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The implementation of a standardized car safety seat discharge teaching to improve self-efficacy in neonatal intensive care unit nurses.

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The Implementation of a Standardized Car Safety Seat Discharge Teaching to Improve Self-Efficacy in Neonatal Intensive Care Unit Nurses

by

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Dedication

I would like to dedicate this work to my future husband, Bill Yancey. I would not be where I am today without your constant support and reassurance. Thank you for believing in me, pushing me to work hard, and always encouraging me never to give up.

Acknowledgments

I would like to specifically thank my DNP project committee, Dr. Galloway, and Dr. Robertson. Thank you for guiding me throughout this project journey and offering professional advice and encouragement. I would also like to express gratitude and appreciation to my fellow NICU nursing staff that were willing to participate in this project and implement this important teaching to our NICU caregivers. This project could not have been completed without you.

Abstract

Background: There is a lack of standardization for car safety seat education to caregivers before hospital discharge. Nationally, 59% of motor vehicle accident deaths occur because the car seat is misused (Greenwall, 2015). The American Academy of Pediatrics (1999) states this is a gap in care because all caregivers need to receive proper car safety seat instruction before discharge.

Purpose: This quality improvement project aimed to increase nursing self-efficacy and compliance of registered nurses (RNs) by implementing a standardized CSS discharge intervention.

Methods: RNs on the unit were educated with a 7-minute presentation video titled "Car Seat Safety: Discharge Teaching" about the new CSS education discharge process. Following education, the 2-month intervention period began. RN education was documented in the patient's EHR. A pre-and post-test design was used to assess nursing self-efficacy. At the end of the trial period, EHR education documentation was analyzed.

Results: Likert-scale statements number two, four, five, six, and seven all had significant change in self-efficacy mean scores, using a p-value of <0.05. Age and level of education were the most significant demographics that affected self-efficacy. 7% of patient charts had documentation about CSS teaching,

Discussion: 60+ age range had lower self-efficacy scores than other age groups. CPSTs didn't show a difference compared to RNs not certified. The Bachelor's and Master's degree groups showed a statistically significant difference for Likert-scale statement four. Further research needs to be conducted on ways to improve CSS documentation.

Keywords: car safety seats (CSS), self-efficacy, discharge teaching, electronic health record (EHR), education

Contents

The Implementation of a Standardized Car Safety Seat Discharge Teaching to Improve Self-Efficacy in Neonatal Intensive Care Unit Nurses

There is a significant problem with the lack of knowledge that caregivers and nursing staff receive about car safety seats (CSS). The Centers for Disease Control and Prevention (CDC) (2019) states that the correct use of CSS can reduce the possibility of injury by 71-82%. In 2017, unintentional car accidents were the third leading cause of death in infants (CDC, 2017). In a 2015 study, 95% of the parent sample made mistakes regarding proper CSS use. 86% of parents made errors with infant placement, and 77% had errors involving the CSS installation (Hoffman et al., 2016). This evidence supports the need for CSS education to caregivers and registered nurses (RNs).

Through internal investigation, several RNs working in a large neonatal intensive care unit (NICU) noticed that at the time of discharge, caregivers brought in their CSS still in the box with no knowledge of how to operate it. Additionally, RNs lacked sufficient understanding of correct CSS use, and there was no formal education program guiding nursing staff education to the caregivers. This proved to be a significant problem that warranted change because 59% of motor vehicle accident deaths occur nationally because a CSS is misused (Greenwall, 2015).

Background

The American Academy of Pediatrics (AAP) has multiple policies concerning child passenger safety and safe transportation for infants at hospital discharge. In 1999, the AAP declared that all hospitals must have a policy about safe transit for the infant at hospital discharge. The hospital staff must ensure that caregivers correctly use the CSS and properly restrain the infant so compliance can be maintained. The AAP also suggested that discharge teaching is an appropriate time to educate caregivers about CSS. Finally, the AAP recommended

that a hospital CSS program include a caregiver education module, evaluation of educational materials, and occasional in-service education for hospital staff.

According to Rogers et al. (2012), most caregivers do not receive a hands-on demonstration of correct CSS use before discharge. However, hands-on CSS education has improved longstanding CSS knowledge (Mantha et al., 2018). There was a need in the NICU to educate nursing staff, so they felt confident to provide the best quality teaching to caregivers about CSS safety. There was no standardization of CSS education for caregivers in the NICU. This didn't follow the AAP's guideline for caregivers to receive proper CSS instruction before hospital discharge. This proved to be a significant gap in care. Some nurses briefly educated caregivers while buckling the infant into the CSS to go home, while other nurses never educated. There was no consistent practice for all nurses to follow; therefore, a standardized CSS teaching was advised to help eliminate this gap in care and improve this significant problem.

Problem

Families with infants are at an increased risk of making severe CSS errors (Hoffman et al., 2016). In a RCT, 95% of families made at least one error while using CSS (Hoffman et al., 2016), while in a John Hopkin's level III study, 85% of CSS consisted of a misuse (Rogers et al., 2012). Most RNs do not feel comfortable providing CSS education to caregivers, nor do they feel trained in the topic or have time throughout their busy shifts (Rogers et al., 2013). These are all barriers to CSS education that needed to be eliminated and improved upon in this quality improvement project.

The population for this project was all RNs working in the NICU. RNs were included as participants if they were full-time, part-time, or per-diem that worked in the NICU. RNs floating from other floors throughout the hospital or pulled from other NICUs in the urban area were not

included in this quality improvement project. The goal was to educate all the nurses on the unit, which totaled 135 nurses.

Rationale

A needs assessment was conducted to determine what significant issues in the NICU warranted change. The nurse manager, discharge coordinator, Child Passenger Safety Technicians (CPSTs), and multiple staff nurses agreed that the CSS education process required change. There was not a thorough understanding as to why RNs struggled with CSS education to NICU caregivers. This lack of knowledge gave reason to begin this investigation.

Past failures with educating staff and NICU caregivers about CSS helped guide intervention selection. The discharge coordinator attempted a standardized CSS education through a weekly class to NICU parents, but it was unsuccessful due to low attendance rates. Her insight into improvement and intervention selection was critical. The goal was to create an intervention that was feasible for RNs to complete on a busy shift while giving the caregivers vital facts about CSS.

Purpose and Aims

Internal evidence showed that RNs were not currently using a standardized discharge teaching process regarding CSS. This lack of education led to ambiguity or even poor understanding by caregivers on safely securing their infant. This quality improvement project aimed to implement a standardized discharge teaching to increase the quality of education delivered to NICU caregivers by RN staff. Additionally, specific aims were to increase RNs' self-efficacy towards CSS and improve accurate documentation of this teaching into the EHR.

Setting

This project took place in a 373-bed urban hospital based in the Southeast United States. More specifically, the project was delivered in a 48-bed, level III NICU. All infants born in the urban hospital under 35 weeks of gestation must come to the NICU for evaluation. Infants born after 35 weeks of gestation may stay with their mother if they are doing well and do not warrant a NICU admission.

Stakeholders

Multiple stakeholders were involved with this project. The NICU nurse manager approved the project intervention and felt strongly about the need for this change. The discharge coordinator gave insight about ways for improvement to better address the NICU RN and caregiver population. All NICU CPSTs advocated for this education as they noticed the current lack of education NICU RNs had about proper CSS use. The chief nursing officer (CNO) was a significant stakeholder as her approval of this project was necessary.

Facilitators and Barriers to Change

The project lead was the only facilitator of this new education and taught as many RNs on the unit as possible. Foreseeable barriers included disinterest in the topic and time constraints. Since the instruction was being conducted during RNs' shifts, it was likely they would not have time to listen to the new training due to patient demands. These barriers were mitigated by making the training short, which was under ten minutes and having multiple modes of teaching to make it more interesting. These included a handout, video, and a checklist.

Ethics

This project was deemed a non-human subject quality improvement project from the University of Louisville's Institutional Review Board (IRB). Additionally, this project received authorization from the agency's IRB, NICU nurse manager, and CNO. Please see Appendix A

for this letter of approval. Informed consent was not warranted due to the nature of this quality improvement project.

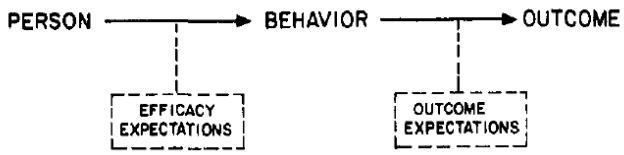
Conceptual Framework

Bandura's self-efficacy theory is directly related to this quality improvement project's purpose and aims. According to Bandura (1977), the stronger the individual's self-efficacy is, the more likely they will make substantial efforts for success. This theory provided the backbone to help support this project.

Bandura's theory of self-efficacy has two significant components. These are the self-efficacy expectations and outcome expectations. The self-efficacy expectations are the personal judgments people have about their abilities to produce the desired outcomes. In contrast, outcome expectations are judgments about behavior that can lead to specific results. These two expectations are separated because Bandura believed that the outcome expectations depended on the self-efficacy expectations. For example, people who determine themselves to be highly successful at completing a task will have better outcomes. See Figure 1 for a visual representation of this theory.

Figure 1

Representation between self-efficacy expectations and outcome expectations.



Bandura's self-efficacy theory shows that for a successful outcome to occur, self-efficacy needs to be high. This quality improvement project aimed to improve the nursing staff's

self-efficacy by using a checklist and an instructional video about CSSs, so successful standardized teaching could occur.

Intervention

This quality improvement project took place in the NICU while RNs were working their assigned shifts. First, RNs took the 2-minute pre-survey. RNs were advised to circle at the top that this is the pre-survey and write the last four digits of their cell phone number on the survey. This helped to ensure that both pre-and post-data could be matched anonymously. After completion, surveys were dropped into a designated box anonymously. Next, nurses viewed the instructional video titled "Car Seat Safety: Discharge Teaching." This video covered the new CSS discharge teaching process. RNs viewed this 7-minute video on the unit's iPad. Once the video had been viewed, RNs initialed next to their name, indicating that they completed the new education and were ready to start the implementation. After the education stage was complete, RNs were then able to use a newly created nursing reference sheet in the unit to be used as a guide regarding the teaching process, roll the unit iPad into the patient room for caregivers to view the CSS video, and supplement with the caregiver five-point checklist. After the 2-month implementation period, RNs completed the post-survey to determine if their self-efficacy related to CSS teaching to caregivers increased. RNs circled that this was the post-survey and labeled their survey with the last four digits of their cell phone number. RNs were advised to place the survey in the designated box so anonymity could be maintained.

Literature Review

The standard methods to educate about CSS use are handouts, videos, didactic courses, online classes, hands-on demonstration, or a combination approach (Giannakakos et al., 2018;

Hoffman et al., 2016; Kuroiwa et al., 2018; Mantha et al., 2018; Rogers et al., 2012; Rogers et al., 2013; Tessier, 2010).

Nursing Staff Education

A quality improvement study by Rogers et al. (2013) focused on teaching nurses about CSS basic education to feel more competent in providing simple instructions to caregivers before discharge. Rogers et al. (2013) sought to understand if providing education would increase the CSS teaching to newborn caregivers. Nurses participated in a didactic, mandatory training, along with a hands-on demonstration that followed. When nurses provided education to caregivers, they were allowed to use a handout and a poster to aid in their instruction about appropriate CSS use (Rogers et al., 2013). This is important because NICU RNs were allowed to use a supplemental caregiver checklist to help their CSS teaching.

After the teaching, a follow-up questionnaire asked 70 mothers if the teaching helped correct CSS use, if the education was sufficient, and if the RN seemed helpful and well-informed. Results showed that 44% of mothers still reported receiving no teaching, while 33% received education. However, in those who received the knowledge, there was no reduction in mothers' number of CSS errors upon discharge (Rogers et al., 2013).

Rogers et al. (2013) found that although the RNs had participated in education, there was a continued low percentage of knowledgeable caregivers. There was no post-intervention survey given to RNS, so there was no understanding of why they were not teaching caregivers. It was essential to incorporate a post-intervention survey for RNs in this quality improvement project to help understand if the project improved nursing self-efficacy related to CSS education.

Car Safety Seat Educational Interventions

Hoffman et al. (2016), Rogers et al. (2012), and Tessier (2010) watched caregivers place their infants into the CSS, harness them, and then place the CSS into the vehicle. From observation, most errors consisted of inaccurately restraining the infant in the CSS, followed by incorrect CSS installation into the car (Hoffman et al., 2016; Tessier, 2010). More specifically, the most common errors had the harness too loose or low on the infant, and the CSS was moving more than one inch in the vehicle (Hoffman et al., 2016; Rogers et al., 2012; Tessier, 2010). This information showed that these errors must be addressed in the discharge teaching content.

A RCT by Kuroiwa et al. (2018) used a video-based program compared to a lecture class. The video program had an introduction by a CPST, followed by participants watching a video demonstration on proper CSS use. Correct CSS installation increased to 50% from 16% for the video-based program members, while the confidence level improved to 79% from 8% (Kuroiwa et al., 2018). Giannakakos et al. (2018) conducted their video education program differently. Two separate videos were used in conjunction, one for the CSS installation and the other video for harnessing the infant into the CSS (Giannakakos et al., 2018). The participant watched the video on an iPad, used a checklist to ensure they completed each step, and monitored themselves (Giannakakos et al., 2018). Along with Kuroiwa et al. (2018) and Giannakakos et al. (2018), Adams et al. (2017) also incorporated a video into their education. Results showed increased CSS knowledge and self-efficacy following the video and a hands-on demonstration (Adams et al., 2017).

From this information gathered, it was essential for the CSS video to incorporate both installation elements to decrease errors and increase self-efficacy. The new video demonstrated how to install a CSS and harness an infant, which took the place of a hands-on demonstration. Video-based programs are a great way to educate about proper CSS use. There are fewer

resources necessary for the video-based curriculum, and the staff's time is used more efficiently (Kuroiwa et al., 2018).

Methods

Participants took the brief pre-test immediately before the project intervention. RNs circled that this was the pre-survey and then labeled their survey with the last four digits of their cell phone number. This pre-test included demographic information about their age, education level, years of NICU experience, and if they were currently a CPST. It was essential to gather this demographic data because those results could impact a RN's self-efficacy about CSS teaching. A seven-question Likert scale survey about nursing self-efficacy immediately followed the demographic content. Outcomes measured were RNs' self-efficacy about CSS teaching to caregivers upon discharge. Please see Appendix B for the pre-and post-test.

After the RNs took the pre-test, they viewed the "Car Seat Safety: Discharge Teaching" presentation video on the unit iPads. Please see Appendix C for the presentation slides. This video began with facts about how CSS misuse can lead to infant death and how RNs can help correct this problem. The new process of CSS discharge teaching was then described. The first step was for nursing staff to watch the "Car Seat Safety: Discharge Teaching" presentation video because it covered how all CSS discharge instructions to caregivers will occur. The presentation discussed how RNs would first review the nursing checklist that was provided to them. This checklist was located in the main binder in all three separate nursing pods in the unit. This allowed for a quick and easy reference for RNs to review the process before teaching caregivers, so no steps were missed.

Next, RNs viewed the National Child Safety Board's (2019) video about installing a rear-facing CSS. The video showed how to restrain an infant into a CSS properly and install the CSS

into the vehicle. This is the same video that RNs had the caregivers view before discharge. The "Car Seat Safety: Discharge Teaching" presentation video instructed RNs that they will be taking the unit iPads into the patient's room, pulling up the National Child Safety Board's video on YouTube, and then having the caregivers watch it.

Next, the presentation detailed how the RNs will teach the caregivers after the National Child Safety Board's video was viewed. RNs provided a supplemental Safe Kids Worldwide checklist that goes over the video's highlights for caregivers to take home (Safe Kids Worldwide, 2019). RNs needed to discuss the inch test, pinch test, and where the chest clip should be located on the infant. Please see Appendix D for the caregiver checklist.

After the RNs provided the National Child Safety Board (2019) video and Safe Kids Worldwide (2019) checklist to caregivers, RNs documented their education into the agency's electronic health record (EHR). The "Car Seat Safety: Discharge Teaching" presentation video discussed where to document the education. First, RNs located the "Education" tab in the EHR and scrolled down to the heading "Prevention/Discharge." Under the heading, RNs selected the check box called "Car Safety Seat Use" and typed into the comment box, "Instructional video viewed, and parent checklist reviewed." Once documentation took place, the new CSS discharge teaching was complete. The presentation video ended with permission for the RNs to begin the new teaching pilot phase with all caregivers at discharge, along with the project lead's contact information and references. Throughout the two-month implementation phase, reminders were posted throughout the unit to prompt RNs to conduct their CSS teaching and document appropriately.

RNs were encouraged to participate in the two-minute post-test, which was administered following the two-month implementation phase. RNs were advised to circle at the top that this

was the post-test, write the last four digits of their cell phone number at the top, and then after completion to place it in the designated box, so their answers are completely anonymous.

Intervention Team

The project lead guided all the implementation, so no additional training of personnel was required. The project lead kept all stakeholders up to date throughout the project implementation period. This included an update on project initiation and completion. Stakeholders were also asked throughout the trial period if they noticed success in RNs teaching caregivers.

Participants

Participants included all full-time, part-time, and per-diem RNs that worked both dayshift and nightshift. Any RN pulled from a different floor was excluded from this project. A list of all RNs in the NICU was provided by Human Resources to reference who had completed the project intervention. This is the form that RNs initialed after they viewed the education. Human Resources also provided a list of all RNs in the NICU at the end of the project intervention trial period since multiple participants were on leave or had left the unit. Informed consent was not necessary because this was a quality improvement project, and all RNs remained anonymous when completing the pre-and post-tests.

Data Collection

All RNs' answers remained anonymous when completing the pre-and post-tests because participants placed their surveys in the designated box without personal identification. All paper copies of the pre-and post-tests were stored in a safe at the project lead's house. Only the project lead had a key to the safe.

After post-test data was collected, a chart review of recently discharged and transferred NICU patients was analyzed throughout the pilot phase. The project lead analyzed 138 patient

charts. The project lead reviewed documentation regarding CSS discharge teaching in the education section of the EHR. The project lead determined if RNs documented in the education comment box that caregivers watched the CSS rear-facing educational video, the supplemental caregiver checklist was reviewed, or both. The project lead followed all the agency's Health Insurance Portability and Accountability Act (HIPAA) guidelines, and no identifiable patient information was used. Data collected from patients' EHR was stored in a password-protected folder on the project lead's computer.

Budget

This quality improvement project was free to the agency site. No grants or funding were received. If a different place were to implement this project, an iPad or a viewing source would be necessary for purchase. Fortunately, this agency's unit already had an iPad, so no additional spending was needed.

Measurement

The pre-and post-test had two distinct sections: demographics and nursing self-efficacy. The pre-test was administered before RNs watched the "Car Seat Safety: Discharge Teaching" presentation video, and the post-test was given after the 2-month pilot phase.

Instrument

The demographic information included four multiple-choice questions about the participant's age, if they were a CPST, how long they had been a NICU RN, and their nursing education level. These demographic questions of the survey were created and were essential to consider. It was imperative to determine if educational level, length of time as a NICU nurse, or certification as a CPST increased an RN's self-efficacy.

The nursing self-efficacy section of the pre-and post-test was based on the survey used in a Doctor of Nursing (DNP) project about nursing self-efficacy, knowledge, and attitudes towards Cologuard® (Besten, 2019). Permission was obtained from the author to change the wording in the survey and to use it. This survey was chosen because there was no validated self-efficacy questionnaire specific to car seat education implementation. The self-efficacy part of the test consisted of seven Likert-scale (1-5) questions based on nursing self-efficacy, ranging from "strongly disagree" to "strongly agree." Permission was obtained from the author to change the wording from Cologuard® to car sear education. See Appendix B for the pre-and post-test.

Statistical Methodology

Quantitative data analysis was used to evaluate the effectiveness of the project intervention. Descriptive statistics were analyzed for the demographic information. A paired t-test was used to assess the self-efficacy variable. The paired t-test was selected because the same population group was analyzed both before and after project implementation. The project lead also analyzed EHR education documentation. A list of patients discharged and transferred throughout the pilot phase was provided to the project lead by Human Resources. Descriptive analysis was used to determine if there was correct CSS education documentation for each patient discharged or transferred. The number of patient charts with proper documentation provided information regarding this new standardized teaching practice's completion rate.

Completeness and Accuracy of Data

Data was examined multiple times to check for accuracy while inputting results into SPSS. A Ph.D. student helped with choosing the appropriate statistical analysis tests to run. Unfortunately, not all surveys were completed to the full extent. Some participants did not fill

out all the questions, while others forgot to put the last four digits of their cell phone number on the survey for accurate identification. This is discussed further in the results section.

Data Analysis

Results were analyzed using the IBM SPSS Statistics version 27.0 software. Qualitative data, including nursing demographics, was studied using descriptive statistics and frequencies, while the quantitative data used a paired t-test and a one-way analysis of covariance (ANCOVA). Chart audits were also completed at the end of the project trial period to evaluate nursing compliance with the new CSS teaching to NICU caregivers.

Qualitative data were analyzed by descriptive statistics and frequencies. This type of data analysis was chosen to explain further the characteristics of the final sample size (n=70). More specifically, this analysis was completed on questions one through four of the pre-and post-tests. These questions examined the participant's age, years of NICU experience, education level, and if they were a CPST. These findings helped to understand further the different types of participants in the sample size.

Quantitative data were analyzed with a paired t-test and a one-way ANCOVA. The paired t-test was chosen to measure the self-efficacy variable. This was for questions one through seven involving the Likert scale. The paired t-test was selected to compare the mean results of the Likert scale scores within the same group of participants on two different occasions. This was completed before education and then eight weeks after the education to see if nursing self-efficacy had improved.

A one-way ANCOVA was chosen for further analysis to determine if different demographics of the sample affected self-efficacy. This test looked for differences in the

adjusted mean and determined if there were any significant variances between the unrelated characteristics of the sample and the post-test scores.

Chart audits were completed at the end of the eight-week trial period. Permission was obtained from the agency hospital, and all HIPAA guidelines were maintained for patient confidentiality. Charts were analyzed to see if RNs documented about completing CSS teaching before discharge and whether they provided caregivers with the discharge handout, had them watch the CSS video or both. Charts were also analyzed to see if the patient was discharged from the NICU or transferred to another unit.

Initially, a paired t-test and descriptive statistics were the only tests to be conducted on this sample. However, it was necessary to add the one-way ANCOVA test to understand if different characteristics of the sample affected their self-efficacy.

Results

Sample Size

The agency's Human Resources Department provided the names of the RNs that worked on the unit. 110 potential RNs could have taken the pre-test. The project lead and the nurse manager were subtracted from that total, along with four RNs out on leave and two RNs who had left the unit. A total of 87 RNs took the pre-test out of a potential 102 RNs. One pre-test was not labeled with an identifier. This led to 85.29% of the nursing staff receiving the education about the new CSS discharge teaching and taking the associated pre-test.

The Human Resources Department provided the names of the RNs that worked on the unit after the eight-week trial period. 109 potential RNs could take the post-test. However, the project lead and the nurse manager were subtracted from that total, along with two RNs that left the unit, four new RNs that did not receive the initial education, eight RNs out on leave, and then

14 RNs that never received the initial education. These 14 RNs that did not receive the initial education and the four new RNs were excluded from the post-test sample size because they never filled out the pre-test nor received the education, so their post-test results could not be compared to a pre-test. This left a potential sample size of 80 RNs, with a total of 78 RNs that took the post-test. There were three post-tests without an identifier, so those could not be used in the sample size.

17 pre-tests were not compared to a post-test, while five post-tests did not correlate to a pre-test. This led to the final sample size of 70 RNs that took both the pre-and the post-test.

Descriptive Statistics

Table 1 shows the qualitative data results of the final sample size (n=70). The majority of RNs were between 30-39 years old (40%), with 2-10 years of experience in the NICU (55.7%) and obtained a bachelor's degree (81.4%). There were very few CPSTs (8.6%) in this sample.

Table 1

Respondent Characteristics (n=70)

Age range	n	Percentage
24-29 years old	19	27.1%
30-39 years old	28	40%
40-49 years old	9	12.9%
50-59 years old	11	15.7%
60+ years old	3	4.3%
NICU years of experience	n	Percentage
Less than 1 year	3	4.3%
2-10 years	39	55.7%
10+ years	28	40%
Nursing level of education	n	Percentage
Associate degree	11	15.7%
Bachelor's degree	57	81.4%
Master's degree	2	2.9%
Child passenger safety technician	n	Percentage
Yes	6	8.6%
No	64	91.4%

Paired T-Test

A paired t-test was conducted to analyze the results regarding the variable of self-efficacy. Results showed an increase in the mean score to all the answers, except number three. See Table 2 with these results. Question number three showed a decrease in the mean score from a pre-test result of 2.66 to a post-test result of 2.36. Question three is a reverse or negative question, so a reduction of the mean score is reassuring. However, not all these changes were significant.

Table 2

Percentage of Change in Pre- and Post-Test Means (n=70)

Item No.	Question	Pre-Test Mean Score	Post-Test Mean Score	Change in Scores
1	*I am likely to discuss car seat education with caregivers before discharge.*	4.40	4.50	**+0.10**
2	*Documentation of car seat education within the electronic health record (EHR) is clear and consistent.*	3.59	4.24	**+0.65**
3	*Barriers exist that prevent me from discussing car seat education with caregivers before discharge.*	2.66	2.36	**-0.30**
4	*I am confident in my understanding of car seats.*	3.73	4.10	**+0.37**
5	*I am comfortable discussing car seat education with caregivers before discharge.*	3.90	4.31	**+0.41**
6	*I am confident in my understanding of the unit's procedure related to car seat education upon discharge.*	3.87	4.40	**+0.53**
7	*It is easy to access resources and/or materials for car seat education.*	3.67	4.34	**+0.67**

The paired t-test showed that statements number two, four, five, six, and seven all significantly changed their self-efficacy mean scores, using a p-value of <0.05. This shows that the CSS intervention impacted increasing RNs' self-efficacy related to those specific questions. However, statements one and three did not show significant changes. See Table 3 for these results.

Table 3

Paired T-Test Significance (n=70)

	Paired Differences							
				95% Confidence Interval of the Difference				
Question	Mean	Std. Deviation	Std. Error Mean	Lower	Upper	t	df	Sig (2-tailed)
Likert-Scale #1	-.100	.887	.106	-.312	.112	-.943	69	.349
Likert-Scale #2	-.657	1.153	.138	-.932	-.382	-4.767	69	**<.001**
Likert-Scale #3	.300	1.458	.174	-.048	.648	1.721	69	.090
Likert-Scale #4	-.371	.765	.091	-.554	-.189	-4.064	69	**<.001**
Likert-Scale #5	-.414	.843	.101	-.615	-.213	-4.114	69	**<.001**
Likert-Scale #6	-.529	.880	.105	-.738	-.319	-5.025	69	**<.001**
Likert-Scale #7	-.671	1.018	.122	-.914	-.429	-5.521	69	**<.001**

One-Way ANCOVA

The one-way ANCOVA analyzed if the unrelated demographics of the sample affected their post-test self-efficacy scores. These demographics were the participant's age, education level, years of NICU experience, and if they were a CPST. The one-way ANCOVA results

showed that age was the most significant demographic that affected self-efficacy, along with the level of education.

The age of the participant showed statistical significance ($p < 0.05$) differences in self-efficacy for statements one, five, and six of the Likert scale. A posthoc test looked at the pairwise comparisons between the different age groups. For question one, the 60+ age range had a significant difference compared to the 30-39 and the 50-59 years old. More specifically, the 60+ age group had a mean score of 3.25, while the 30-39 and 50-59-year-old groups had a mean score of 4.57 and 4.74, respectively. For question five, the 60+ age range had a significant difference between all age groups. The 60+ group of RNs had a mean score of 2.78, while all the other age ranges had a mean score of 4.13 or greater. Lastly, for question six, the 60+ age range had a significant difference between all age ranges except the 50-59-year-olds. The 60+ age range had a mean score of 3.11, the 50-59-year-old RNs showed a mean of 4.13, while the other three groups had a mean score of 4.44 or greater.

The participant's level of education only showed significance ($p < 0.05$) to their post-test self-efficacy score with question number four. The posthoc test results showed that those with a Master's degree had a significant difference compared to those with a Bachelor's degree. The RNs that had a Master's degree had a lower mean score (2.85) compared to those with a Bachelor's (4.20) and Associate's degree (3.85).

The participant's years of NICU experience and whether they were a CPST did not show any statistically significant findings between groups related the nursing self-efficacy. However, RNs who were a CPST had higher mean scores for all self-efficacy statements than RNs who were not certified. See Table 4 for the one-way ANCOVA statistical significance results.

Table 4

One-Way ANVOCA Statistical Significance (n=70)

Likert Scale Question	Age	Years of NICU Experience	Level of Education	CPST Status
1. I am likely to discuss car seat education with caregivers before discharge.	**0.027**	0.919	0.470	0.191
2. Documentation of car seat education within the electronic health record (EHR) is clear and consistent.	0.067	0.146	0.848	0.963
3. Barriers exist that prevent me from discussing car seat education with caregivers before discharge.	0.378	0.508	0.696	0.294
4. I am confident in my understanding of car seats.	0.168	0.290	**0.003**	0.143
5. I am comfortable discussing car seat education with caregivers before discharge.	**< 0.001**	0.402	0.088	0.219
6. I am confident in my understanding of the unit's procedure related to car seat education upon discharge.	**0.011**	0.264	0.072	0.762
7. It is easy to access resources and/or materials for car seat education.	0.062	0.215	0.909	0.926

Chart Analysis

The agency's research department provided a list of patients discharged or transferred out of the NICU from March 10, 2021, to May 5, 2021. This totaled 137 patients, with one patient missing data due to being deceased. The final sample of 136 patients was used. There were 102 discharges (75%) and 34 transfers (25%) from the NICU. Ten patient charts had documentation about CSS education. One patient chart only talked about supplementing CSS teaching with the handout, while the other nine patient charts discussed using the CSS video for caregiver education. No RNs charted about using both the CSS handout along with the CSS video.

Discussion

Summary

The overall goal of this quality improvement project was to implement a standardized CSS education for NICU RNs, so they felt more comfortable teaching NICU caregivers before hospital discharge. Furthermore, the specific aims were to increase nursing self-efficacy about CSS teaching and to increase compliance with the education documentation in the patient's EHR.

Overall, a high percentage (85.29%) of NICU nursing staff were educated about the new CSS education. However, there was some loss of retention with RNs for the post-test. This was related to the loss of participants due to medical leave, staff leaving the unit, or specific RNs not working during the two-week follow-up period. The five post-tests that did not correlate with a pre-test could be due to RNs that did not take the pre-test taking the post-test accidentally.

There were multiple critical findings from the results. First, results showed nursing self-efficacy regarding CSS teaching improved for four out of the six statements. This is reassuring because this finding relates to the specific aim of increasing nursing self-efficacy about CSS teaching; however, it would have been better to see an increase for all six statements.

Unfortunately, a meager percentage of RNs accurately documented in the EHR about the CSS teaching. Only 7% of patient charts had some sort of documentation about CSS teaching, whether related to education with the CSS video or the handout. However, only one chart had accurate documentation, which discussed teaching with both the video and the supplemental handout. This shows that increasing documentation compliance was not met, and future endeavors should focus on this.

Interpretation

The varied results have a significant impact on further research into this topic. There is a lot to learn about the different outcomes found and the effect this can have on people and related systems.

Paired T-Test and Nursing Self-Efficacy

There was a significant increase in mean self-efficacy scores for all statements except for numbers one and three in the Likert scale. For statement number one, there was a mean pre-test score of 4.40, while the post-test score had a mean of 4.50. See Table 2. Although this finding was not significant, it is still reassuring that there was a slight increase in the mean. This shows that after the project implementation, RNs were slightly more prone to discuss CSS teaching with NICU caregivers before hospital discharge. This is encouraging because now RNs have more resources to help aid in their teaching, including a specific handout related to CSS main safety points and a supplemental video.

Statement number three also did not have a significant change. However, there was a decrease in the mean scores, which is reassuring since this statement is reversely worded. The pre-test mean score was 2.66, while the post-test mean score was 2.36. See Table 2. This is important because although it is not a significant finding, RNs felt that they had fewer barriers that would hinder their CSS discharge teaching to caregivers.

These findings have clinical significance related to the outcomes of this project and for the future. Overall, these findings show that this intervention did help increase RN self-efficacy about CSS discharge teaching. However, it would have been better to see a statistical change in all self-efficacy statements. Adams et al. (2017) showed similar findings with an increase in self-efficacy after viewing a CSS video. However, they included a hands-on demonstration after the supplemental video. A hands-on component for RNs to physically practice harnessing an infant

and placing a CSS into the vehicle should be considered in the future as this could increase RN self-efficacy further.

Some influencing factors could have played a role in not showing a significant change in all the self-efficacy statements. Some nurses were distracted during the initial intervention teaching due to their patient alarms going off and not seeing the iPad screen well. In the future, it might be better to complete this project during a staff meeting where there are limited distractions and a bigger television screen. This would allow for the full attention of all RNs.

One-Way ANCOVA and Nursing Self-Efficacy

The one-way ANCOVA showed a more detailed analysis of the differences found amongst the demographics of the RNs and their self-efficacy scores. The findings showed that only age and level of education were the demographics that showed a statistically significant difference among groups.

There was a statistically significant difference between age groups regarding nursing self-efficacy in statements one, five, and six. Results showed that the 60+ age range had lower mean scores than other age groups for all seven statements; however, only three statements showed statistical significance. These findings are important to consider because further teaching should be geared towards this age range since they are less likely to discuss CSS teaching to caregivers, feel more uncomfortable with the education, and lack a complete understanding of the unit's procedure to CSS teaching. Furthermore, as part of the unit culture, the RNs that have been on the unit the longest typically prefer more straightforward patient assignments. These patients include the feeders and growers that are being discharged home soon. This leads to a higher importance of educating this population because they will be doing a lot of discharge teaching to caregivers.

The participant's level of education showed a statistically significant difference among the Bachelor's degree and the Master's degree groups for Likert-scale statement four. It was surprising that the participants who had a higher education level felt less confident in their understanding of CSS. It was anticipated that those with more advanced levels of education would have higher self-efficacy scores. Although Master's prepared participants had higher mean scores than the Bachelor's and Associate's degree participants for statements one, two, three, and five, the assumption was proven wrong for statement four. Influencing factors that could have affected this finding would be a low sample size of only two Master's degree prepared participants. Further education for this small group is most likely not warranted because these RNs are awaiting future nurse practitioner jobs and will soon leave the NICU.

It was an unexpected finding not to have the CPSTs show a statistically significant difference compared to those not certified technicians. However, all CPSTs had a higher mean score on all self-efficacy statements than those not certified technicians. Statement three, which is reversely worded, was included in this higher mean score for CPSTs. This is an unexpected finding as CPSTs find that more barriers prevent them from completing CSS education. This could be because their teaching is more detailed and time-consuming since they have a more extensive knowledge base. Many CPSTs on the unit will get out the practice vehicle chair and use that as a demonstration toward caregivers. Although this was not required in this intervention, they take the teaching a step further to help with understanding. This leads to more comprehensive teaching, which takes away from patient care and can be a barrier to education.

Along with the role of being a CPST, the demographic associated with years of NICU experience did not show a statistically significant difference between groups for the self-efficacy

scores. It was anticipated that those with longer NICU years of experience would show higher levels of self-efficacy.

Chart Analysis

Overall, the results of the chart analysis were poor and unexpected. There were very few RNs that documented CSS teaching. Ten out of 137 patients had documented charting about CSS teaching. This proves that the aim of increasing documentation compliance for CSS teaching was not met.

This is a surprising finding since the paired t-test results of the Likert-scale statement two showed a statistically significant increase in mean scores related to CSS documentation. This showed that RNs thought that documentation was clear and consistent in the EHR. See Table 3. The pre-test mean score was 3.59, and the post-test mean score showed an increase to 4.24. See Table 2. These pre-and post-test scores do not correlate with the chart analysis findings.

It is unsure if the paper reminders placed throughout the unit were helpful. They could have been beneficial as prompts for RNs to teach the caregivers, however, RNs were still forgetting to document. These reminders were placed on the shift huddle board and in each nursing pod. In the future, important consideration needs to be taken on ways to improve CSS documentation. This could include weekly reminder e-mails sent to staff or, more specifically, an e-mail sent to the individual RNs that discharged or transferred patients out of the unit without accurately charting in the EHR. This would require weekly chart audits instead of waiting until the end of the trial period.

Project Impact

This project affected the NICU system and the RN staff. RNs had to adapt and change their practice to help incorporate this new teaching. This intervention also impacted NICU

caregivers because they received instructions about the proper use of CSS from the RNs. In future studies, it would be beneficial to survey NICU caregivers before discharge to analyze further the impact the teaching had on them. It would be helpful to understand if they received the instruction with the video and handout and if it was worthwhile. This would be important to compare with the chart analysis to see if RNs did the teaching but forgot to chart it.

Limitations

There were several limitations and challenges to overcome during the implementation of this QI project. First, it was challenging to find a Likert-scale questionnaire about self-efficacy regarding CSS education. Unfortunately, a validated tool was not seen throughout research, so the wording was changed, with permission from the author, from a validated instrument of a previous DNP project based on colorectal cancer screening. This can limit the validity and reliability of the results found regarding self-efficacy.

Furthermore, the pre-and post-test data collection design limits the validity of the post-test results. The participants could have had a bias toward the post-test since they had already completed the pre-test, which had the exact wording. Also, since RNs were self-reporting their self-efficacy scores versus having a more objective scale, they could have been over or under compensating their perceived self-efficacy on both the pre-and post-test. This limitation was adjusted for by having a longer intervention time frame of eight weeks to help with the pre-and post-test bias.

The design of using paper pre-and post-tests made the measurement and analysis of the results more challenging. It would be beneficial to have a URL given to RNs after the presentation to pull the survey up on their phones, and results could immediately be submitted

online. This would make data collection, analysis, and interpretation more up to date and more straightforward.

While supportive of this QI project, the unit's manager did not make the teaching and the pre-and post-tests mandatory for RNs like expected. This could have caused RNs to feel like this education was unnecessary, resulting in the flawed findings found in the chart analysis. However, reminder signs in all nursing pods were set out to help improve documentation in the patient charts, yet results were still unfortunate.

This project may be difficult to implement in other NICUs of similar characteristics. This NICU already had access to unit iPads which made the dissemination of teaching easy and free to complete on the unit while RNs were working. However, the handout and video presented to caregivers could be used as this is accessed online through validated, evidence-based resources.

Conclusion

Overall, this QI project showed results that are significant for current and future practice. In the future, it would be helpful to include RNs' thoughts on if they felt like this project was useful in guiding their CSS education. This information could be gathered in the post-survey. Although charting results were poor, more RNs may have been implementing this teaching but not documenting their actions.

This project is sustainable for future practice; however, changes can and should be made to the process. It would be advised to implement RN teaching in a more controlled setting versus on the unit after shift change. RNs are busy during this time looking up their new patient information and settling into their shift. While asked to watch the new teaching, their attention was not directed solely to the CSS teaching video. It would also be beneficial to implement more frequent reminders to specific staff that are not documenting the teaching. This would involve

the project lead to assess charting throughout the intervention period instead of only at the end. These regular reminders and assessments could lead to a higher percentage of accurately documented patient charts.

This project can only be implemented for caregivers with infants or children using a rear-facing infant carrier instead of a convertible CSS. This project did not go into detail about convertible CSS, forward-facing CSS, or booster seats. Therefore, this project is limited to a specific population of caregivers with infants or very young children. This project can be used in other NICUs or expand to Mother and Baby units since the population of caregivers is the same. Future studies can focus more on education regarding convertible CSS, forward-facing CSS, and booster seats. This would be an essential topic for education in pediatric units and emergency rooms of hospital settings.

This project will be disseminated in multiple ways and settings. First, the CNO, unit manager, discharge coordinator, and staff educator will receive the results about RN self-efficacy before and after teaching, along with the documentation results. These were critical stakeholders in this project, so their knowledge about project findings is vital. NICU RN staff will also be educated about project conclusions. It will be helpful to discuss with the RNs to see what went well for them and what they disliked. This can impact future project implementation to help understand what can be changed for improvement. Furthermore, this project will be presented at the University of Louisville's poster presentation for other DNP students and APRNs at a conference. This can help guide teaching about CSS for the upcoming APRNs and those that are currently in practice.

Overall, this project had important findings regarding nursing self-efficacy about CSS teaching and has many implications for future practice and further study.

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Appendix A

Letter of Approval

NORTON HEALTHCARE
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January 26, 2021

Lynette Galloway, DNP, APRN
Madeline Sass, RN
555 South Floyd Street, Suite 3019
Louisville, KY 40202

RO# 21-N0007 / IRB# 20.0895 / Title: The Implementation of a Standardized Car Safety Seat Discharge Teaching to Improve Self-Efficacy in Neonatal Intensive Care Unit Nurses

Dear Researchers:

The Norton Healthcare Research Office (RO) is pleased to notify you that your application to conduct the research study referenced above in the following Norton Healthcare (NHC) facility has been approved.

- **Norton Women's and Children's Hospital**

Your project does not meet the "Common Rule" definition for human subjects' research (NHSR). Therefore, IRB review is not needed prior to conducting this project. Research Office should be notified if the status of your project changes.

Please note: Additional institutional approvals, such as from practice managers, HR, and/or Norton Medical Group, may be necessary based upon the type of study you are conducting. It is your responsibility to work with your advisors to ensure that all institutional permissions have been obtained prior to initiating your research project.

We look forward to the successful completion of your project. If you have any further questions or need assistance, please contact the RO at 502-629-3501.

Please let us know how we are doing. Follow the link https://www.surveymonkey.com/s/NHORAsatisfaction to complete the RO Satisfaction Survey in less than two minutes. Your feedback helps the RO improve the services we provide and meet the needs of the research community.

Sincerely,

Stephen W. Wyatt

Stephen W. Wyatt, DMD, MPH
Chief Research Executive
Norton Healthcare Research Office

Appendix B

Pre- and Post-test

Car Seat Safety Education Pre- and Post-Test

Last 4 digits of your cell phone number: _____

1. Select your age range.

a. 20-29 years old
b. 30-39 years old
c. 40-49 years old
d. 50-59 years old
e. 60 + years old

2. Select how long you have been a NICU nurse.

a. Less than 1 year
b. 2-10 years
c. 10 + years

3. Select your nursing level of education.

a. Associate's Degree
b. Bachelor's Degree
c. Master's Degree

4. Select if you a Certified Safety Passenger Technician.

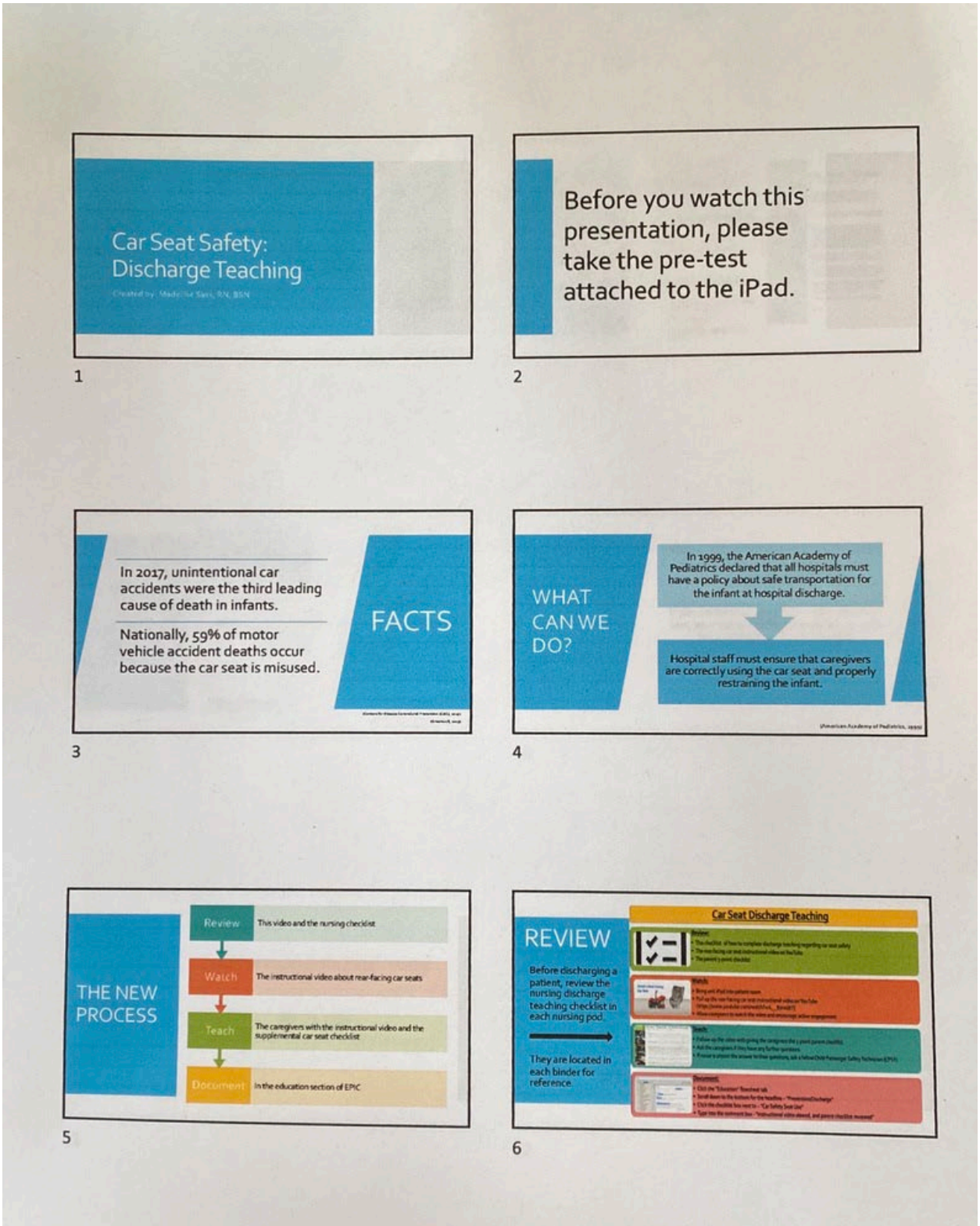
a. Yes
b. No

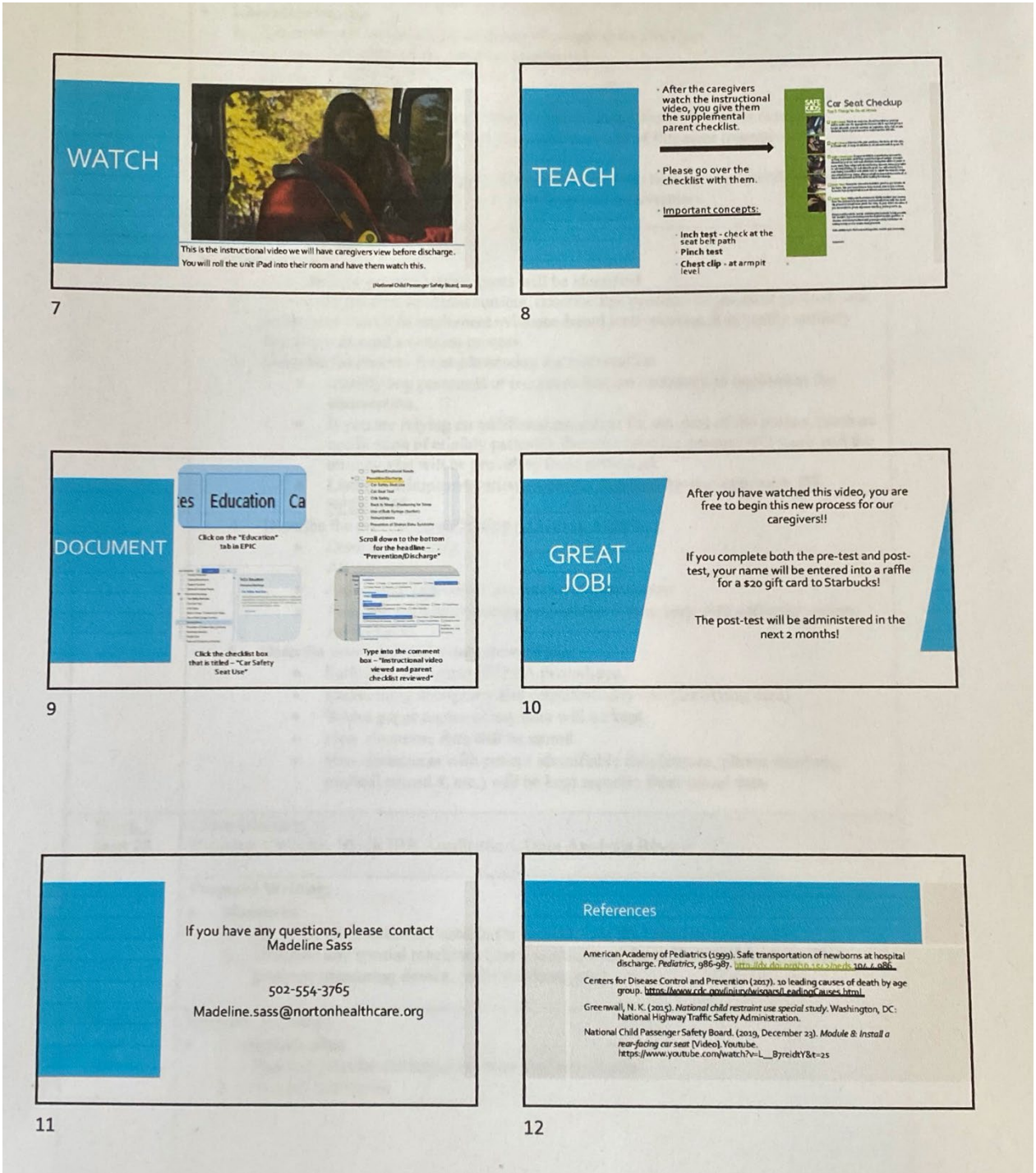
Please use the Likert scale (1-5) to measure the following attitudes and beliefs:

Question	1 = Strongly Disagree 2 = Disagree 3 = Neutral/Don't Know 4 = Agree 5 = Strongly Agree				
1. I am likely to discuss car seat education with caregivers before discharge.	1	2	3	4	5
2. Documentation of car seat education within the electronic health record (EHR) is clear and consistent.	1	2	3	4	5
3. Barriers exist that prevent me from discussing car seat education with caregivers before discharge.	1	2	3	4	5
4. I am confident in my understanding of car seats.	1	2	3	4	5
5. I am comfortable discussing car seat education with caregivers before discharge.	1	2	3	4	5
6. I am confident in my understanding of the unit's procedure related to car seat education upon discharge.	1	2	3	4	5
7. It is easy to access resources and/or materials for car seat education.	1	2	3	4	5

Appendix C

"Car Seat Safety: Discharge Teaching" Presentation Slides




WATCH
This is the instructional video we will have caregivers view before discharge.
You will roll the unit iPad into their room and have them watch this.
7
TEACH
After the caregivers watch the instructional video, you give them the supplemental parent checklist.
Please go over the checklist with them.
Important concepts:
Inch test - check at the seat belt path
Pinch test
Chest clip - at armpit level
Car Seat Checkup
8
DOCUMENT
Education
Click on the "Education" tab in EPIC
Scroll down to the bottom for the headline – "Prevention/Discharge"
Click the checklist box that is titled – "Car Safety Seat Use"
Type into the comment box – "Instructional video viewed and parent checklist reviewed"
9
GREAT JOB!
After you have watched this video, you are free to begin this new process for our caregivers!!
If you complete both the pre-test and post-test, your name will be entered into a raffle for a $20 gift card to Starbucks!
The post-test will be administered in the next 2 months!
10
If you have any questions, please contact Madeline Sass
502-554-3765
Madeline.sass@nortonhealthcare.org
11
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Appendix D

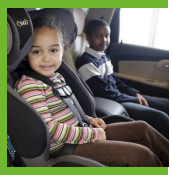
Caregiver Checklist

SAFE KIDS WORLDWIDE

Car Seat Checkup

Top 5 Things to Do at Home

☐ **Right Seat.** This is an easy one. Check the label on your car seat to make sure it's appropriate for your child's age, weight and height. Like milk, your car seat has an expiration date. Just double check the label on your car seat to make sure it is still safe.



☐ **Right Place.** Kids are VIPs, just ask them. We know all VIPs ride in a back seat, so keep all children in a back seat until they are 13.

☐ **Right Direction.** Keep your child in a rear-facing car seat for as long as possible, until they reach the highest weight or height allowed by your car seat manufacturer. Many kids will be 2 years or more when they outgrow their rear-facing car seat. Move your child to a forward-facing car seat when they are too tall or heavy for a rear-facing convertible seat. Make sure to adjust the harness straps and attach the top tether after you tighten and lock the seat belt or lower attachments (LATCH) after making the change.

☐ **Inch Test.** Once your car seat is installed, give it a good shake at the base. Can you move it more than an inch side-to-side or front-to-back? A properly installed seat will not move more than an inch.

☐ **Pinch Test.** Make sure the harness is tightly buckled and coming from the correct slots (check car seat manual). Now, with the chest clip placed at armpit level, pinch the strap at your child's shoulder. If you are unable to pinch any excess webbing, you're good to go.

Please read the vehicle and car seat instruction manuals to help you with this checklist. If you are having even the slightest trouble, questions or concerns, don't worry. Certified child passenger safety technicians are waiting to help or even double check your work.

Visit safekids.org to find a car seat inspection event in your community.

Reviewed 2019