Educating Health Care Providers on the Benefits of Trauma-Informed Care and Sensory Modulation Techniques for Adolescents on an Inpatient Unit

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Abstract

Background*:* Restraint and seclusion have been utilized in a multitude of settings to prevent injury to self and or others, but restraint and seclusion have also demonstrated to have a negative impact on the individuals involved, including risk of physical injury and psychological trauma. The quality improvement project titled *Educating Health Care Providers on the Benefits of Trauma-Informed Care and Sensory Modulation Techniques for Adolescents on an Inpatient Unit* focuses on the implementation of an educational training program for staff members of inpatient adolescent units (nurse practitioners, psychiatrists, mental health counselors and nurses) on trauma-informed care and use of sensory modulation.

Purpose: The purpose of this project was to improve knowledge for healthcare providers regarding the use of trauma-informed care and sensory modulation for an inpatient adolescent population to minimize the risk for restraint and seclusion.

Method: A pre and post survey was administered before and after two training sessions presented by this DNP student, focused on restraint reduction techniques, sensory modulation, and trauma informed practice.

Results: Twenty-four participants completed the pre and post survey. Results from the post survey demonstrated a statistically significant increase in knowledge gained regarding trauma-informed care and sensory modulation use following participant attendance at a training session.

Conclusion The education of trauma-informed care and sensory modulation is beneficial as it can improve knowledge for staff members on two effective interventions that can minimize the risk of restraint and seclusion.

Keywords**:** *restraint and seclusion, adolescent, trauma-informed care, sensory modulation, education, improve knowledge*

Introduction

Restraint and seclusion are restrictive, high-risk containment procedures that may contribute to negative health outcomes (Raveesh et al., 2019). The use of restraint and seclusion in an inpatient setting for the adolescent population has been shown to adversely impact the quality of care and safety of those involved, including risk of physical injury to both staff and patients, as well as psychological trauma. Moreover, the use of restraint and seclusion in the inpatient psychiatric setting are responsible for most of the reported injuries and traumas that occur to patients during their hospitalization and can have significant harmful implications (Chieze et al., 2019; Parkes & Tadi, 2021).

Lack of educational training on the use of alternatives to restraint and seclusion such as de-escalation techniques and trauma-informed care contributes to the use of restraint and seclusion measures (Wilson et al., 2018). The purpose of this project was to increase knowledge of trauma-informed care and sensory modulation use for healthcare providers on an adolescent pan inpatient psychiatric unit. The plan was to implement an educational training program for health care providers which included nurse practitioners, psychiatrist, nurses, and mental health counselors. Education of trauma-informed care and sensory modulation use were selected as these techniques have been shown to be effective in reducing the number of restraint and seclusion from occurring.

Background

Restraint is defined as any device or equipment that restricts and prevents the ability for an individual to move on their own (Lai et al., 2011). Physical restriction of an individual can be done by holding the patient's extremities or by placing them into a mechanical device such as a restraint chair (Lai et al., 2011). Restraint intervention is viewed as a last resort measure due to

the desire to not physically or mechanically prevent an individual from freely moving. Seclusion is when an individual is placed in an environment and informed that they cannot leave the environment and are prevented from doing so. Seclusion can be used to decrease environmental stimuli (Parkes & Tadi, 2021).

Restraint and seclusion can have detrimental short-and long-term impact on patients which can include a negative impact on a patient's behavioral health and progress toward in-patient goals, and or physical injury. Long-term effects can include lasting trauma resulting from being restrained or secluded, or a longer physical recovery if a major injury was sustained during restraint (Knox & Holloman, 2012). The negative health outcomes of trauma, re-traumatization and physical injury in the adolescent population can hinder maturation and increase risk for PTSD symptoms due to the possibility of structural and functional alterations in the brain from chronic maltreatment (Pazderka et al., 2021). These alterations in the brain can result in the development of mental health disorders and maladaptive coping skills. Use of physical restraint in the child and adolescent population has been shown to be positively associated with multiple inpatient admissions, trauma, and history of aggression (Nielson et al., 2021). Traumatic events have been associated with behavioral health consequences of depression, anxiety, and risk for suicide among adolescents and adults (Ranjbar et al., 2020). Restraint and seclusion also place healthcare workers at risk for physical injury as well as psychological distress. Forty percent of nurses involved in restraint or seclusion with an aggressive patient reported psychological distress and ten percent experienced moderate to severe depression (Knox & Holloman, 2012).

Restraint is a high-risk containment procedure that is often linked to negative outcomes, such as violence against other patients and staff members. These outcomes can result in injury and traumatization for those involved. The improper use of restraint can cause injuries that vary

in severity and may even be fatal (Berzlanovich et al.,2012). A reduction in restraint in all healthcare settings can help to keep patients safe from restraint-related injuries and can minimize restraint-related injuries to staff. It also reduces the chance of trauma occurring or re-occurring (Wale et al., 2011). It is imperative that alternatives to use of restraint and seclusion occur to prevent negative health outcomes.

Trauma-informed care is an approach that seeks to recognize the signs and symptoms of trauma in individuals, families, and staff members, understand the impact of trauma, and see the paths for recovery. Trauma-informed care is also an approach that actively seeks to avoid the re-traumatization of individuals (Ranjbar et al., 2020). The core principles of trauma-informed care include safety, choice, collaboration, trustworthiness, and empowerment (Purkey, Patel & Phillips, 2018). Safety involves individuals feeling not only physically safe but psychologically safe (Purkey, Patel & Phillips, 2018). Choice is the idea of including patients in the healing process using informed choice by presenting both negative and positive choices (Purkey, Patel & Phillips, 2018). Collaboration refers to shared decision-making and understanding power differences between staff and patients. Trustworthiness involves decisions that are made transparently with the idea and goal of building and maintaining trust (Purkey, Patel & Phillips, 2018). The last core principle of trauma-informed care is empowerment. Empowerment refers to recognizing strengths of individuals and believing in resilience and the ability to heal from trauma (Purkey, Patel & Phillips, 2018). The trauma-informed care approach offers the opportunity for patients to engage with health care providers in a more open, trusting manner and improve health outcomes. Hospitals that have adopted a trauma-informed care approach have seen a reduction in the number of restraint and seclusion occurrences (Azeem et al., 2017).

Sensory modulation is the adaptive regulation of sensory input which is filtered both neurologically and through conscious and unconscious behaviors. It is a tool that supports trauma-informed practice and has been shown to reduce restrictive practices (Sutton & Nicholson, 2011). It involves supporting and guiding people in utilizing senses such as sight, sounds, smells, touch, taste, and movement to manage and change the emotional state of the individual (Brown, Tse & Fortune, 2018). Examples of this include tools such as music, essential oils, rocking chairs and weighted items. These tools help to support an individual in developing self-regulating techniques and can work to change an individual's response to a stressful situation (Brown, Tse & Fortune, 2018). This can be helpful in the reduction of restraint and seclusion as patients are able to learn and be guided into utilizing available sensory tools when experiencing emotions or feelings that can lead to challenging behaviors (Andersen et al., 2017)

Currently restraint and seclusion are used in the inpatient psychiatric setting for the management of aggressive or violent patients who may be at risk for harm to self and or others (Lai et al., 2011). There are multiple interventions that have been shown to reduce the rate of restraint and seclusion from occurring. Interventions are not currently taught to all staff. The organizational gap analysis revealed that there is a lack of a cohesive education and training program that incorporates interventions to reduce restraint and seclusion use, including trauma-informed care and sensory modulation. The project site currently does not implement yearly training that includes trauma-informed care or sensory modulation for healthcare workers (psychiatrists, nurse practitioners, nurses, and mental health counselors). The project site does implement debriefing post-restraint incident.

Review of the Literature

The review of the literature was conducted by using the PubMed and Google Scholar databases with the search terms “mental health, restraint and seclusion, restraint and seclusion reduction, sensory modulation, trauma-informed care, and adolescents.” The inclusion parameters for this review were research articles published in peer-reviewed journals between 2011 and 2021. The search of PubMed database search resulted in a total of twenty-three articles. The search of Google Scholar search resulted in twelve articles. When conducting the search of literature, a total of thirty-five articles were reviewed. After reviewing the title and abstract of articles, ten articles were excluded as information presented would not be relevant to this literature review. Three articles were excluded upon reviewing as the data included was not considered to be statistically significant. Five articles were excluded after reading the full text of the article and determining that information would not pertain to the purpose of this project. For the purpose of this review, seventeen articles were selected. Fifteen of the selected articles came from the PubMed database and three articles were included from the Google Scholar database. The process of exclusion of research articles is depicted in a PRISMA flowchart (Appendix A).

In the studies reviewed, researchers found sensory modulation as an effective intervention to de-escalate patients and as a result reduce the use of restraint and seclusion (Andersen et al., 2017; Bryson et al., 2017; Camartata et al., 2020; Wale, 2011). One study explored defining sensory modulation (Brown, Tse & fortune, 2018). One study explored trauma-informed care and its core strategies to reduce restraint and seclusion use in the inpatient psychiatric setting (Azeem et al., 2017). Three studies used an improvement model to focus on post-incident debriefing and training, including trauma-informed care (Bell & Gallacher, 2016; Hallman et al., 2017; Hammervold et al., 2019). The study by Pukrey, Patel, Phillips focused on

the principles of trauma-informed care (2018) while Blair et al. studied routine use of the Broset Violence Checklist (2017). The negative impact of restraint and seclusion use including post-traumatic stress disorder occurring after restraint/seclusion incidents was also studied (Lai et al., 2011). Another study explored poor staffing ratios as a contributing factor to the use restraint and seclusion (Staggs et al., 2017). Another two studies explored types of restraint use and alternative measures to restraint use including the ethical judgment of a restraint (Chieze et al, 2019; Raveesh et al., 2019). Two studies examined the perception of restraint and seclusion from staff and patients at an inpatient level of care setting (Kinner et al., 2017; Ye et al., 2017). The main themes that emerged from this literature review included the use of debriefing, trauma-informed care, and sensory modulation.

Debriefing refers to a meeting with staff members and the patient after a restraint and/or seclusion incident to assess what de-escalation techniques could have been used, and how the situation was effective and ineffective in managing the patient's behavior (Hammervold et al., 2019). Debriefing after a restraint and seclusion incident promotes the reflection of how staff members can respond in the future to avoid another incident from occurring and allows the patient to have an opportunity to provide insight into the behavior requiring restraint and/or seclusion. Debriefing and post incident review allows clinicians to evaluate alternative responses and consequently promote patient well-being and their recovery process (Hammervold et al., 2019; Azeem et al., 2017).

Trauma-informed care has five defining principles, including safety, choice, collaboration, trustworthiness, and empowerment. These defining principles have been adopted by healthcare providers and have been shown to lead to improved patient health outcomes and patient healing (Purkey, Patel & Phillips, 2018). Review of the literature identified trauma-

informed care education and training to have a significant impact on restraint reduction and, reducing restraint use by over sixty-six percent in one study and by fifty percent in another study (Azeem et al., 2017; Bell & Gallacher, 2016). Of these two studies. one study was completed with the child and adolescent population (Azeem et al., 2017). This study described how the adoption of six strategies directly based off core principles for trauma-informed care led to significant restraint and seclusion reduction for hospitalized youth (Azeem et al., 2017). The study by Bell & Gallacher highlighted how their training included education regarding the core principles of trauma-informed care as well as open discussions regarding de-escalation techniques and dynamic scenarios which contributed to a reduction in restraint use (2016). Another study highlighted how trauma-informed care improved the culture of safety on an inpatient child and adolescent psychiatric unit (Hallman et al., 2017). The culture of safety was improved by training on and adopting trauma-informed care principles into their hospital culture and practicing mindfulness which decreased the number of staff call-ins, decreased the need for 1:1 staffing episodes and decreased restraint use (Hallman et al., 2017).

Sensory modulation refers to how the central nervous system regulates and processes sensory stimuli which provides an individual with the opportunity to respond to the stimulus behaviorally (Brown, Tse & Fortune, 2018). It involves assisting individuals in utilizing their senses to manage and change their emotional state to respond to the stimulus (Brown, Tse & Fortune, 2018). The implementation of sensory modulation can reduce the occurrence of restraint and seclusion by having a variety of sensory tools available. These sensory tools include rockers, weighted blankets, and music (Andersen et al., 2017; Bryson et al., 2017; Wale et al., 2011). When sensory modulation is implemented, the need for physical restraint was reduced by twenty-eight percent and the use of forced medication of patients was reduced by forty-six

percent (Wale et al., 2011; Andersen et al., 2017). Sensory modulation encompasses the implementation of education and training and can be an effective way to reduce restraint and seclusion.

Theoretical Framework

The theoretical framework that has served as a guideline for this project is Lewin's Theory of Planned Change. Lewin's theory groups change into three phases: unfreezing, moving, and refreezing (Barrow et al, 2021). The overall objective or plan of this project is to improve the knowledge of healthcare providers regarding trauma-informed care and the use of sensory modulation. The first stage of Lewin's Theory of Planned Change is unfreezing which is to understand that a change is needed (Barrow et al., 2021). In reviewing the negative health outcomes of using restraint and seclusion, it was determined a change in practice is needed to reduce the use of restraint and seclusion. The gap analysis of the project site revealed a lack of yearly education of trauma-informed care and sensory modulation.

The moving phase includes initiating change (Barrow et al, 2021). The change in this project was educational training with the goal of teaching practitioners, nurses, and mental health counselors the practice of trauma-informed care and sensory modulation. These practices have been shown to reduce the need to use restraint or seclusion with a patient (Azeem et al., 2017; Wale, 2011). The third phase of Lewin's Theory of Planned Change is refreezing (Barrow et al., 2021). This phase includes establishing a new practice that encompasses the change. Upon the results of this DNP project, the intervention of educational training may be adopted into standard training for the healthcare workers.

Methods

A DNP project was implemented as an educational training program for health care providers to improve knowledge of trauma-informed care and sensory modulation on an inpatient adolescent unit. These methods have been shown to be effective in reducing the amount of restraint and seclusion that occurs. In educating providers regarding trauma-informed and sensory modulation, participants gained knowledge that can be applied to direct patient care. A survey called the trauma-informed care provider survey (TIC) was disseminated to providers. attendees of the educational training session prior to the intervention and post-intervention (Appendix B). The survey consisted of a total of forty-eight questions, in which thirty-two were ordinal scale questions that are separated into three categories: trauma-informed care knowledge, opinions and practices among health care providers and self-rated competence. The remainder of the questions on the survey addressed trauma-informed care and barriers to trauma-informed care intervention with nominal questions. The TIC survey is specific towards the children/adolescent population (TIC provider survey, 2021). The TIC survey is a tool that is reliable, has validity and is specific in what it can measure (Ranjabar et al, 2020).

Staff were also assessed on their knowledge of the use of sensory modulation in the adolescent population via a DNP student created questionnaire (Appendix C). The DNP student created a questionnaire comprised of three Likert scale questions and one open-ended question (Appendix C). These surveys assessed knowledge gained from the educational training sessions conducted Fall 2022 at the project site. The cost and the benefits of this project were also determined and analyzed prior to implementation (Appendix F).

Goal and Objectives

The goal of the quality improvement project was to educate psychiatric providers, nurses, and mental health counselors on the topic of trauma-informed care and the use of sensory modulation. The objectives for this DNP project included:

- Deliver education by having an educational training over the duration of 45 minutes to psychiatrists, nurse practitioners, nurses and mental health counselors who work on a psychiatric inpatient adolescent unit. Both trainings were held in November 2022
- Evaluate participants knowledge and opinions of trauma-informed care prior to each training session and after each training session.

The expected outcome of this project was that staff will demonstrate increased knowledge of trauma-informed care and sensory modulation post-intervention. The desired outcomes for this DNP Project included:

- Participants will have increased knowledge and confidence of trauma-informed care and the use of sensory modulation after attending the educational training.
- Participants will verbalize ways that their practice will change after completing the educational training.
- To have seventy-five percent of psychiatrists, nurse practitioners, nurses, and mental health counselors who work with the adolescent population attend one of the two training sessions.
- Eighty percent of participants will complete the pre and post TIC survey.
- Eighty percent of participants will complete the knowledge of sensory modulation pre and post survey.

Project Site and Population

The implementation of this project was at a psychiatric hospital in central Massachusetts. This psychiatric hospital is comprised of three adult inpatient units, one child inpatient unit and one adolescent unit, offering short-term hospitalization with an average length of stay between five and seven days. The adolescent unit is one of five units of the hospital and is the only unit at the project site that is specific to the adolescent population. The age range of patients on the unit is from age 13 to18. The total number of participants in this Quality Improvement (QI) project was twenty-four. Participants included one psychiatrist, two nurse practitioners, twelve nurses, and nine mental health counselors who work on the adolescent inpatient unit were invited to participate. Approval for implementation of the QI was obtained from the chief nursing officer, the head of quality control, and the adolescent nurse director.

Prior to the education training session, participants completed a pre-survey that was available online immediately prior to the education session. The pre-survey assessed participants' current knowledge and feelings regarding use of restraint and seclusion and assessed knowledge regarding de-escalation techniques. Two educational sessions were conducted with the participants in November 2022. The curriculum of the educational training session included de-escalation techniques that have been shown to decrease the rate and incidence of using restraint and seclusion measures (Appendix D). De-escalation techniques included the evidence-based practice of trauma-informed care and the use of sensory modulation. The emphasis of this training focused on how to utilize these techniques to prevent the need to use restraint and seclusion in the adolescent population. The participants received a post-survey available online immediately after the training session was conducted. This survey assessed participants' knowledge and feelings regarding restraint and seclusion use and de-escalation

techniques. Communication regarding the training session was through email, flyers and an in-person meeting with participants. Communication via email occurred during the month of October to create awareness for this project. The flyers were placed in front of the conference room where the training was held approximately one month prior to the implementation of this project to remind participants of the training. The in-person meeting was completed two weeks prior to the educational training to answer any questions participants had prior to their participation.

Measurement

The outcomes of this DNP Project were evaluated with the following instruments: Trauma-Informed Care provider survey (TIC) and a DNP-student created survey regarding knowledge of sensory modulation (Appendix B, Appendix C). Immediately prior to the implementation of each educational training in November, the TIC survey and student-created survey were available to staff who work on the adolescent psychiatric unit at the project site. Another survey was available to participants immediately after the education session to assess knowledge gained by participants. Staff had one week to complete the survey. Survey responses were compared to determine if there was an increase in knowledge about the use of trauma-informed care and sensory modulation as a de-escalation technique.

Data Collection Procedure

Following IRB and site approval participants were contacted via email, flyers and an in-person meeting with the assistance of the chief nursing officer and nursing director of education. Participants were asked to complete the TIC survey and the DNP student created survey of sensory modulation before attending the training. Completion of both pre-surveys took 10-15 minutes and was available online. Participants attended a 45-minute educational training held at

the project site. Two sessions of the training were held to accommodate participants with diverse schedules to attend. Participants were then asked to complete the TIC survey and the student created survey of sensory modulation upon completion of the educational training. Completion of both post surveys took 10-15 minutes and was available online.

Data Analysis

Survey participants were coded by the first two initials of their first and last name, for example Sophia Khalifa = SOKH. The survey responses were analyzed using a paired t-test and descriptive statistics using SPSS software. A paired-t-test was completed with data from the TIC survey. The results of the pre and post surveys were scored utilizing a summary score with a range of score from 0-52 in three categories. The categories included knowledge, opinions favorable to trauma-informed care and self-rated competence. The scoring for items belonging to the knowledge category (items 1-13) had a potential range score of 13-52. The scoring for items belonging to opinions favorable to trauma-informed care were items 14-20 had a potential range score of 7-28. The last items on the TIC survey were 21-32, part of the self-rated competence category. Participants could score a potential of 0-24. The remainder of the questions answered by participants on the TIC survey did not contribute their summary score. Higher scores indicate that participant is knowledgeable and competent in implementing trauma-informed care.

The sensory modulation survey analyzed participants knowledge, self- confidence and confidences in educating patients on sensory modulation via three questions with a Likert scale rating. Scale rating was 1-5 with scores of 1 = worst and 5 = best. Participants had a possible range score of 3 to 15, with higher scores indicating that the participant is knowledgeable, confident in themselves, and confident in teaching others regarding use of sensory modulation. An open-ended question was also included in this survey in order to gauge how participants will

change their practice upon completing the educational training. Throughout the duration of this project, data was entered into an Excel spreadsheet. The data was then imported into SPSS to run the aggregate data. The file was only accessible by the DNP student and site mentor.

Ethical Considerations/Protection of Human Subjects

The University of Massachusetts, Amherst (UMass) Internal Review Board (IRB) approval was obtained prior to initiating the DNP Project. All participants were protected by the Health Insurance Portability and Accountability Act of 1996 (HIPAA) which, among other guarantees, protects the privacy of patients' health information (Modifications to the HIPAA Privacy, Security, Enforcement, and Breach Notification Rules, 2013). Additionally, the DNP student and practice personnel who carefully conducted this project followed the Standards of Care for practice in inpatient psychiatric hospital. All information collected as part of evaluating the impact of this project was aggregated data from the project participants and did not include any potential patient identifiers. The project site did not have its own IRB review board and required IRB to be obtained through the University of Massachusetts – Amherst which was obtained.

The risk to patients participating in this project is no different from the risks of patients receiving standard psychiatric care. Participant confidentiality was assured by coding the participants using individual identification numbers. The list of participants and their identifying numbers was kept in a locked file on the computer of the student conducting the project and was only accessible to the project coordinators. All electronic files containing identifiable information were password protected to prevent access by unauthorized users and only the project coordinators had access to the passwords.

Results

The setting of this project was at a psychiatric hospital. Of the current thirty staff members hired for the adolescent unit, twenty-four participated in this project. Participants include healthcare providers (psychiatrists, nurse practitioners, nurses, and mental health counselors) who care for the adolescent population. This project was implemented over the course of two days. A 45-minute educational session was held each of those days, providing instruction on the use of trauma-informed care and sensory modulation. The first educational session had ten participants and included five nurses, three mental health counselors, and two nurse practitioners. The second session had fourteen participants and included seven nurses, six mental health counselors, and one psychiatrist. One hundred percent of the participants from both sessions completed both the TIC and student created pre- and the post-surveys. In analyzing this data, the DNP student was able to determine that the participants gained knowledge regarding trauma-informed care and sensory modulation and had increased self-confidence in the use of sensory modulation as well increased confidence in educating the adolescent patient population. The paired t-test for the TIC survey and sensory modulation survey were statistically significant in that the post survey results indicated higher average survey scores.

The Trauma-Informed Care Survey included three specific categories: Knowledge of trauma-informed care, opinion of trauma-informed care, and self-rated competence in the use of trauma-informed care. In each category, participant attendance was correlated with an increase in knowledge gained for the use of trauma-informed care and sensory modulation (Table 1).

Table 1

Paired Samples Correlations for Trauma-Informed Care Pre and Post Survey Results

		N	Correlation	Significance One-Sided p	Significance Two-Sided p
Pair 1	Knowledge-Training & Knowledge Post-Training	24	.676	<.001	<.001
Pair 2	Trauma-informed Care Opinion-Training & Trauma-informed Care Opinion Post-Training	24	.894	<.001	<.001
Pair 3	Self-rated competence Pre-Training & Self-rated competence Post- Training	24	.851	<.001	<.001

The category that showed the highest improvement was knowledge of trauma-informed care. Participants had a mean score of 29.38 regarding knowledge of trauma-informed care prior to the educational training and had a post educational score of 35.79 (Figure 1). The second category with the greatest improvement in participants score was opinions favorable to trauma-informed care, with a pre-survey mean of 19.04 and the post-survey mean of 21.25 (Figure 1). The last category of improvement was the self-rated competence. Participants scored a mean of 15.75 on the pre-survey and 17.33 on the post-survey (Figure 1). The results of the trauma-informed care survey overall indicate a positive result.

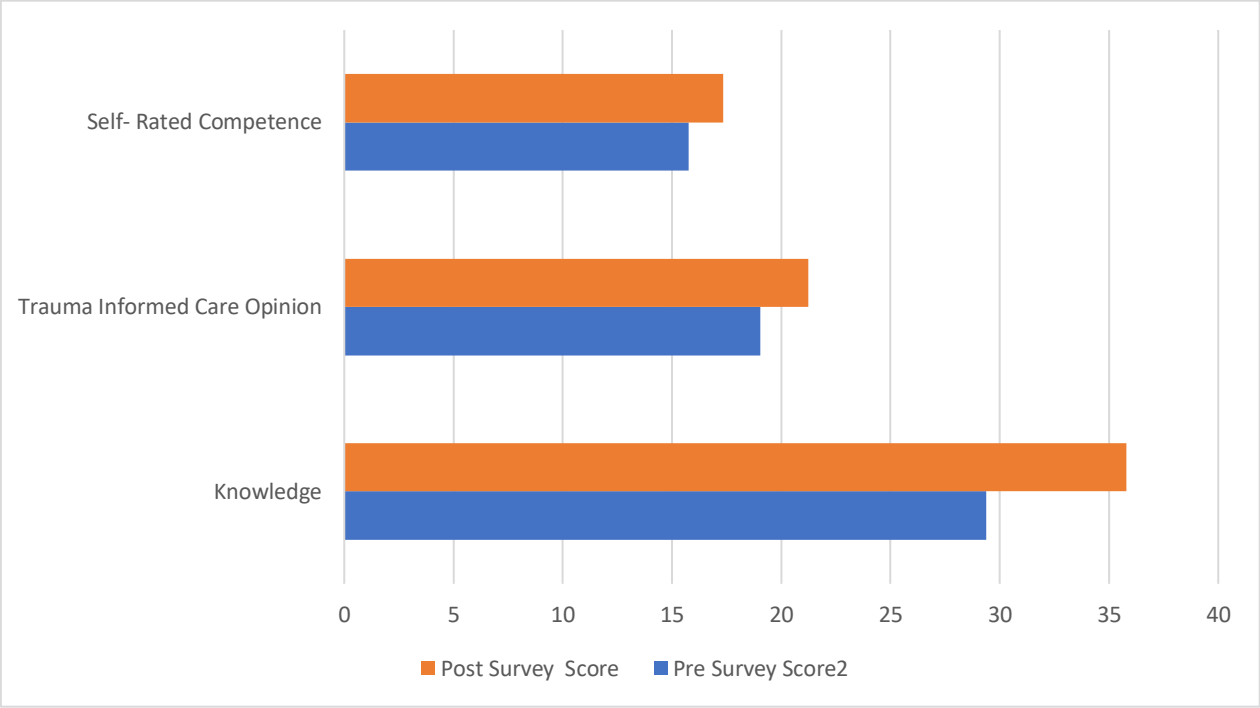


Figure 1:

TIC Pre Vs Post Survey Mean Results

The sensory modulation survey was comprised of three questions that participants answered on a Likert scale. Each score was then analyzed and averaged to determine if there was increased knowledge gained and increased self-confidence in use. Table 2 illustrates the paired t-test results conducted from the sensory modulation survey. Each question showed statistical significance in improvement of knowledge and confidence (Table 2).

Table 2

Paired Samples Correlations of Pre and Post Sensory Modulation Survey

		N	Correlation	Significance One-Sided p	Significance Two-Sided p
Pair 1	Knowledge Sensory Modulation-Survey Results & Knowledge Sensory Modulation Post-Survey Results	24	.250	<.001	<.001
Pair 2	Confidence-Survey & Confidence Post-_Survey	24	.357	.003	.006
Pair 3	Confidence in Educating Post-Survey & Confidence in Educating-Survey	24	.286	<.001	<.001

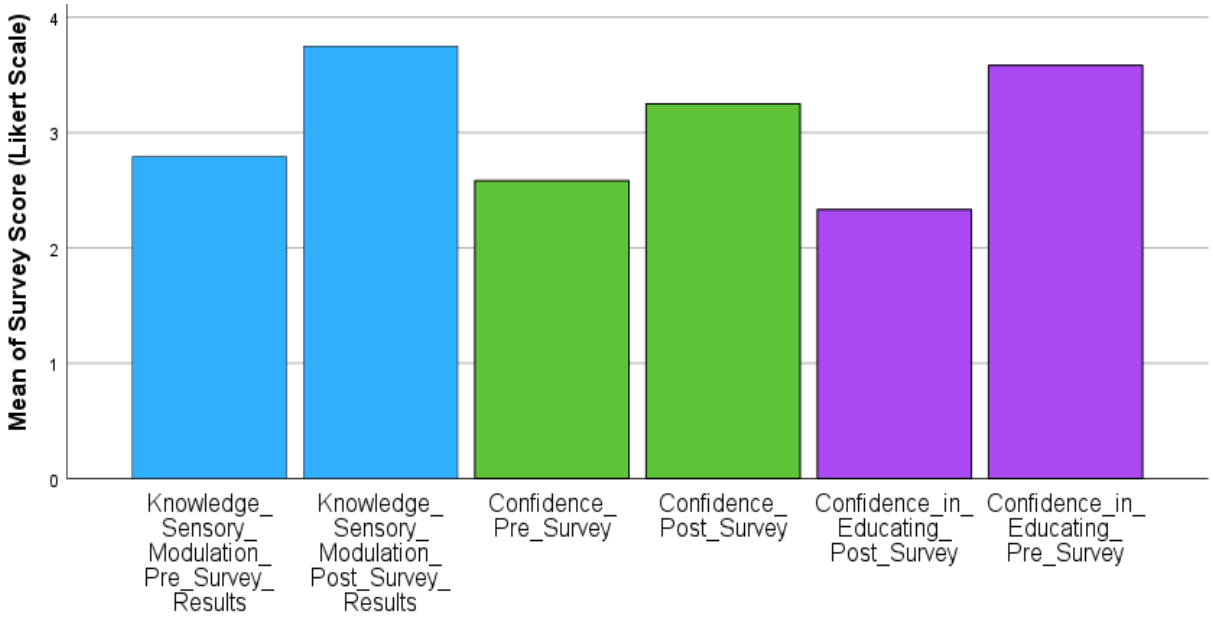
The average pre-survey mean score for the student created sensory modulation survey ranged from 2.33 to 2.79 (Table 3). Following the training, the average mean score of each question increased which is illustrated in Figure 2. Overall, participants showed increased knowledge about sensory modulation, had increased confidence in the use of sensory modulation, and increased confidence in educating adolescents regarding sensory modulation use after completing the education session.

Table 3

Sensory Modulation Survey

Survey Questions (Likert-Scale; 1-5; 1 = worst)	Pre-Survey Mean Score	Post Survey Mean Score
Please rate your knowledge of sensory modulation	2.79	3.75
Please rate your confidence in using sensory modulation	2.58	3.25
Please rate your confidence in education patients on use of sensory modulation	2.33	3.58

Figure 2:
Mean of Pre and Post Student Created Sensory Modulation Survey



The sensory modulation survey also included an open-ended question regarding what participants would incorporate or change in their practice following the education training. The most common themed responses were “Think about what we offer to our patients as coping tools,” and “remember that we do not know what others may have been through.”

Discussion

The main findings of the literature review were that sensory modulation and trauma-informed care were effective interventions to reduce the number of restraint and seclusion incidences. A site gap analysis found that the site lacked training about these interventions. The implementation of this project showcased the need for increased knowledge and use of sensory modulation and trauma-informed care with adolescent patients. The project found that the education training session was effective in increasing knowledge for trauma-informed care and sensory modulation. The project also found that participants will practice sensory modulation and trauma-informed care with patients in the future as evidenced by the responses of the open-ended questions from the student created survey (Appendix C).

The theoretical framework that has served as a guideline for this project was Lewin’s Theory of Planned Change. This theoretical framework supported the purpose of improving health outcomes and the quality of clinical practice for the adolescent population. The gap analysis of the project site revealed a lack of yearly education on trauma-informed care and the use of sensory modulation. The project site requires an annual training for all staff members to review the policy and procedure of the site and to maintain clinical competencies. The annual training does not encompass trauma informed care and use of sensory modulation.

A barrier to this project was the small number of participants. A greater number of participants would have provided a greater scope of how participants will change their future practice after receiving the educational training. Part of the cause of this barrier was that the participants that were included were full-time or part-time employees who work with the adolescent population and did not include per-diem staff members. Including per-diem staff members would have increased the number of participants in this project.

Due to the negative health outcomes that occur with the use of restraint and seclusion, a change in practice is needed to reduce the number of times restraint and seclusion is used in a psychiatric setting (Chieze et al., 2019). Increased knowledge of trauma-informed care and the use of sensory modulation can improve the safety of patients and staff while also minimizing the use of restraint and seclusion (Azeem et al., 2017, Andersen et al., 2017). This project can be adapted for future training sessions at other facilities to increase knowledge and confidence on the use of trauma-informed care and sensory modulation. The educational training session can be incorporated into yearly-training required for healthcare providers and can be extended to healthcare providers who care for psychiatric patients across their career. This project also facilitated a change in future practice for the participants, as the survey required them to identify what change they could incorporate into their future practice. Education and training can have a significant impact on the reduction in the use of restraint measures. A change in practice highlights the participant's increased knowledge of how to implement trauma-informed care and sensory modulation (Purkey, Patel & Phillips, 2018).

Conclusion

The use of restraint and seclusion are restrictive, high-risk containment procedures that contribute to negative health outcomes. The restraint and seclusion practice in the adolescent

inpatient setting has been shown to adversely affect the quality of care and safety of those involved. This can include trauma, re-traumatization, and physical injury to the patient. There are multiple interventions that have been shown to reduce the rate that restraint and seclusion are used, and a gap in education in what methods are taught to all staff in the psychiatric setting. There is a lack of a cohesive education and training program that incorporate various interventions to reduce restraint and seclusion use.

The purpose of this DNP project was to implement an education and training program to improve knowledge and use of trauma-informed care and sensory modulation in an inpatient psychiatric setting for healthcare workers. These techniques have been effective in reducing the rate of restraint and seclusion occurrence. The educational training was for staff, including healthcare providers, nurses, and mental health counselors who work with the adolescent inpatient population. The outcome of this project was successfully met in that there was knowledge gained by staff regarding trauma-informed care and the use of sensory modulation which can minimize the risk for restraint and seclusion. Future steps that can be taken would be to implement a yearly education training session on trauma-informed care and sensory modulation for staff, extending education to all staff members and not only staff members who treat the adolescent population to improve health and safety outcomes.

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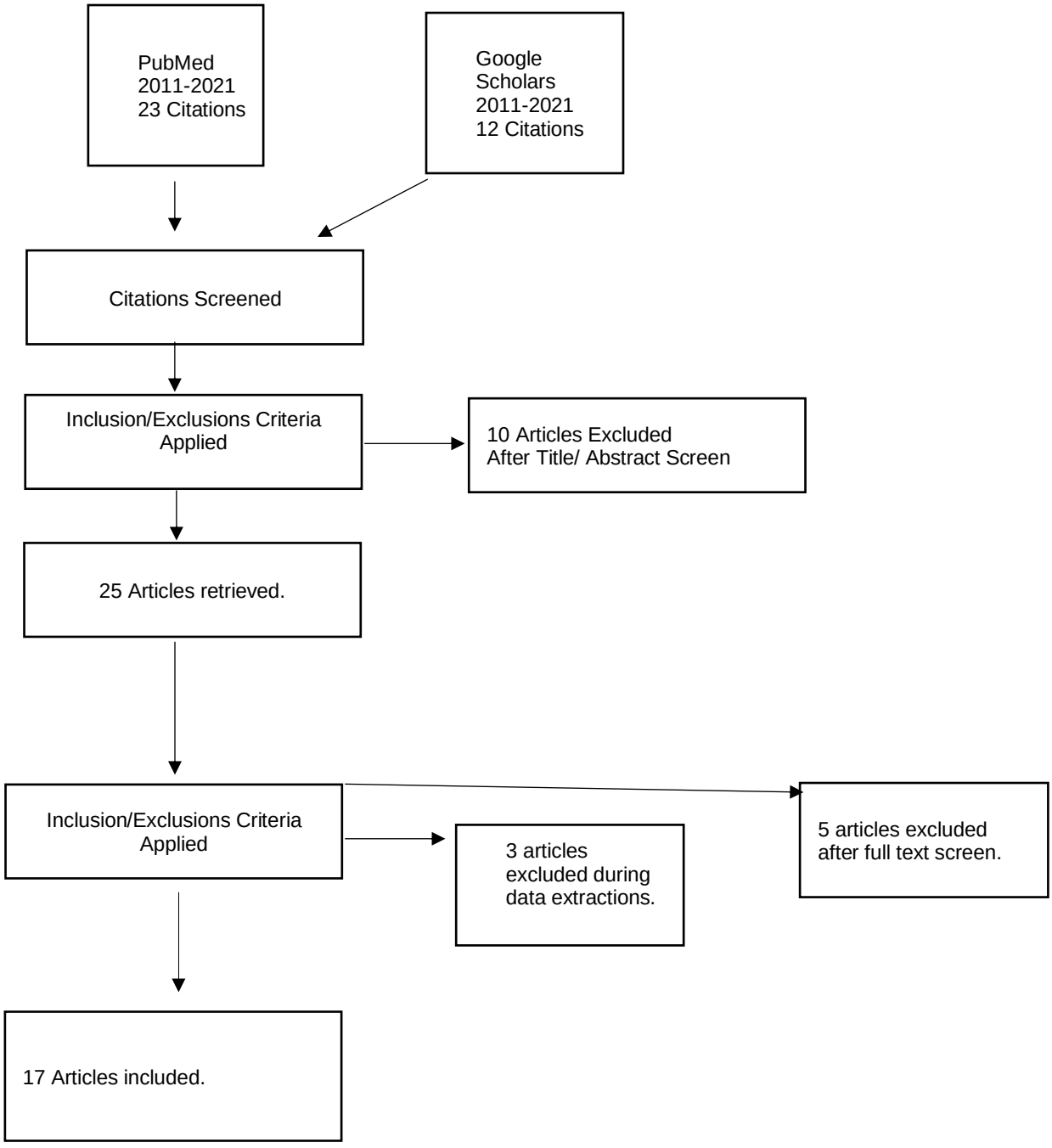
Appendix A

PRISMA Flowchart



Appendix B

Trauma Informed Care Survey

Provider Survey – pediatric patient version

Based on your understanding and experience, indicate whether you more strongly agree or disagree with the following:	Strongly Disagree	Disagree	Agree	Strongly Agree
1. Almost everyone who is seriously injured or ill has at least one traumatic stress reaction in the immediate aftermath of the event.				
2. It is inevitable that most children and families who experience a life-threatening illness or injury will go on to develop significant posttraumatic stress or PTSD.				
3. Children who are more severely injured or ill generally have more serious traumatic stress reactions than those who are less severely injured or ill.				
4. Children who, at some point during a traumatic event, believe that they might die are at greater risk for posttraumatic stress reactions.				
5. Many children and families cope well on their own after experiencing serious illness or injury.				
6. The psychological effects of an injury or illness often last longer than the physical symptoms.				
7. Children and families with significant posttraumatic stress reactions usually show obvious signs of distress.				
8. I know the common signs and symptoms of traumatic stress in children and families.				
9. Some early traumatic stress reactions in children and families can be part of a healthy emotional recovery process.				
10. There are things that providers can do to help prevent longer-term posttraumatic stress in ill and injured children and families.				
11. There are effective screening measures for assessing traumatic stress that providers can use in practice.				
12. Healthcare staff can themselves experience signs of physical and/or emotional distress related to their work.				

13. The risk for staff distress is strongly influenced by both personal and work-place factors.				

Please indicate whether you more strongly agree or disagree with the following statements:	Strongly Disagree	Disagree	Agree	Strongly Agree
14. Providers should focus on medical care for hospitalized children as opposed to children's mental health.				
15. The way that medical care is provided can be changed to make it less stressful for children and families.				
16. Providers can teach families how to cope with trauma.				
17. Health care professionals should regularly assess for symptoms of traumatic stress.				
18. It is necessary for providers to have mental health information about their pediatric patients in order to provide appropriate medical care.				
19. I have colleagues I can turn to for help with a child or family experiencing significant traumatic stress.				
20. Healthcare organizations should address how working with patients and families impacts staff.				

How would you rate your competence and comfort in…	Not Competent	Somewhat Competent	Very Competent
21. Engaging with traumatized children/families so that they feel comfortable talking to you/ comforted by you.			
22. Responding calmly and without judgment to a child's or family's strong emotional distress.			
23. Eliciting details of a traumatic event from a child or family without retraumatizing them.			
24. Educating children and families about common traumatic stress reactions and symptoms.			
25. Changing or adapting situations within the hospital that a child or family might experience as traumatic.			
26. Responding to a child's (or parent's) question about whether the child will die.			
27. Assessing a child's or family's distress, emotional needs, and support systems soon after a traumatic event.			
28. Providing basic trauma-focused interventions (assessing symptoms, normalizing, providing anticipatory guidance, coping assistance).			

29. Understanding how traumatic stress may present itself differently in younger children, older children, and teens.			
30. Understanding the scientific or empirical basis behind assessment and intervention for traumatic stress.			
31. Responding to colleagues' distress, emotional needs, and need for support.			
32. Managing your own work-related stress or distress.			

Please indicate whether any of the following is a barrier for you in providing basic trauma-informed assessment / intervention:	Not a barrier	Somewhat of a barrier	Significant barrier
33. Time constraints			
34. Scope of practice constraints			
35. Lack of training			
36. Confusing or unclear information on trauma-informed care			
37. Worry about further upsetting or traumatizing patients			
38. Lack of organizational support			
39. Level of personal stress/distress			

In the past SIX (6) months, have you done the following basic trauma-informed interventions?	No	Yes
40. Ask a child questions to assess his/her symptoms of distress		
41. Ask parents questions to assess their symptoms of distress		
42. Teach child or parent specific ways to manage pain and anxiety during a procedure		
43. Teach child or parent specific ways to cope with upsetting experiences		
44. Encourage parents to make use of their own social support system (family, friends, etc.)		
45. Teach parents what to say to their child after a difficult/painful/scary experience		
46. Provide information to parents about emotional or behavioral reactions that indicate their child may need help		
47. Assess and care for your personal emotional and physical health		
48. Utilize support for yourself / your team available from your organization		

Appendix C

Sensory Modulation Survey

Name

Please answer the following questions on a scale of 1 to 5 where 1 is the lowest and 5 is the highest.

I. Please rate your knowledge of sensory modulation

1 2 3 4 5

Worst Best

II. Please rate your confidence in using sensory modulation

1 2 3 4 5

Worst Best

III. Please rate your confidence in educating patients on use of sensory modulation

1 2 3 4 5

Now that you have completed this training session, how would you change your practice?

Appendix D

Outline for curriculum for educational training session

- Trauma
    - What is trauma?
    - How can it impact an individual?
    - Signs of trauma
- Re-traumatization (Restraint use)
- Vulnerability of adolescent population
- Trauma-informed care: What is it?
    - Five guiding principles
        - Safety
        - Choice
        - Collaboration
        - Trustworthiness
        - Empowerment
    - How can it help?
- Use of sensory modulation
    - Review activities/coping skills we can provide.
        - Stress ball
        - Fidget toys
        - Essential oils – dos and don’ts

Appendix E

Cost-Benefit Analysis/Budget

Data Collection: Data collection from analysis of pre and post surveys.

Training sessions:

- Supplies (pen/paper): Two educational training sessions for a total of at least twenty participants. Pen/paper cost = $30.00
- Refreshments: This includes beverages and food items such as muffins, cupcakes, and cookies. Cost for two educational sessions = $ 50.00
- Handouts: Informational packets for training and education use = $5.00 per pack x 25 participants) = $125.00

Total cost: $205.00

The costs of this project included the cost of supplies for the training sessions, which encompasses refreshments, handouts, and resources such as pen and paper to take notes on the presentation. The educational training sessions will be optional and not mandatory training and there will be no additional cost for training for the hospital. The benefits of this project may include a decrease in the amount of restraint and seclusion that occurs and therefore reduce the number of injuries that occur to the patient and to staff involved. A Restraint can also be expensive with research suggesting a restraint to cost an average of $350.00 dollars (Rubio-Valera et al.,2015). One of the most used medications during a medication restraint is Lorazepam IM. The average cost of a vial of Lorazepam is over $100 dollars (Rubio-Valera et al., 2015). Reducing restraint and seclusion may also lead to a decrease in inpatient hospital acuity, decreased cost on restraint and seclusion, and improve job satisfaction as the hospital environment becomes safer with fewer restraint incidences (Hanrahan et al., 2010).