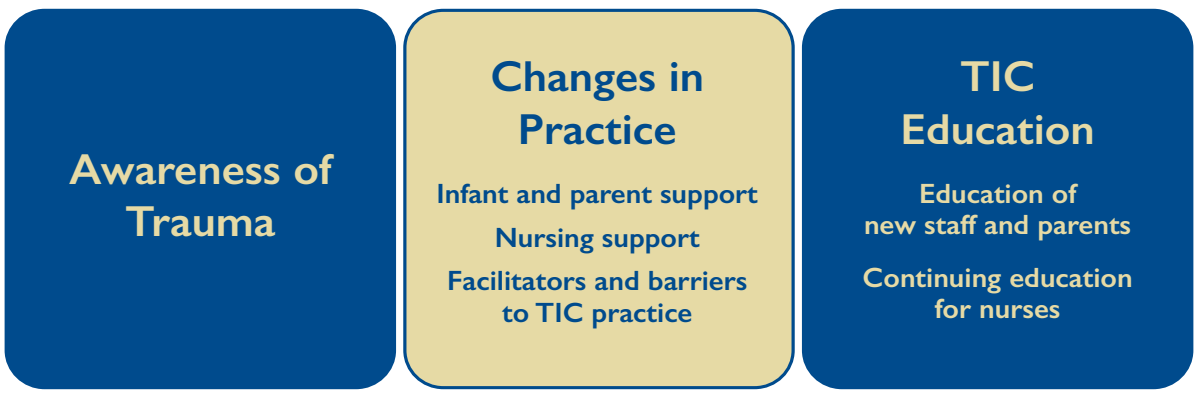

Fig. 2. Emerging themes and subthemes from qualitative analysis.

after the educational intervention. All participants noted some increase in their understanding of TIC in the NICU. Overall, results of the posttest demonstrated an increase in nurses' familiarly, knowledge, and understanding of TIC utilization. The overall mean score on the pretest questions was 54%, whereas the mean score on the posttest questions was 98% resulting in an overall improvement from pretest to posttest of 44%.

Part Two Findings

Three overarching themes and six subthemes surfaced from the qualitative analysis (see Fig. 2). The first theme that emerged from interviews was an increased *awareness of trauma* that took place in the NICU. One participant noted, "I'm definitely more aware of the impact trauma has on the infants and the long-term outcomes it has." The participant also shared that the TIC educational intervention was "rejuvenating to my practice." All participants stated that this new knowledge and awareness allowed them to better help parents form bonds with their babies.

The second theme that emerged encompassed *changes in practice* after participating in the TIC training module. Participants noticed significant changes in their practice when working with infants, parents, and fellow nurses. One participant explained they were less task oriented and more engaged in their care of infants. Following the TIC intervention, the participant noted that nurses had an even greater awareness of infant stress which led to the incorporation of specific techniques, including hand hugs and positive touch.

Participants also identified changes in their interactions with parents since implementing TIC practices into the NICU. Two participants discussed how they promoted awareness of TIC by hanging encouraging posters and signs in the parent lounge, getting the chaplain more involved, and staying connected with parents.

All participants described an increase in support and encouragement for one another in the NICU since the implementation of TIC practices. Said one participant, "I feel like everyone's been supportive of checking in with coworkers to see if they need anything."

While participants reported most staff members were receptive to implementing TIC and learning more about the topic, barriers to TIC practice included some resistance to change and new routines in the NICU. Two participants discussed "push back" from health care professionals about making changes to their practice and explained that it took longer to implement TIC protocols when some staff were hesitant. Another barrier noted was the impact the COVID-19 pandemic had on staffing shortages, which increased the workload for the nurses.

The third emerging theme was the importance of ongoing *TIC education* in the NICU. Participants mentioned how helpful additional TIC continuing education had been in the past year. It is worth noting that after part one of this study, the DCT provided ongoing education through monthly "tidbits" to remind participants about different TIC principles, as well as information about the importance of staff self-care.

All participants indicated they provided education to other nurses, especially new staff, as well as to the parents. Two participants said they educated parents on TIC strategies for infants; this included explaining how positive touch could help calm infants before or after care.

Participants received continuing education during a competency day training that occurred one year after the initial TIC educational intervention. This training day provided a review and follow-up information from the previous educational module about implementing TIC into practice in the NICU. All participants found this training helpful.

DISCUSSION

This study supports TIC educational interventions as effective means of increasing NICU nurses' knowledge of TIC that may lead to practice changes promoting improved infant, family, and staff outcomes. This is consistent with a previous study where subjects who participated in a brief TIC curriculum increased their knowledge about the effects of trauma, leading to comfort and empathy during patient interaction.[15]

The mean of the pretest scores for our study was low (50.2%), congruent with other studies that reflect health care professionals' limited knowledge and perceived confidence in TIC.[16-18] Low levels of TIC knowledge are associated with professionals' judgmental attitudes toward mothers.[18] Developing an awareness of TIC could therefore improve the relationship between health care workers and patients.

Emerging themes from the interview transcriptions provided detailed information in relation to the research questions. Our findings indicate that many of the nurses had not received prior education about TIC. A variety of changes occurred in practice after the TIC module, including increased pain management

strategies, improved communication and relationships between staff and parents, increased interdisciplinary collaboration, and additional continuing education opportunities.

The results are consistent with limited available literature detailing NICU staff knowledge of TIC and the implementation of TIC practices in the NICU. A gap remains, however, in the current health care literature regarding TIC and best practice in the NICU. This inquiry supports the idea that TIC educational interventions may be an effective strategy to increase NICU staff knowledge of TIC and may promote best practice in the NICU.

The participants in our study may have understood how to consider and address a client's trauma history during treatment but may not have been accustomed to the nomenclature surrounding this treatment, as indicated by the dramatic increase in scores for "incorporating TIC to daily practice" and using "strategies to mitigate stress at workplace."

Our findings suggest that the TIC educational module allowed participants to gain a broader understanding of the trauma infants' and families' experience in the NICU, and the potential lifelong impacts of trauma. Our findings are consistent with literature showing that, although fundamental aspects of nursing reflect the principles of TIC, more training would be beneficial to increase health care workers' knowledge of TIC practice.[16,17,19]

Understanding the parents' experience in the NICU, and any post-traumatic stress disorder (PTSD) symptoms they may have, is an integral piece of fostering mother-infant relationships.[20] Increased understanding of the parent experience, as well as potential PTSD symptoms, allows nurses to better help parents. Participants became more aware of how traumatic the NICU experience can be for parents and how training helped nurses recognize potential trauma triggers.

Participants in our study reported significant changes regarding their practice one year after receiving TIC education, including the positive impact the TIC initiative and educational intervention had on relationships between staff members. Participants reported that nurses have been checking in on one another more often and were even more likely than before to step in to help each other.

A second noted change in practice was an increased effort to address infant stress, including being even more intentional than before about taking infants' stress and comfort levels into consideration during daily care times. Our findings suggest that participation in a TIC educational module, like the one used in this study, may influence NICU staff to implement TIC approaches into care.

A third change in practice the participants identified was the way they addressed infant pain management: they implemented positive touch and hand hugs to improve quality of care and reduce stress levels for infants during their care times. A previous study found that utilizing hand hugs as well as positive touch in a NICU allowed infants to feel comforted during care times.[21]

A final change participants noted was the impact changes in practice had on parents in the NICU. Intermittent hand hugs by staff members in the NICU allow parents to have a sense of solace, knowing their infants are being cared for.[22] Participants in the study also reported being more supportive of parents who were eager to be involved in their infants' care by providing hand hugs and participating in rounds. Current literature demonstrates that parents should be involved in their infants' care and should rely on staff for support during their stay.[23]

Trauma-Informed Care Education

Our findings suggest a need for further education and training, and that nurses trained in TIC could take on roles of educators to both colleagues and patients. Research supports that time constraints can be a barrier to implementing TIC into practice,[17] thus our findings indicate that consistent education about TIC is helpful, as it promotes awareness about using a TIC approach in daily practice.

Implications for Best Practice

The findings of this study suggest important implications for best practice, specifically that a TIC educational module may be an effective way to increase awareness of trauma in the NICU, implement TIC principles into the care of infants and parents, and change staff interactions and self-care practices. Participants reported many changes in their practice, which may help to reduce and mitigate the negative effects of trauma.

Participants also noted an increase in support between staff members, and between parents and staff members. Limitations to providing best practice can include some of the barriers identified by participants, including staffing issues, resistance to change, and the COVID-19 pandemic.

Implications for Future Research

Several opportunities exist for future research on this topic. To determine if certain health care workers are more predisposed to being knowledgeable about or incorporating TIC into practice, and to increase the breadth of knowledge regarding TIC in the NICU, future research should involve both quantitative and qualitative designs.

Further quantitative studies using TIC educational modules might facilitate understanding of the utility of TIC by NICU nurses and other health care providers via larger numbers of participants, as well as greater geographic diversity of pooling and sampling methods, such as randomization and controls, to increase generalizability of findings. Future research should also involve several types of educational modalities to determine what delivery is most effective in portraying TIC information.

Limitations and Strengths

In discussing the validity of the results, we must also consider the limitations of this study. The sample size was small with only 45 nurses. Further, we did not collect demographic information, therefore the diversity of participants remains unknown. The study lacked a control group for comparison of results which impacted the validity and strength of the study. Lastly, the pretest and posttest were not pilot tested prior to implementation. The test consisted of only 10 knowledge-based questions, which may not accurately capture whether a nurse has full knowledge on the topic of TIC. Future studies utilizing a rigorously tested tool would further confirm the results of this study.

Despite these limitations, we took steps to strengthen the results of the study, including ensuring rigor and trustworthiness. We used team-based coding, triangulation, peer debriefing, reflexivity, and member checking to increase reliability.

Regarding the qualitative study, we chose participants who volunteered for the study, which may have led to selection bias. We also chose participants based on their participation in a previous study, which may have led to researcher bias and skewed results. The small sample size threatens the validity and generalizability of the results. A final limitation was the potential for retrospective bias, as some of the reflections from the participants were about the initial TIC educational module, which took place a year before interviews.

CONCLUSION

It is fundamental that health care professionals have knowledge surrounding the topic of TIC and utilize this approach in treatment to protect infants, caregivers, and themselves. Findings from this study support the idea that TIC educational interventions have the potential to significantly change NICU nurses' knowledge of TIC and incorporation of these techniques in practice.

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LG Health CME On Demand Lectures Count Toward New DEA Licensing Requirements

The Drug Enforcement Administration (DEA) and Substance Abuse and Mental Health Services Administration (SAMHSA) recently released materials related to the new Medication Access and Training Expansion Act. Starting June 27, 2023, the Act will require new or renewing DEA registrants to complete a total of at least eight hours of accredited continuing education on the treatment and management of patients with opioid or other substance use disorders *before renewal of their license.*

Penn Medicine Lancaster General Health's Continuing Medical Education department offers recorded CME hours that count toward the DEA requirement. Providers can access this at lancastergeneralhealth.org/health-care-professionals/for-physicians/continuing-medical-education. The lectures, available in the CME On Demand "Featured" section, include: Buprenorphine Use in Long Term Care, Management of Chronic Generalized Musculoskeletal Pain, Treating Pain in the Patient with SUD, and Opioid Act 124 Update 2021.

Providers excluded from the eight-hour requirement include:

1. All practitioners that are board certified in addiction medicine or addiction psychiatry from the American Board of Medical Specialties, the American Board of Addiction Medicine, or the American Osteopathic Association.
2. All practitioners that graduated in good standing from a medical (allopathic or osteopathic), dental, physician assistant, or advanced practice nursing school in the United States within five years of June 27, 2023, and successfully completed a comprehensive curriculum that included at least eight hours of training on:
   a. Treating and managing patients with opioid or other substance use disorders, including the appropriate clinical use of all drugs approved by the Food and Drug Administration for the treatment of a substance use disorder; or
   b. Safe pharmacological management of dental pain and screening, brief intervention, and referral for appropriate treatment of patients with or at risk of developing opioid and other substance use disorders.
3. All practitioners who completed DATA-Waived trainings ("X-waiver" for buprenorphine) in the past.

Providers do not need to send a new certificate to the DEA.