Increasing Parent Satisfaction With Discharge Planning

An Improvement Project Using Technology in a Level 3 NICU

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ABSTRACT

Background: Neonatal intensive care unit (NICU) families are often overwhelmed by the discharge process. Their anxiety can inhibit learning and contribute to poor infant outcomes and increased healthcare utilization after discharge. Quality of the discharge teaching is the strongest predictor of discharge readiness, so NICUs must develop excellent discharge preparation programs.

Purpose: This improvement project enhances NICU discharge preparedness by providing consistent, early discharge teaching using technology as a supplemental resource and raises parental satisfaction with the process.

Methods: Neonatal intensive care unit staff and former NICU parents developed a task force to create technology-based discharge education content. The content was originally uploaded to an e-book and later transferred to the electronic health record inpatient portal. Families were able to view discharge teaching content at their own convenience and pace and review topics as needed with the NICU staff. Postdischarge follow-up phone calls provided insight into parental reaction to the new education format.

Results: Parent satisfaction top-box scores, reflecting the highest rating in the "Prepared for Discharge" category of the patient satisfaction survey, improved from a baseline of 47% in 2017 to 70% in 2019. Overwhelmingly, 92% of families highly rated the tablet-based discharge teaching during postdischarge phone calls.

Implications for Practice: A comprehensive, consistent, and early discharge program using technology can lead to more effective and efficient NICU discharge education and improved parent satisfaction.

Implications for Research: Further studies are needed to generalize hospital-based inpatient portal teaching as an additional resource for parental education in the NICU.

Key Words: discharge planning, instructional technology, neonatal intensive care units, parent satisfaction, patient portal

PROBLEM DESCRIPTION

Readiness for discharge from a neonatal intensive care unit (NICU) requires both clinical stability of the infant and parental ability to care for the infant at home. After days, weeks, or months in the NICU with full-time support from NICU staff, families can feel overwhelmed by the amount of education needed for discharge and often express distress about their ability to assume total care of their infant. The literature shows that inadequate preparation for discharge from the NICU increases family anxiety, the risk for hospital readmission, and emergency department (ED) visits, as well as infant care issues in the home such as difficulty with feedings.[1-4] In contrast, standardized discharge-teaching tools that provide consistent information delivered in a planned manner can reduce parents' stress and build their confidence as they navigate the discharge processs.[5]

In 2017, our NICU formed a family-centered care program (FCCP) to improve our discharge process, as well as other aspects of our families' experience in our unit. The FCCP reviewed our patient satisfaction surveys and noted that only 47% of our parents indicated satisfaction with our current process by selecting the top-box scores (highest possible rating) in the "Prepared for Discharge" category. The quality of discharge teaching has proved to be the strongest predictor of discharge readiness, so we began a quality improvement (QI) process to improve our discharge preparation program.[1]

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AVAILABLE KNOWLEDGE

Families are excited to take their infant home from the NICU, but the distress caused by this transition is well documented in the literature. One way to help mitigate their anxiety is to develop a discharge process that both teaches the needed skills to care for the infant at home and supports their emotional and mental preparation for life after discharge.[6,7] The American Academy of Pediatrics provides guidelines[8] for NICU discharge education, which include

- parental involvement encouraged from the time of admission;
- individualized teaching plan;
- a checklist of knowledge and skills for parents to master;
- ample time allowed for learning;
- return demonstrations as needed; and
- follow-up with the parents after discharge.

Every NICU family has unique discharge education needs. Depending on the complexity of the infant's diagnoses and length of stay in the NICU, parents need a variable amount of preparation for home. Education should also be tailored to parental learning needs and preferences, which may include traditional in-person education with registered nurses (RNs), prerecorded media,[5,9,10] video conferencing,[11] and/or independent Web portals.[12-14] Quality improvement projects and published studies identify common factors that contribute to inadequate preparation for discharge from the NICU, which need to be addressed when developing a new discharge process. These factors include parents feeling rushed on the day of discharge because teaching was left until the end of the hospital stay, feelings of anxiety about taking their high-risk infant home, a lack of consistent information from caregivers, limited English proficiency, poor communication of the plan between staff members, ineffective communication styles between staff and parents, uncertainty with the actual discharge date, lack of opportunities for rooming-in overnight, and insufficient availability of education in the evening or at night.[1,15,16]

Technology has been used successfully in the discharge process. One randomized study looked at a smartphone application used by parents of very low birth-weight infants during the transition home from the NICU and showed improved parenting self-efficacy, discharge preparedness, and length of stay with increasing benefits based on degree of usage.[17] Another article showed that video-recorded preprogrammed discharge teaching effectively decreased maternal stress and increased maternal confidence when caring for a newborn.[9,10] In addition, inpatient portals have been used successfully with patient education in the adult setting.[12,13] With the ubiquitous presence of electronic health records (EHRs) in hospitals and health systems, both inpatient- and outpatient-focused online patient portals are increasingly being used by parents to reference their children's medical information.[14,18] For NICU families, these online patient portals could provide ease of access to infant-specific information in the EHR and therefore have immense potential for facilitating a more satisfying transition to home.
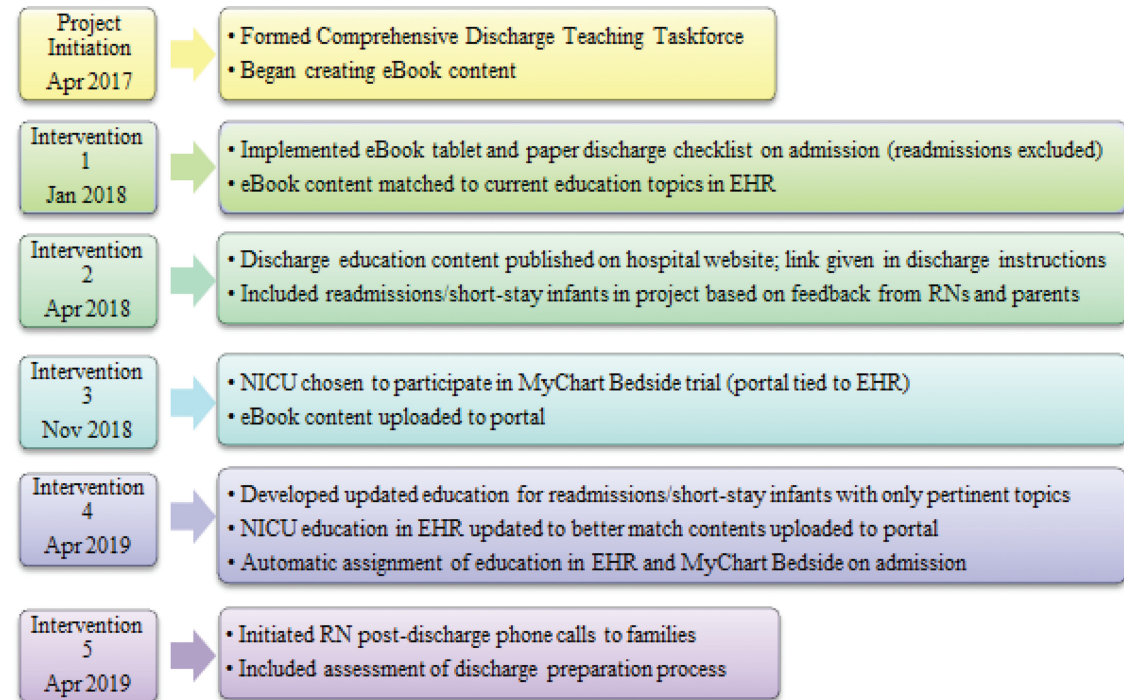
RATIONALE

The level 3 NICU at El Camino Hospital (ECH) historically utilized a discharge process that involved the RNs preparing families for discharge based on their own experience level and teaching style. Often, this teaching took place shortly before or on the day of discharge, which is not aligned with the best practice recommendation to begin discharge preparation shortly after admission to the NICU.[1,8] Our ECH FCCP formed a Comprehensive Discharge Teaching Taskforce (CDTT) in April 2017 to explore ways to improve our discharge process and increase parental feelings of preparedness and satisfaction with the process. The CDTT was composed of neonatologists, RNs, unit administrative support, the NICU clinical nurse specialist, the NICU nurse manager, and members of our family advisory board (FAB). Our FAB comprised former NICU parents who provide feedback and guidance for all our FCCP projects. The CDTT met to explore potential causes for parents feeling unprepared for discharge. We developed our interventions based on our assessment that the prominent dissatisfiers with our current discharge process were (1) inconsistent teaching, (2) lack of easy access to education materials before and after discharge, and (3) most teaching being done close to discharge. The CDTT and FAB suggested supplementing discharge preparation with additional modalities of education, including technology-based formats, to create a more dynamic and satisfying discharge-teaching process for NICU parents. Therefore, we launched a QI project (Figure 1) to improve our discharge process using technology as a supplemental resource.

SPECIFIC AIMS

Our SMART (Specific, Measurable, Achievable, Relevant, Timely) aim was to increase the percentage of top-box scores on the patient satisfaction postdischarge survey for "Prepared for Discharge" from our baseline of 47% in the preintervention period. Our top-box scores in other categories were in the 70% range, so our goal was to reach that same level in "Prepared for Discharge." However, at the beginning of our QI work, we were not able to specify a specific percent increase or timeline for

FIGURE 1

Project Initiation Apr 2017	• Formed Comprehensive Discharge Teaching Taskforce • Began creating eBook content
Intervention 1 Jan 2018	• Implemented eBook tablet and paper discharge checklist on admission (readmissions excluded) • eBook content matched to current education topics in EHR
Intervention 2 Apr 2018	• Discharge education content published on hospital website; link given in discharge instructions • Included readmissions/short-stay infants in project based on feedback from RNs and parents
Intervention 3 Nov 2018	• NICU chosen to participate in MyChart Bedside trial (portal tied to EHR) • eBook content uploaded to portal
Intervention 4 Apr 2019	• Developed updated education for readmissions/short-stay infants with only pertinent topics • NICU education in EHR updated to better match contents uploaded to portal • Automatic assignment of education in EHR and MyChart Bedside on admission
Intervention 5 Apr 2019	• Initiated RN post-discharge phone calls to families • Included assessment of discharge preparation process

Quality improvement process map. Chronological map of interventions implemented to improve discharge preparation for our NICU families. EHR indicates electronic health record; NICU, neonatal intensive care unit; RN, registered nurse.

assessing the success of our interventions due to the unpredictable survey return rate. Therefore, we focused on the individual intervention process measures during the project and planned to review the parent satisfaction data on a quarterly basis.

METHODS

The El Camino Health system includes 2 not-for-profit, acute care hospitals in Santa Clara County, California. The 20-bed, community level 3 NICU is located on the Mountain View campus, with approximately 4200 newborn deliveries and 450 NICU admissions per year. This NICU can provide care to infants less than 1000 g at birth, less than 28 weeks of gestational age (GA), and/or those with severe or complex illnesses. From 2017 to 2019, our average daily census was 11.2 patients, with 11% of our patients with 32 weeks of GA and less, 9% with 32 to 33 6/7 weeks of GA, 29% with 34 to 36 6/7 weeks of GA, and 51% with 37 weeks of GA and greater. During that time, 9.2% of patients' ethnicity was Hispanic or Latino, and the racial breakdown was 59% Asian, 25.9% White or Caucasian, 1.6% Black or African American, and 13.5% other. English was the maternal language indicated for 88.6% of the patients, with 4.1% Spanish, 3% Chinese, 1.2% Japanese, and 3.1% other. In the same time period, 8% of NICU patients had a

public insurance payer (California Children's Services or Medi-Cal). The unit is staffed by board-certified neonatologists from the Division of Neonatal & Developmental Medicine at Stanford University and does not utilize advanced practice providers or pediatric trainees. This QI project was done as a part of the comprehensive FCCP with no personally identifying patient data collection and, as such, was not formally reviewed or supervised by the hospital institutional review board. This report was created in accordance with SQUIRE 2.0 guidelines.[19]

Intervention 1—e-Book Discharge Education (January–April 2018)

Our initial process improvement was to move all education content to an electronic format for parents. The CDTT recruited staff members interested in improving our discharge process and family-centered care. Education topics were chosen on the basis of American Academy of Pediatrics recommendations[8] and suggestions by Smith et al,[1] in addition to items already in our family education. We also created videos of staff demonstrating hands-on skills such as mixing formula, medication administration, and bulb suction use. The new written education content was merged into an e-book via the iBooks Author application (iBooks is a registered trademark of Apple Inc, Cupertino, California). The e-book had

an easy-to-navigate table of contents and options to bookmark what parents needed to review. The e-book was uploaded onto 3 tablets donated by a former NICU parent. Parents could use our tablets during their time in the NICU to review the discharge education content in the e-book at their own pace.

A paper discharge teaching checklist was developed to match the education content in the e-book. Upon NICU admission, the checklist was to be placed at the bedside for qualifying infants, regardless of GA or diagnosis. We excluded hospital readmissions, believing that their discharge teaching had been completed during their initial birth hospitalization. We also excluded infants with a presumed NICU stay of less than 48 hours (ie, for hyperbilirubinemia, or transient tachypnea of the newborn) as the discharge education content was deemed too extensive for parental review during their short NICU stay.

Nursing staff champions were designated on each shift to educate and sign off each nurse on the new discharge education process. This initial process was developed to provide consistent educational material, allow families to begin reviewing information at their convenience, and to start education earlier in their NICU stay. Parents were then educated by nurses on how to navigate the e-book education and asked to sign off on the checklist as they mastered each topic. The paper checklist items followed the same order as the e-book chapters and the RNs' preexisting Epic education documentation in the EHR for easy workflow. Parents were reminded to ask questions as needed for clarification on any education topics.

Intervention 2—e-Book Improvements (April–November 2018)

Based on qualitative feedback from nurses during intervention 1, we subsequently recognized that readmitted families were often the most in need of consistent and in-depth discharge teaching due to truncated, rushed discharge preparation during their birth admission. We also found that with short stay infants, nurses primarily focused on breastfeeding education, so other education topics were missed or done at the last minute. Therefore, during intervention 2, we included readmitted infants and infants with length of stay less than 48 hours, placing a paper discharge checklist at their bedside and encouraging parents to review the e-book discharge education. In addition, to further facilitate ease of access to the discharge education, we published the content on the hospital Web site for parents to access from home even after discharge. Staff and physicians provided the Web site link to parents both in person and in written discharge instructions.

Random audits were performed between April and September 2018 to assess the e-book discharge education process. We audited for the presence of the paper checklist at the bedside and showed an improvement in the frequency of its presence from 84% to 94%. Nurses (n = 33) were surveyed about the e-book process: 92% liked the discharge teaching tool because it supplemented and eased the burden of education on the day of discharge. Some RNs expressed concern that the process added more work by requiring them to transfer information from the paper checklist into the EHR to create permanent documentation of the education. Another concern was that the short-stay families were unable to finish all of the education topics on the full discharge checklist during their brief NICU stay.

Intervention 3—Integration of the e-Book Into EHR Patient Portal (November 2018 to April 2019)

In November 2018, the NICU was chosen as a pilot unit for our hospital's MyChart Bedside implementation, which gave us an unexpected opportunity to further expand our QI work by transferring our e-book to the inpatient portal. Our EHR, Epic Systems Corporation (Verona, Wisconsin), has education modules built into both the inpatient portal (MyChart Bedside) and an outpatient portal (MyChart). MyChart Bedside allows patients to view parts of their EHR online during an inpatient hospitalization. It was designed to improve inpatient education and engagement and to strengthen patients' and family relationships with their care team. In addition to reviewing education, NICU families can also view their infants' vital signs, medications, laboratory results, and treatment team in MyChart Bedside.

Information technology (IT) analysts transferred the discharge education content from the e-book into the MyChart Bedside education called "To Learn" where parents could access the learning material on hospital-provided tablets or on their own devices. From within the patient's EHR education documentation section, or "Education Activity," nurses assigned the discharge education content called the "Newborn Discharge Education Checklist" for parents to review in MyChart Bedside. The nurses were educated during the initial MyChart Bedside training, and subsequently via a tip sheet and nurse champion review, on how to assign the discharge education for all admitted infants. The goal was to assign the discharge education as soon as possible after admission.

Once the education material was reviewed in MyChart Bedside, parents could sign off electronically and this information would flow directly into the Education Activity (Figure 2). If parents needed more information about a topic, they could mark "I Have Questions" in MyChart Bedside. Topics which the parents completed by marking "I Understand"

FIGURE 2
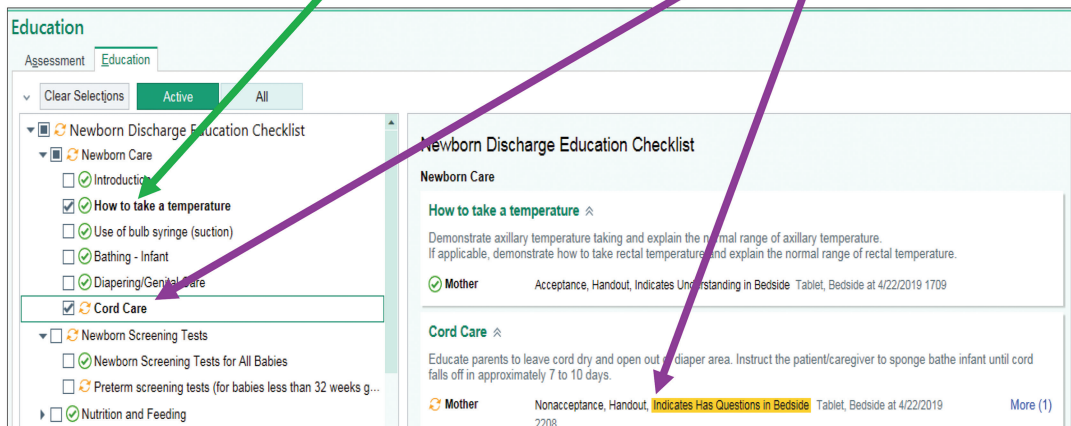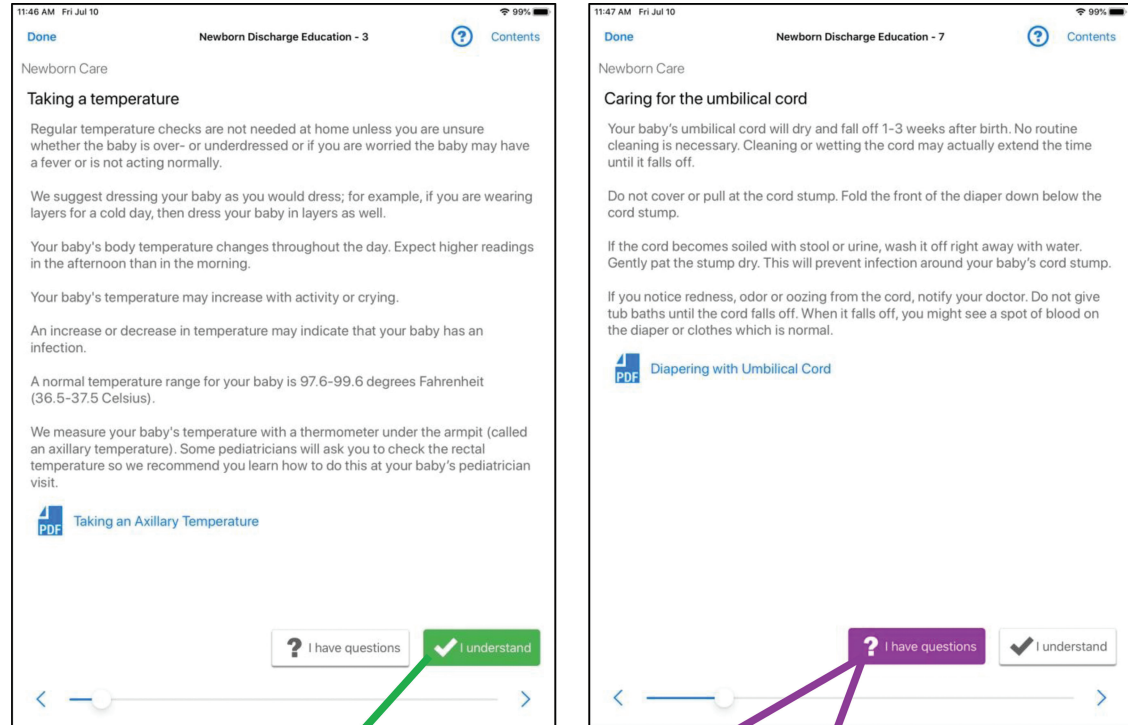
Education documentation. Parents sign off education topics they review on the tablet at their infant's bedside, and the documentation transfers directly to the electronic health record. The registered nurse can see whether the parents indicate understanding of the content or have questions. MyChart Bedside is a registered trademark of Epic Systems Corporation. Copyright 2019 Epic Systems Corporation. Adapted from the original images. Used with permission.

in MyChart Bedside were indicated with a green check on the Discharge Education Checklist in the Education Activity. Topics on which parents had questions were indicated with a yellow–orange circle, so the bedside nurses were able to view easily where more extensive review was needed.

Intervention 4—EHR Patient Portal Improvements (April–October 2019)

In April 2019, our physician builder (a neonatologist with Epic certification to build elements within the

EHR) redesigned the Discharge Education Checklist to be automatically assigned in the EHR upon admission to the NICU. For the birth hospitalization, the full NICU discharge education, which included 36 education points, was assigned (Table 1). For readmissions, a shortened checklist was assigned, which included only 10 education points, focused on the most pertinent information for that population (Table 1). We created this modified checklist after receiving continued qualitative feedback from RNs and readmitted families that they were unable to

TABLE 1. Comparison of NICU Discharge Education Topics in Full Versus Readmission Checklists

Full NICU Discharge Education Points	Readmission Discharge Education Points
Newborn care	Newborn care
Introduction	How to take a temperature
How to take a temperature	Use of bulb syringe (suction)
Use of bulb syringe (suction)	Bathing—infant
Bathing—infant	
Diapering/genital care	
Cord care	
Newborn screening tests	N/A
Newborn screening tests for all infants	
Preterm screening tests (for infants younger than 32 wk of gestation or <1500 g at birth)	
Nutrition and feeding	Nutrition and feeding
Feeding your infant	Feeding your infant
Human milk expression	N/A
Establishing your milk supply with a pump	
Collection of human milk	
Cleaning a pump	
Storing, labeling, and transporting human milk	
Appropriate milk volumes	
Maintaining a healthy milk expression routine	
Maintaining full milk production	
Thawing and warming stored human milk	
Transition to home	Transition to home
Easing the transition to home	Tips and tricks for transition to home
Tips and tricks for transition to home	Safe to sleep—positioning for sleep
Circumcision care	Tummy time
Safe to sleep—positioning for sleep	Comforting your infant
Tummy time	When to call the pediatrician
Comforting your infant	Safety tips
Infant CPR	
Pets at home	
NICU discharge medications	
Follow-up appointments	
When to call the pediatrician	
Safety tips	
Immunizations	N/A
Why vaccinate?	
Hepatitis B vaccine	
DTaP vaccine	
Hib (*Haemophilus influenzae* type b) vaccine	
Polio vaccine	
Pneumococcal vaccine	
Immunizations for preterm infants	

Abbreviations: CPR, cardiopulmonary resuscitation; DTaP, diphtheria, tetanus, and acellular pertussis; N/A, not applicable; NICU, neonatal intensive care unit.

complete the full set of 36 education topics during their brief admissions.

Automatic assignment of the Discharge Education Checklist and immediate activation of MyChart Bedside on a tablet kept at the bedside allowed education to begin on admission. At this time, we also removed all the paper discharge education checklists from the bedside and focused on the electronic process. Bedside RNs found it challenging to activate the tablets during their already busy admission process. Therefore, we recruited our administrative support staff to activate the tablets, we developed a tip sheet for staff, and we asked RN members of the CDTT to act as champions to ensure that MyChart Bedside was active soon after infants' admissions. Once assigned, the tablet was kept at the infants' bedside for the duration of their NICU stay. Families could also choose to use their personal mobile devices with a portal app provided by Epic.
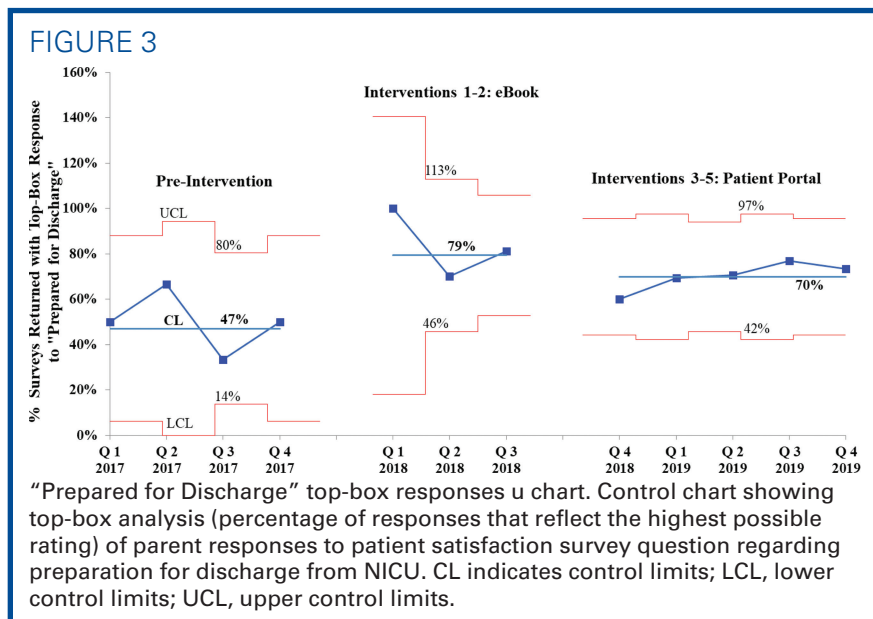
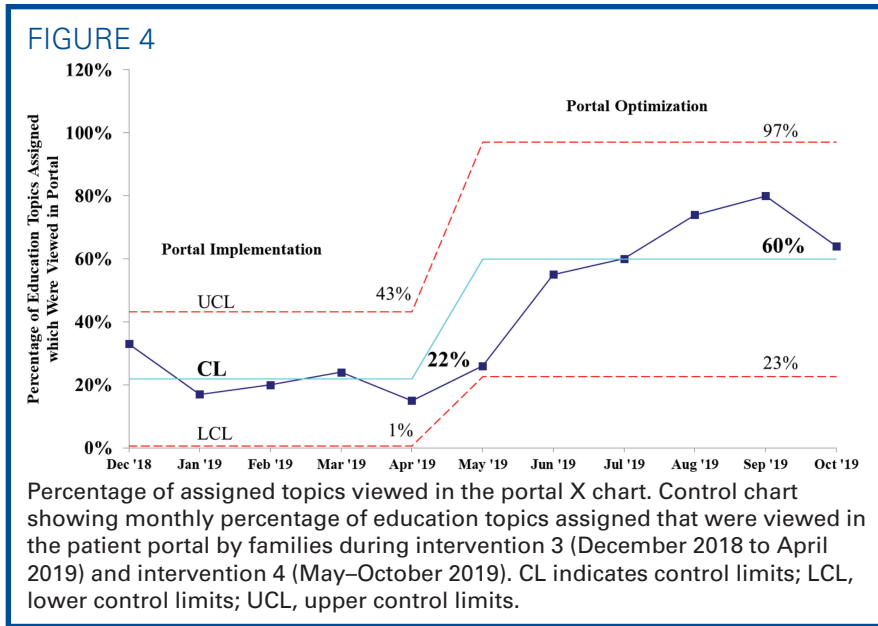### Intervention 5—Postdischarge Follow-up (April 2019 to April 2020)

Members of our FAB provided feedback that they felt abruptly disconnected from their "NICU family" after discharge. Therefore, we implemented follow-up phone calls to maintain connectedness with families after they went home. We asked for feedback about our discharge preparation process and transition to home during these calls to supplement the written patient satisfaction surveys sent by the hospital, which did not gather NICU-specific feedback. We recruited 3 RN champions and created scripts for them to use during the calls. They attempted to call each family twice between 1 and 4 weeks after discharge but did not make subsequent calls if unable to connect. Part of the script instructed them to ask about our discharge process and also encouraged families to return the patient satisfaction survey, which they received by mail after discharge. Topics specific to the discharge process included use of the tablet-based education, dislike or like of the tablet-based education, and qualitative assessment of the discharge preparation process.

RESULTS

We improved our parent satisfaction top-box scores in the "Prepared for Discharge" category from 47% to 70% by the end of intervention 5 (Figure 3). Our survey return rate ranged from 8% to 24% per quarter with an average of 17%, which is slightly above than national average of 16%. We determined that the follow-up calls provide an additional way to connect with families even if they do not return a survey. During our postdischarge phone calls to NICU families, we reached 159 of the 219 (73%) families discharged between April 2019 and April 2020. Of these, 111 of 159 families (70%) stated that they reviewed the discharge education in MyChart Bedside before going home. Ninety-two percent (102 of 111) liked using the tablet in addition to direct nursing education and rated the process 4 or 5 (lowest score = 1, highest score = 5). Alternatively, 6% preferred direct nursing education only, and 2% did not provide a rating. The other 30% (48 of 159) who stated that they did not review the tablet content sited lack of time and/or a short admission as a reason. Some verbatim parent quotes from the phone calls regarding the education on MyChart Bedside included the following: "it is very good informative material and it answered most of our questions," "appreciated the simplicity of the iPad," "very convenient refresher for experienced parents," and "smooth, easy-to-navigate, and self-paced." Most parents expressed that the discharge process using MyChart Bedside helped them ease their transition to home.
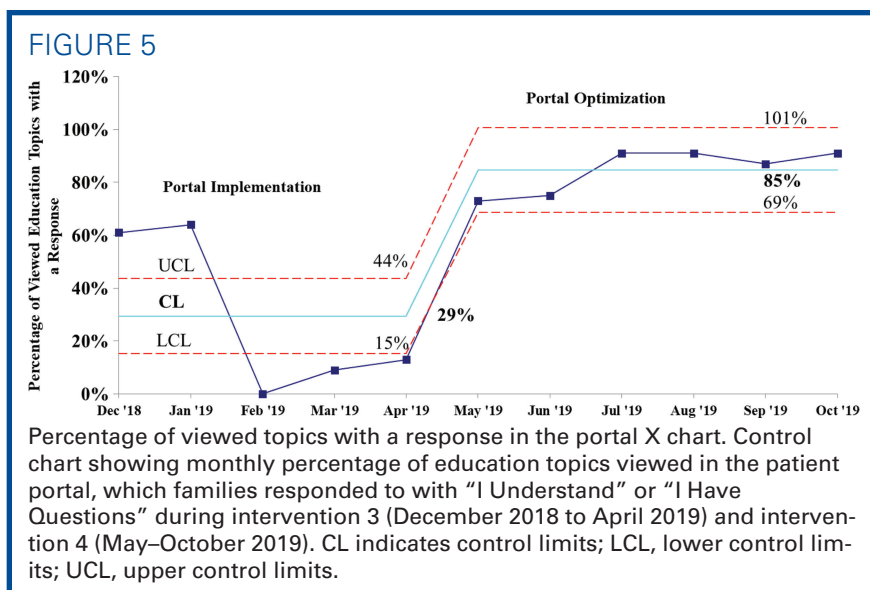

FIGURE 3

"Prepared for Discharge" top-box responses u chart. Control chart showing top-box analysis (percentage of responses that reflect the highest possible rating) of parent responses to patient satisfaction survey question regarding preparation for discharge from NICU. CL indicates control limits; LCL, lower control limits; UCL, upper control limits.

FIGURE 4

Percentage of assigned topics viewed in the portal X chart. Control chart showing monthly percentage of education topics assigned that were viewed in the patient portal by families during intervention 3 (December 2018 to April 2019) and intervention 4 (May–October 2019). CL indicates control limits; LCL, lower control limits; UCL, upper control limits.

DISCUSSION

Summary

Implementation and adoption of consistent, high-quality discharge education using technology as a supplemental resource were successful in our level 3 NICU. Within 3 years of creating the CDTT, we were able to deliver consistent discharge education using a patient portal connected to our EHR and demonstrated improved parent satisfaction with the discharge education process. Top-box responses to postdischarge survey questions regarding "Prepared for Discharge" increased by a relative 50% from baseline 47% in 2017 to 70% after patient portal introduction. Overwhelmingly, 92% of families highly rated the tablet-based discharge teaching during postdischarge follow-up phone calls.

Within 1 year of portal introduction, an average of 60% (up to 80%) of discharge education topics assigned were being viewed in the portal (Figure 4), and an average of 85% (up to 91%) of those viewed were responded electronically (Figure 5). Because the parental responses to the education topics were automatically recorded in the EHR, RNs could view them and appropriately tailor teaching efforts to match families' needs.

Interpretation

Our initial intervention of tablet-based e-book discharge education and a paper discharge checklist

FIGURE 5

Percentage of viewed topics with a response in the portal X chart. Control chart showing monthly percentage of education topics viewed in the patient portal, which families responded to with "I Understand" or "I Have Questions" during intervention 3 (December 2018 to April 2019) and intervention 4 (May–October 2019). CL indicates control limits; LCL, lower control limits; UCL, upper control limits.

provided delivery of consistent discharge information and ease of use for our NICU parents. However, RN workload was increased by requiring them to manually transfer documentation of completion of the education topics from the paper checklist to the EHR. This finding was consistent with a prior study in which nurses felt redundancy of their workload by having planned discharge teaching.[20] For NICUs without an integrated patient portal, this increased workload could be a barrier to implementing an e-book education program.

We leveraged the portal technology to overcome this barrier. We improved RN workflow by moving the same education content from the e-book into the patient portal where parental responses to the education topics were automatically documented in the EHR. Nursing workflow improved not only through elimination of manual charting but also by allowing them to focus more of their education efforts on topics where families had questions. Patient portal-facilitated tailoring of education to family needs could lead to significant time savings for nursing staff. Staff workflow on the day of discharge was improved because parents had previously seen the education and were able to ask more informed questions prior to the day of discharge.

Using tablet-based discharge education was also beneficial for families. They were encouraged to enroll in the patient portal at the time of their infant's NICU admission, so that discharge preparation could begin early in the hospital stay and not feel rushed at the time of discharge. Parents expressed appreciation for the easy access to information, with around-the-clock availability provided by using unit-based tablets, home mobile devices, or viewing the material on the hospital Web site. The ability to review education at their convenience, at their own pace, and even after discharge potentially reduced families' perception of unpreparedness in taking their infants home.

One concern when using an electronic patient portal for discharge education is the possibility of parents clicking through the education topics without full comprehension. The education in MyChart Bedside did not replace direct bedside teaching by RNs but supplemented in-person teaching by allowing parents to review topics on their own time and as often as desired. We also learned during our follow-up phone calls that parents liked the one-on-one demonstration of certain skills by nurses in addition to the tablet-based teaching. To ensure parental proficiency in infant care, families still demonstrate certain tasks prior to discharge. The return demonstrations are charted in the EHR Education Activity on a separate Discharge Demonstration Checklist. These tasks include temperature taking, use of bulb syringe, medication administration, human milk/formula preparation, and infant cardiopulmonary resuscitation.

Limitations

A benefit of using the mailed postdischarge patient satisfaction surveys as the main outcome measure is that they provide anonymous answers to sensitive questions. They also result in less interviewer bias and social desirability bias, since an interviewer does not directly influence the respondents' answers.[21] However, their use does introduce responder and nonresponder bias. One limitation of our study is that we were unable to analyze the demographic characteristics of our survey responders and nonresponders to strengthen our results. A second limitation is the use of supplemental feedback from the follow-up phone calls that lacked anonymity, potentially biasing the responses.

Low response rate to our parent satisfaction surveys is another limitation of our results. The observation of an initial increase in top-box responses during interventions 1 to 2 (where the e-book was used), which then decreased slightly during interventions 3 to 5 (where the patient portal was used), may be due to low response rates. Low numbers of responders may have contributed to wider control limits in top-box responses during interventions 1 to 2 (Figure 3). By the time of interventions 3 to 5, survey response rates had increased, and though the average percentage of top-box responses was lower, the range of control limits was narrower.

Parents recently discharged from the NICU can find it difficult to complete additional, time-consuming surveys. To encourage responses, we started adding information about the surveys in our hospital discharge instructions. The discharging physician also reminded families during their face-to-face meeting, and the RNs again encouraged parents to complete the survey during their follow-up phone call after discharge. In 2017, we had a very low survey return rate because the hospital was sending the survey only to a random sampling of NICU discharges. Subsequently, the CDTT requested that surveys be sent to 100% of discharges from the NICU, and this change was implemented in 2018.

Another limitation to our QI project was the lack of ability to track readmissions or ED visits because there are multiple healthcare systems in our local area and not all infants return to us. Consistent, thorough discharge teaching for NICU families is linked to decreased readmission rates and ED visits for the infant.[1] Objectively tracking a reduction in readmissions and ED visits would have strengthened the correlation between our interventions and the quality of our discharge process. However, anecdotally, during the follow-up phone calls with the 159 families we reached, no readmissions or ED visits were reported.

The original 3 iPads used for the e-book discharge education were donated by a FAB member. Once ECH adopted MyChart Bedside, an additional 20 iPads (1 for each bed) were provided by the IT department to

Summary of Recommendations for Practice and Research	
What we know:	• Lack of adequate discharge readiness can lead to adverse outcomes for families, infants, and the healthcare systems. • Standardized teaching methods can reduce readmission and negative consequences after discharge. • Early consistent discharge teaching helps reduce parental anxiety and improves parental satisfaction with the discharge process.
What needs to be studied:	• Value of currently used patient satisfaction surveys in assessing the needs of ethnically and culturally diverse patient populations. • Effect of technology used in NICU discharge teaching on postdischarge ED visits and hospital readmissions. • Generalizability of inpatient portal model of discharge teaching to all NICUs.
What we can do today:	• Develop a family advisory board to consult on current discharge teaching practices and provide suggestions for improvement. • Involve NICU nurses in assessing and improving current discharge process. • Emphasize the importance of standardized discharge teaching practices to improve parent satisfaction and promote better outcomes. • Explore new ways to support families using technology to supplement discharge teaching.

the NICU specifically for family use. Families can also use their home devices to complete or reference education materials through the portals. With our location in Silicon Valley and a family population skilled in using technology, we were able to implement these interventions easily; however, this could be a potential barrier for other NICUs if access to or familiarity with devices is limited. Hospitals will also need to ensure that their wireless Internet configuration, capability, and capacities are adequate so that families using the tablets in the hospital do not have difficulty. Other resources needed were dedicated IT analysts and a physician builder who acted as content expert while optimizing the education build in the EHR.

CONCLUSIONS

Our goal is for families to feel well supported during their NICU journey and to better prepare them for discharge by delivering clear, concise, and consistent information. We will continue working to improve the completion of all education electronically prior to discharge. If any changes in discharge education content are required, it will be easier to incorporate them into MyChart Bedside compared with other formats such as prerecorded video content or printed teaching materials.[5] In addition, we recently translated the NICU Discharge Education Checklist into Spanish with automatic assignment to families where Spanish is selected as the preferred language in the EHR.

We recognize the importance of discharge readiness and guiding families through the discharge preparation process, starting at the time of NICU admission. We have learned a great deal about using technology to support families and enhance discharge education, and we anticipate more NICUs creating multidisciplinary teams and starting to use patient portals for family education purposes.

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