



**DEVELOPMENT OF A POST-DISCHARGE OUTREACH ENTERAL NUTRITION
PROGRAM**

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A DNP Project

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Dedication

First and foremost, I would like to dedicate this project endeavor to God, the ultimate healer, who presents the gift of healing to us. May this work be a testament to your grace and a means to serve your purpose on earth. In your service to the Creator of life, I offer this work, intent, and actions to reflect your purpose in my heart. May it continue to reflect your excellent plan for the well-being of humanity and fulfill my purpose-driven life.

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Executive Summary

There is an increased population of patients who are sent home with home enteral nutrition (HEN), which consists of an enteral tube feeding (TF) through a nasogastric, gastrostomy, or jejunostomy tube (Best & Hitchings, 2009). Problems are recognized when patients are recovering at home from their hospitalization. Barrett et al. (2021) highlight strong evidence of complications occurring during the first thirty days post percutaneous enteral gastrostomy (PEG) placement. Unexpected adverse events such as equipment failure, missing supplies, mismanaging gastrointestinal symptoms, feeding complications, and dehydration eventually lead to unplanned visits to the Emergency Department (ED) or increased risk of readmission to the hospital due to lack of provision of sufficient training or after-care (Hitchings et al., 2010). Additionally, the Affordable Care Act combines reimbursement penalties with hospital readmissions related to the occurrence of malnutrition (Martin et al., 2017).

Although enteral patients received pre-discharge teaching from Registered Dietitians (RDs), bedside nurses, or infusion providers, there was no thorough post-discharge follow-up related to patient understanding of the equipment used, nutrition orders, tube-feeding cares, ED visits, and rehospitalizations. The hospital's local pharmacy and RDs from the clinic were only responding to patient-initiated questions on providing tube feeding supplies. Because of this lack of support, there were equipment failures, ED visits, and rehospitalizations in this patient population.

The intent of this project was to act strategically to help address problems during the transitional care pathway by implementing post-discharge follow-up calls to patients at two critical time points. The Project Lead's objectives include developing and evaluating the surveys to garner information about potential complications, care gaps, and service failures. Verbal

responses to open-ended and informational questions were aggregated to analyze complications, care gaps, and service failures. Furthermore, the follow-up allowed the respondents to freely share their needs and offered feedback about their patient care experience. The education learned from the patient was evaluated and shared with the organization. There was an improvement in patient understanding, self-monitoring, and navigation between the two survey timepoints.

This quality improvement project was designed to study the impact of a systematic process of patient follow-up gear to improve the outcomes of patients receiving enteral feedings.

Keywords: post-discharge follow-up, outreach calls, home enteral nutrition (HEN), enteral (ENT), tube feeding (TF), tube feeding education interventions

Problem Statement & Significance / Effort to Address the Problem

Follow-up care for the enteral nutrition therapy (ENT) community is essential for good outcomes. Before implementing this project, the medical center's pharmacy and Registered Dietitian (RD) only followed up on providing tube feeding supplies and answering patient initiated questions regarding the patient's percutaneous endoscopic gastrostomies (PEG) when they arose. At a major university medical center in Southern California, the nutrition support team (NST) provides ENT support to patients in the Inland Empire region. The medical center works with referral sources such as various infusion and health care providers to help transition care for tube feeding (TF) therapy patients between hospitalization and home-based care. In addition, this medical center teaches tube feeding placement and enteral feedings during the pre-discharge process.

According to the NST Manager, no data had been collected regarding home enteral nutrition (HEN) outcomes. There was no robust program in place to follow up with patients who were discharged on tube feedings. Consequently, there was little information regarding the follow-up care or patient outcomes related to current practice, complications, re-hospitalizations, and equipment issues for this population. The NST manager expressed a need to collect post-discharge follow-up data to address the problems related to home nutrition to ensure good outcomes, impact patient satisfaction and continuity of care, and drive quality improvement processes. Therefore, a quality improvement project was needed to provide follow-up, promote education, and collect data through surveys to help inform gaps in care.

Environmental Context

Setting

The setting of this quality improvement project was a major university medical center in Southern California. The NST consists of RDs, Registered Nurses (RN), a Nutrition Pharmacist, and an NST Manager. The Organization provides ENT equipment, formula, and total parenteral nutrition (TPN) services. Prior to the implementation of the project, the NST provided services to 110 patients in the inpatient and outpatient settings quarterly. During the first quarter of 2023, approximately 2-5 ENT patients were discharged weekly from the inpatient setting to home enteral nutrition (HEN), and about 2-3 patients per month were discharged from the outpatient setting to HEN services. The post-discharge outreach calls occurred at a nutrition support service at the facility.

Market/Risk Analysis

A Strengths, Weaknesses, Opportunities, and Threats (SWOT) analysis was conducted at the medical center (See Table 1). The project's internal strengths include committed RDs who possess expertise in nutrition and infusion and are essential members of the NST. Since the NST service focuses on patient-centered care, the RDs tailored a personalized nutrition care plan for each patient. The education component, such as pre-discharge teaching, online videos, and literature handouts, aimed to help reduce avoidable readmissions and complications. In addition, the medical center has the latest telehealth communications from the pharmacy and RD teams to follow up on providing tube feeding supplies.

The project's internal weaknesses include the fact that no robust program was in place to follow up with seeing patients receiving tube feedings and there was a lack of home visits to patients by the community home health agencies (HHA) due to low reimbursement from

insurance payers. There was a lack of data from the nutrition support service to identify problems or issues related to readmissions, short-staff nursing at the medical center, and that not all ENT patients were contacted for their start of care services. The medical center has not yet transitioned to a new enteral connector, Enteral Nutrition Fit (ENFit), branded by the Global Enteral Device Supplier Association (GEDSA). ENFit is a worldwide initiative to make all enteral feeding devices specific to tube feeding (Moog, 2023, para. 1). The medical center refers tube-feeding patients to other infusion providers that have transitioned to ENFit. Therefore, patient safety may be impacted due to possible financial barriers from the medical center.

The project's external opportunities include opening up positions for staff nurses or dietitians to follow up on patients at the medical center, providing outreach possibilities using the medical center's existing education resources, roll-out TF clinic program implementation for the NST, RD follow-up to provide early recognition of TF-related complications, and identification of psychosocial issues. The project creates an environment of shared accountability, capitalizes on new opportunities, and resolves existing problems. Additionally, the RD's will be able to follow up to provide early recognition of TF-related complications and close the loop with their referral sources, such as discharge planners and other healthcare providers, to ensure a smooth discharge. Furthermore, the creation of a post-discharge nutrition program tailored to the ENT population has the potential to enhance patient outcomes, improve care experiences, and facilitate more effective communication between the discharge planning department and patients. The prospect of increasing ENT services provided by the hospital will further enrich the project's scope and impact on patient care and support.

The project's external threats include providing care to the increasing numbers of non-insured patients who need to pay for services and equipment out of pocket, and low-income groups that do not have follow-up resources and are at risk for readmission to the hospital. When no nutrition education or a home health visit is provided, the patient is at a higher risk for complications and readmissions, which can negatively impact hospital performance measures and risk the medical center's reputation. Eventually, hospital performance decreases, affecting the NST's outcomes and revenue. Patients will be redirected to other hospitals or medical providers. Another ongoing threat is the impact of the national shortage of formula and ENT equipment due to the COVID-19 pandemic supply chain, which can impact patient outcomes.

Table 1

(SWOT analysis: Post-discharge outreach for ENT patients)

INTERNAL	STRENGTHS <ul style="list-style-type: none"> - Organization has an NST - Patient-centered care focus - Education resources available - Pre-discharge education provided - Up to date with telehealth/communications 	WEAKNESS <ul style="list-style-type: none"> - No robust follow-up program in place - Lack of support from Home Health Agencies (HHA) - Lack of data from the ENT community identifying problems related to readmissions and outcomes - Short staffing - Not ENFIT transitioned
EXTERNAL	OPPORTUNITIES <ul style="list-style-type: none"> - Open follow-up roles for staff Clinicians positions in the future for the Organization - Outreach resources using the infusion provider's education videos 	THREATS <ul style="list-style-type: none"> - Non-insured patients - Low-income families

<ul style="list-style-type: none"> - Roll out program implementation for the TPN team - Dietitian follow-up - Identify psychosocial issues - Create a post-discharge nutrition program for other sister hospital locations - Improve the patient care experience - Improvement in communication between the inpatient nursing team and patients - Improve patient outcomes - Decrease length of stay - Identify gaps in care - Identify opportunities for process improvement 	<ul style="list-style-type: none"> - Hospital penalties/fines from readmissions within 30 days impact the hospital's reputation. - National formula shortage - ENT equipment shortage - High turnover rate due to high acuity and patient ratio
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Literature Review and Evidence Synthesis

Following up on home enteral nutrition (HEN) and post-discharge care aspires to focus on ensuring positive patient care outcomes. Collaboration with interdisciplinary professionals is imperative to consistently deliver results to make a difference in the organization. Through an in-depth analysis of relevant articles, the literature review provided awareness of the prime methods of enteral nutrition (EN) administration and shed light on current strategies for follow-up care after discharge. By synthesizing existing research, this translational DNP project aimed to contribute a broad understanding of how an interdisciplinary approach enriched the overall management of outcomes for the enteral community relying on tube feeding interventions.

Search Criteria

A literature search was conducted using the following databases: Cumulative Index of Nursing and Allied Health Literature (CINAHL), EBSCOhost, Google Scholar, and PubMed Central (PMC). The search keywords for post-discharge follow-up and home enteral nutrition were tube feeding, complications of tube feeding, enteral nutrition outcomes, educational interventions on home enteral nutrition, readmissions, preventing readmission, post-discharge outreach, post-discharge follow-up, post-discharge calls, tube feeding education, cost related to tube feeding complications, and quality of care. The inclusion criteria included documents written in English language between 2009 and 2022 that were evidenced-based, full-text, and peer-reviewed. The search yielded an estimated 48,000 articles altogether. Combining the keywords tube feeding complications, home enteral nutrition, enteral nutrition outcomes, tube feeding education, and readmission yielded about 1,900 articles, and of those, 15 were chosen as most relevant. The search was narrowed down when applying words specific to readmission outcomes and costs related to post-discharge follow-up on home enteral nutrition, which yielded 566 articles, and an additional ten were chosen from this search. By only including articles substantially relevant to the project's topic, 25 articles were identified for the final review.

Evidence Synthesis and Findings

Four key themes surfaced from the literature: patient-centered education, coordination of care, costs related to complications of HEN, and supportive practice for health promotion. The American Society of Parenteral and Enteral Nutrition (ASPEN) is an organization that provides clinical nutrition intervention guidelines to patients on enteral nutrition (Gramlich et al., 2018). ASPEN does not, however, address telephonic outreach calls in its guidelines for patients on home enteral nutrition (HEN). Experts discussed that there is no collection of data on registries

to evaluate patients on ENT services (DeLegge & Ireton-Jones, 2007). Limited research was available on whether education programs on HEN impacted patient outcomes. Nevertheless, the findings of several studies about post-discharge follow-up calls suggested that communication is integral among interdisciplinary teams in contributing to patient safety and that education techniques to improve communication are acceptable (Boullata et al., 2017).

Patient-centered Education

Effective patient education is vital in preventing potential tube feeding and nutrition regimen complications. Education in follow-up support programs is required as readmissions are more likely to happen without a nutrition support team (Barrett et al., 2021). Martin & Gardner (2017) and Chang et al. (2015) highlighted strategies to lower the risk of readmissions, such as educating patients and caregivers before discharge. First, the patient needs to establish enteral nutrition (EN) tolerance. Second, educating the patient or caregiver on feeding tube use and nutrition regimens is essential to maintain the continuity of care. For example, healthcare providers trained caregivers on proper medication administration via a feeding tube to prevent clogging. Consequently, educating patients about their nutrition regimen and understanding equipment function is vital in preparing them to self-manage their home ENT journey. Lastly, providing educational pamphlets or videos on potential gastrointestinal intolerance and mechanical problems is crucial to ensure patient comfort with self-care. Patients' feelings of anxiety and confusion about post-discharge self care can be transformed into an environment where patient satisfaction is improved, thus molding an environment where the patients are empowered and collaborating with the nutrition support team. Therefore, having pre-discharge education provided by a clinician is vital to help with the care gap post-discharge.

Amaratunga et al. (2023) and Byrnes et al. (2022) reviewed various studies on home enteral tube feeding education offered to patients. The educational intervention was part of the multimodal approach that entailed a dietitian-led outpatient clinic, routine follow-up visits, assessments, educating patients, and a telephone helpline. Interventions included demonstrating tube feeding care, identifying and managing complications, and providing patients access to a healthcare professional. Although the study mentioned the risk of bias, there were significant improvements in knowledge of tube-feeding complications during the post-test (Amaratunga et al., 2023).

Amaratunga et al. (2023) also discussed a critical study pertinent to this DNP project, the importance of initial education, and the need for ongoing specialized care to help support healthy outcomes in adults with HEN. Appendix A summarizes this review by outlining aspects of self-care important to patients (see patient perspectives in column 2). The exploration of recognizing perspectives in self-care varies from one country to another. For example, in Singapore, there was evidence of access to a nutrition nurse, and technical support was viewed positively. Access to support from health care professionals (HCP) in the United Kingdom was variable. In the U.S.A., there was a need for ongoing education related to unexpected complications related to HEN. Research in Sweden supported the perspective that further training was needed on G-tube and stoma site care and managing complications, in addition to the hospital training on setting up equipment.

In summary, clinicians were able to identify various gaps and capture adverse events related to care issues. They found that offering patient-centered education using a standardized, evidence-based approach to HEN and strategies to handle potential complications empowered patients to control their self-care more.

Costs Related to Complications of HEN

There was a positive presentation of information to consumers regarding financial burdens related to enteral tube complications (Barrett et al., 2021). A study was conducted at a United Kingdom (UK) National Health Service (NHS) trust. The study highlighted the frequency of the following complications, all of which prompted an emergency department (ED) visit. Forty-two percent of the complications accounted for dislodged tubes, 16% for blocked tubes, 10% for leakage, and 9% for infection. The cost for readmissions related to procedures and treatments in the ED was \$37,097, \$26,435 for radiological procedures, \$10,691 for inpatient surgical procedures, and \$74,655 for inpatient bed days (Barrett et al., 2021).

A Canadian study by Sandhu et al. (2022) highlighted the financial impact on healthcare costs from limited access to dietitian services for HEN. Fifty-three percent of the sample population presented an emergency department (ED) visit related to HEN problems costing \$10,677,946.00 to the Canadian healthcare system. Although the authors suggested costs associated with HEN, the study did not offer details of the reasons for limited access to dietitian services, which may limit the opportunity to improve interventions in response to reporting concerns.

Byrnes et al. (2022) and Hall et al. (2014) discussed an impressive health economics review on HEN. The authors mentioned the significance of a HEN service team, which resulted in cost savings on hospital readmissions related to gastrostomy tube complications. Table 4 highlighted the U.K. cost savings on hospital readmissions of £64,341 (\$78,640.08) with the support of a HEN team service for one year (Dinenage et al., 2015). Hall et al. (2014) implemented a dietitian-led enteral nutrition support clinic (NSC) in the U.S. This implementation enhanced quality improvement and cost savings related to reduced readmissions.

The authors discussed a gap in HEN care and education due to a lack of comprehension and, therefore, retention of information given to patients during hospitalization. A lack of sensitivity to health literacy contributed to challenges in healthcare providers' knowledge levels. The gap led to noncompliance with enteral nutrition at home. Therefore, a nutrition support clinic was implemented for nurses and dietitians to participate in weekly follow-up visits in tube-feeding management, focusing on preventing complications. Also, for patients without transportation access due to long-distance travel, a follow-up phone call was placed as necessary for post-discharge care. The results of these interventions were an 88.9% reduction in nutrition-related emergency room visits and a 78.1% reduction in readmissions. Estimated per-patient cost reductions amounted to \$6831 (Hall et al., 2014).

Despite the importance and benefits of education and follow-up care for HEN patients, obtaining coverage for the related costs has been difficult. For instance, an expert team (home parenteral and enteral nutrition services provider) must justify the need for enteral services. Clear clinical documentation is needed to indicate that the functional capacity of a patient's esophagus or small intestine does not allow for food entry or absorption for the patient to qualify for additional services. In addition, the Centers for Medicare & Medicaid Services (CMS) reimbursement rates are low for enteral formulas. For example, Delegge and Ireton-Jones (2007) reported that enteral nutrition formula might not be considered reimbursable because of its classification as "food" (p. 728). Therefore, some patients served by Medicare insurance payers may not qualify for a visit from a Home Health Agency due to the low reimbursement rates. This is why pre- and post-discharge education is so crucial for these patients who may experience post-discharge complications. Clinicians who provided post-discharge ENT education filled the gaps between the hospital and home-based settings.

Coordination of care

Carter-Stephens (2020), Maher et al. (2017), Alsaeed et al. (2018), and Lim et al. (2018) discussed the importance of patients receiving HEN through a multidisciplinary team approach. Care coordination plays a pivotal role when following up with the patient during the transition gaps to promote a positive transition from hospital to home. A study by Martin and Gardner (2017) highlighted ways to improve care coordination through collaboration and follow-up to improve patient outcomes. Collaboration between an experienced RD, home infusion providers, durable medical equipment (DME) suppliers, and healthcare providers improved a safe home-to-hospital transitional care pathway and ensured appropriate patient follow-up and coordination (Martin & Gardner, 2017). In addition, Gramlich et al. (2018) reported that caregivers verbalized that a home visit for follow-up was appreciated, and psychological support was deemed valuable for positive patient outcomes. By having a community team liaison consisting of hospital-based and community dietitians and nutrition nurses, this unified service promoted “excellent communication and continuity of care” (Carter-Stephens, 2020, p. 182). The intent was to prevent unplanned hospital readmissions and improve the patient care experience with tube feeding by offering post-discharge support from specialized healthcare professionals.

Cawsey et al. (2010), Lim et al. (2018), and Sanders et al. (2021) agreed on a strong need for HEN service, including post-discharge RD support for the continuity of care. A dedicated home enteral nutritional team was shown to be cost-effective in reducing hospital readmissions related to tube feeding complications due to conducting home visits and telephone advice. The authors emphasized the need for specialized nutritional support through a multidisciplinary team prior to discharge to improve outcomes. Raphael et al. (2019) also discussed the importance of an interdisciplinary team to provide follow-up in response to the top three issues reported during

post-discharge visits: 90% of problems were related to inadequate education and training, and supply and delivery, 80% were gastrointestinal symptoms, and 75% were equipment use.

Supportive practices of health promotion

Using telehealth or virtual services offered patients access to healthcare advice tailored to the patient's health needs as a form of health promotion. A formal transition plan from hospital to home optimized the post-discharge process through the utilization of follow-up phone calls after surgeries. Donsel & Missel (2021) and Harrison et al. (2014) highlighted the need for support from a nurse, who is identified as a sufficient resource following discharge. The follow-up phone call allowed the patients to express their health concerns to alleviate anxiety, increase their sense of security, and evaluate patients' understanding of their care plan, resulting in improved quality of care (Liu et al., 2019). For example, one patient verbalized the need for another follow-up call, although they believed they were "feeling more on top of things" (Donsel & Missel, 2021, p.1700). Moreover, Kirsch et al. (2015) and Scotten et al. (2015) highlighted a call center to conduct post-discharge calls as a primary communication tool in the pediatric population. Their studies resulted in positive patient engagement outcomes, which added value to adhering to appointments to bridge the post-discharge chasm.

Tuso et al. (2013), Soong et al. (2014), and Harrison et al. (2014) discussed 72-hour post-discharge outreach calls that helped remedy medication adherence, discharge instructions, and follow-up care issues. The authors also stated that person-focused care reduced healthcare costs by decreasing 30-day readmission rates on the Medicare population through Project BOOST (Better Outcomes by Optimizing Safe Transitions), a transitional care program in their intervention bundle to improve the continuity and quality of care. Markley et al. (2013) highlighted the implementation of Project RED (Reengineered Discharges), which focused on

improving patient education and engagement, medication compliance, and patient and healthcare-provider interactions. Furthermore, a multidisciplinary approach through the collaboration between physicians, nurses, case managers, pharmacists, and other interdisciplinary personnel utilized active communication in a structured follow-up phone call script, significantly reducing readmission rates from 23% to 15% for all Medicare fee-for-service patients. The results revealed a reduction in readmission rates from 19% to 12% for the hospital's quality improvement organization.

In conclusion, the literature presented evidence and insights necessary to support the benefits of implementing a structured post-discharge follow-up. Furthermore, all authors emphasized patient safety, monitored nutritional status, addressed potential complications, and optimized healthy outcomes for the enteral community.

Theoretical Framework

The framework that guided this quality improvement project development, implementation, and evaluation was the Deming Plan Do Study Act (PDSA) tool. The PDSA originated from Edward Deming's delivery of four cyclic stages. This structured model systematically performs iterative test changes in process improvement (Donnelly & Kirk, 2015).

The four cyclic stages are as follows: 1) The 'plan' stage aims to identify the necessary changes to improve the process as stated in the objective. For example, the Project Lead developed scripted questionnaires that focused on key areas: providing tube feeding care, reviewing education on nutrition orders, understanding feeding pump equipment, understanding the refill platform, and ensuring a post-discharge follow-up visit with the doctor within seven days of the discharge date. 2) The 'do' stage aims to test the change and record what has happened. For instance, the questionnaires were utilized at the 48-hour start of care and the 30th

day of their discharge date. 3) The ‘study’ stage involves observing the attainment of the change and analyzing and evaluating if the goals were met. Qualitative analysis was used to measure patient responses and behaviors. 4) The ‘act’ stage identifies the measures or procedures to remain effective and if modifications are needed to plan for the next cycle (Donnelly & Kirk, 2015). For example, the Pareto charts presented relevant data that impacted patient outcomes.

During the ‘plan’ stage, the Project Lead developed a scripted questionnaire (Appendix C) that focused on critical areas: reviewing tube feeding care instructions, education on nutrition orders, patient understanding of feeding pump equipment and the refill platform, and ensuring a post-discharge follow-up visit with the doctor within seven days after the discharge date. The questionnaire was approved by the medical center’s NST. The Project Lead collected data through the questionnaire to assess patients’ understanding of their nutrition regimen and education, identifying any unplanned ED visits and hospital readmissions, and address equipment-related issues.

The project was implemented during the ‘do’ stage. The bedside RN or the infusion provider visited the patient for pre-discharge education on ENT therapy. The Project Lead conducted post-discharge outreach calls. During the outreach calls, the Project Lead utilized the post-discharge questionnaire, handouts, and literature given to the patient during their pre-discharge education as resource guides for reinforcement (Appendices E-N). In addition, the Project Lead also used the questionnaire and added narrative notes to gather information regarding patient problems or concerns. If the patient reported a problem, the NST was notified within twenty-four hours.

After implementation of the project, the Project Lead reviewed the data and evaluated that the goals were met during the ‘study’ stage. Finally, during the ‘act’ stage, the participants

concluded if the post-discharge follow-up interventions had the desired outcomes. After a review of the data obtained from the DNP quality improvement project, the RDs and RNs from the NST decided to implement post-discharge follow-up services to ensure the continuum of care. In addition, the NST also chose to implement a post-discharge program for the infusion community focusing on Home Parenteral Nutrition (HPN) services such as total parenteral nutrition (TPN).

Faith Integration

A servant leader manifests a Christian leadership style by giving patients spiritual care, such as listening, motivating, empathizing, compassion, and feeling connected with health (Murphy & Walker, 2013). The focus on the patient's physical, emotional, social, and spiritual needs serves the whole person. The clinician leads Spirit-guided care in caring for the patient through a holistic approach, including active listening and being present in the moment. Clinicians should separate themselves from being task-oriented and allow Christ's Holy Spirit to flow freely (Murphy & Walker, 2013). Furthermore, Spirit-guided care is the foundation as nurses use themselves as "Christ's hands and presence as they engage in nursing care" (Murphy & Walker, 2013, p. 149). This approach has guided this writer to lead the patient's holistic care to include post-discharge follow-up from a faith-based hospital.

Cooper et al. (2020) reviewed a critical discourse analysis constructed by RNs that explored language, beliefs, and practices surrounding spirituality in nursing. The authors discussed the various ways in which nurses understand and incorporate spiritual care into their patient interactions. Two of the three findings related to spirituality and spiritual care best describe this writer's position at a faith-based hospital: spirituality as holistic care and spirituality as empathetic care (Cooper et al., 2020). Patients are motivated by exhibiting behaviors to achieve their tasks or goals, which leads to self-empowerment. For example, when the Project

Lead initially called the patient for follow-up, she identified herself with the patient's wellness. The Project Lead evaluated the patient's or caregiver's willingness and capacity to learn about the self-administration of TF. Spirituality is associated with the person's physical and mental health, "and the combination of these is holistic care" (Cooper et al., 2020, p. 6). As the patient advocate, the Project Lead supported the post-discharge continuum to help patients find meaning in their health and well-being; therefore, praying privately to God and using nursing knowledge and skills helped meet the patients' needs. Incorporating spirituality as holistic care into the post-discharge follow-up period aligns with the principles of patient-centered care.

Furthermore, this supports emotional and psychological well-being. Spirit-guided care was guided by outcomes based on patient responses (Murphy & Walker, 2013). For example, when reaching out to the patient post-discharge, the clinician created a safe environment for patient engagement during the care process.

Integrating faith into the Project Lead's spirituality as an empathetic perspective may enhance the patient care experience due to the connection, listening, empathy, sensitivity, and caring (Cooper et al., 2020, p. 6). Following discharge, connecting with the person on a spiritual level lessens anxiety, mainly when transitioning from hospital to home. Promoting the whole person's needs is an opportunity to achieve the desired results in improving outcomes with patients on home enteral nutrition. Jeremiah 33:6 states, 'Nevertheless, I will bring health and healing to it; I will heal my people and let them enjoy abundant peace and security' (New International Version, 2011). This verse truly resonates with the Project Lead's purpose-driven life. The rewards are worth having when the desired outcomes come to fruition. The post-discharge assessment questionnaire will address the patients' needs beyond the physical as they transition from the hospital to their homes.

Project Objectives / Outcomes

This project aimed to prevent tube feeding complications that led to unplanned ED visits or hospital readmission through post-discharge follow-up. The ultimate goal of this project was to reduce healthcare costs related to labor, readmissions, diagnostic testing, and length of stay. The alignment between the problem and outcomes ensured the quality of care and reduced potential adverse events.

Short-term objectives:

1. Within 24 hours of identifying care gaps (equipment/supplies), on discovery at follow-up, 100% of issues will be addressed by the NST.
2. Within 24 hours of identifying patient concerns (health complications), on discovery at follow-up, 100% of concerns will be addressed by the NST.
3. By the 30-day follow-up call, 75% of patients will verbalize they have an increased understanding of their nutrition regimen and self-care.
4. By the 30-day follow-up call, 75% of patients will verbalize they received timely management of equipment/supply/health concerns since discharge.
5. By the 30-day follow-up call, 75% of patients will verbalize they were satisfied with post-discharge follow-up calls.

Long-term objectives:

1. By January 2024, after a review of the data obtained from the DNP quality improvement project, the NST leadership will decide whether to formally implement post-discharge follow-up services to ensure the continuum of care.
2. By January 2024, after a review of the data obtained from the DNP quality improvement project, the NST will decide whether to implement a post-discharge program for the infusion

community focusing on Home Parenteral Nutrition (HPN) services such as total parenteral nutrition (TPN) will be used in the medical center.

3. By March 2024 – March 2025, the Project Lead will present the quality improvement project at the American Society of Parenteral and Enteral Nutrition (ASPEN) conference and will achieve a 10% increase in audience engagement and receive positive feedback reflecting from the Q&A forum sessions or polls from at least 75% of attendees by developing innovative presentation techniques and evidence-based practices.

Quality Improvement Methods

Institutional Review Board Process

The protection of human subjects in this quality improvement project is crucial. All personnel adhered to ethical principles and guidelines to ensure the safety, confidentiality, and well-being of all individuals involved. The Project Lead obtained IRB approval from the Organization and CBU in July 2023 to protect human subjects. All questionnaires were secured in a password-protected file and only available to the Project Lead. Documentation of the CBU IRB approval is in Appendix B.

Project Plan

The post-discharge outreach enteral nutrition program is a process improvement project to promote high-quality care through education promotion and effective communication to help bridge care gaps, sustain the continuity of care, and identify opportunities for process improvement. The start date of the project implementation was mid-July 2023. The post-discharge calls from the NST service took place at the project site within the medical center. The project entailed providing tube feeding care instructions, reviewing nutrition orders, educating on

feeding pump equipment, and ensuring that a post-discharge follow-up visit with the doctor was scheduled within seven days of the discharge date.

Tools

The tool utilized was the questionnaire for the post-discharge outreach calls (Appendix C). The NST has vetted the post-discharge questionnaire based on their expertise in the nutrition specialty field. After incorporating feedback and making necessary revisions, the Project Lead conducted a final review with the NST to ensure all concerns had been addressed. In addition, during follow-up, the Project Lead evaluated the patient's understanding of the pre-discharge handouts and feeding pump instructions (Appendices E-N).

Stakeholders

The project team members included the Project Lead, clinic RDs, hospital bedside RNs, and the NST, which consists of RDs and RNs responsible for delivering enteral services to patients receiving tube feedings at home. The project focused on patients with gastrostomy tubes receiving enteral feedings and discharged from the medical center and outpatient clinics. Patients had direct access to the RD contact number provided on the written nutrition instructions when they had questions or concerns. The Project Lead made the follow-up calls and updated the NST as issues arose. Until project implementation, the medical center's pharmacy and RDs from the clinic only followed up on providing tube feeding supplies and when RD consults were needed.

Timeline

- April 2023 – May 2023: Developed a draft questionnaire for the post-discharge outreach calls and received feedback and approval from the Organization's NST leader.

- May 2023 – July 2023: LLU’s Nursing Research Council approved the proposed project as quality improvement. CBU’s IRB committee deemed the proposed project a quality improvement, and implementation proceeded.
- July 2023: The Project Lead met with the NST, presented the project, and highlighted the objectives, goals, and desired outcomes. Roles and expected job duties were discussed (Appendix O). Project implementation began.
- July 2023: The Project Lead or co-lead: 1) Conducted post-discharge outreach calls 48 hours post-discharge (Appendices C, E-N). 2) Conducted post-discharge outreach calls on the 30th day from the discharge date (Appendix C, D-N). 3) Collected data on an Excel spreadsheet and analyzed quantitative and qualitative measurements from patient responses.
- October 2023 - November 2023: Evaluated project data and shared results with the Organization.

Implementation Process

The outpatient feeding tube placement process at the medical center and clinics began when the referring clinic or provider identified a patient's need for tube placement. Prior to the hospital discharge, the clinic RD completed the assessment, provided recommendations, coordinated home enteral supplies, and provided education. If the referring clinic did not have an RD, the clinic provider linked with the NST. The clinic nurse provided site care instructions if the accepting pharmacy did not offer this service and assisted the clinic RD in finding a pharmacy and home health as needed. The evaluation of learning took place during the follow-up calls.

The discharge process for inpatient enteral patients began when an NST RD provided written instructions, a bedside RN provided education about bolus feedings, and a pharmacy infusion provider trained the patient how to use the pump correctly. Pre-discharge teaching tools and materials included existing materials of hospital literature handouts, nutrition regimen instructions, and pharmacy education materials (Appendices E-N), HEN education web links, and demonstration of care (Appendices E-N). The teaching tools addressed tube-feeding care, managing potential complications, and different methods of tube-feeding administration. After the teachings were completed, the patients were asked if they would participate in a series of follow-up calls to help coordinate their care. If the patient agreed, the RD informed them that they would receive an outreach call 48 hours after discharge and then again on the 30th day after their discharge date. In addition, the clinician would give the patient the dietitian's contact information to address any clinical issues the patients encountered, such as gastrointestinal complications or formula intolerance.

Forty-eight hours following discharge, the Project Lead (RN) or the co-lead (RD Educator) performed the first telephone outreach call and made an additional follow-up phone call on the 30th day from the discharge date. The Project Lead anticipated that confirming the delivery of supplies, including equipment, was crucial. Furthermore, ensuring an understanding of educational materials was anticipated to have contributed to a smooth transition to managing their post-discharge nutrition instructions.

In preparation for the post-discharge outreach call, the Project Lead or co-lead, an RD Educator, reviewed the nutrition orders on the medical center's electronic access platform and called the patient. Microsoft Excel employed password protection and encryption measures to render the document inaccessible to unauthorized individuals to ensure patient confidentiality.

Excel was the leading platform to organize patients and to house the questionnaires and responses after completing the calls. The patients were asked a series of questions (Appendix C). The Project Lead completed the questionnaire with the patient and reinforced the education as needed. If there were any concerns, referrals were made to address them within 48 hours after the start of home care. The Project Lead or co-lead inputted a “yes” or “no” responses and added additional narrative comments as necessary.

The NST was notified if a patient needed intervention. Introduction Situation Background Assessment Recommendation (ISBAR) was utilized as the standardized interprofessional communication format when there was a need to address the patient’s concern. When a communication alert was sent to the RD team mailbox, one of the RDs contacted the patient within twenty-four hours to address the issue, concern, or health-related event. Upon the call’s completion, the Project Lead documented the actions of the telephone encounter as “call completed, call incomplete, call escalated, follow-up needed.”

The Project Lead or co-lead conducted another outreach call to the patient thirty days after the discharge date using the same scripted questionnaire (Appendix C) to evaluate actual problems incurred since the previous telephone communication, reinforce education, and make any needed referrals. The Project Lead collected data from patient-reported responses related to their post-discharge follow-up with their doctor, tolerance to their feeding regimen, complications with their tube feeds (TF), access to TF refills, supplies, and equipment, and whether they had contacted an RD for health-related concerns. Also, the Project Lead captured unplanned ED visits or readmissions to the hospital that the patient reported within the 30-day callback period.

A post-implementation survey was presented to the patients at the completion of the follow-up call on day 30. The patients were asked if they were willing to answer a few more questions regarding their post-discharge follow-up call experience. If the patient agreed, the post-implementation survey was emailed to them (Appendix D). For those patients who had no email access and felt comfortable expressing their opinions, a verbal survey was conducted over the phone (Appendix D).

Strategies for Data Collection

Prior to the project's implementation, the NST lacked sufficient data to substantiate the requirement for post-discharge follow-up, but this has changed following the project write-up. However, after several discussions with the NST and operational leadership, the NST manager and RD staff believed implementing the project was necessary to assess patient education, compliance, complications, and outcomes. The Project Lead and the NST leadership believed that providing patients with reinforcement would be instrumental in improving adherence to planned medical management. Patients were re-instructed on self-care management, ordering nutrition formulas, and contacting an RD as needed. Most importantly, the data collected enabled the medical center to review patient knowledge and understanding regarding self-monitoring, self-management, communication, health services navigation, issues or complications encountered, hospitalization readmissions, and ED visits. The NST leadership anticipated that the data would validate the value of follow-up, its impact on patient satisfaction, and continuity of care, resulting in improved outcomes.

Furthermore, the NST leadership and the Project Lead expected the reinforcement of the organization's existing education and resources would improve tolerance issues that may prevent readmissions. The Project Lead collected data throughout the implementation. Additionally, the

Project Lead presented the medical center with valuable qualitative and quantitative data to strategize to improve outcomes and design marketing strategies to share with referral sources.

The medical center was eager for the Project Lead to provide pertinent data that could streamline care processes and identify care gaps.

Project Evaluation

Qualitative measurements related to the patient's responses, behaviors, and verbal teach-back of discharge instructions were used as key indicators to measure patient engagement and understanding of the care plan, aiming to achieve SMART objectives one through four. To achieve SMART objectives one through four and for data collection using a Pareto chart, the Project Lead obtained the following information: delivery of equipment supplies; understanding of education on nutrition orders; TF care; refill process; a post-discharge follow-up visit to the doctor; reported incidence of readmissions, and ED visits; and any issues or complications encountered. Since there was no comparison data, the Project Lead presented new data on the Pareto chart to the Organization showing the most common complications or adverse events from ascending to descending order encountered at the 48-hour and 30th-day post-discharge follow-up. The Project Leader's productivity was measured using the medical center's electronic access platform, Excel, and Microsoft Outlook. The data from the questionnaires generated results as evidence of service delivery. Furthermore, the Project Leader anticipated the patients' adherence to recommended TF care, water flushes, or hydration and evaluated the time of delivery of equipment, the incidence of readmissions, and ED visits.

Effectiveness of Marketing

Clinicians work to earn the trust of patients and referral partners by meeting the Organization's commitments and acting with reliability. For the intent of this project, the NST

asked the patient if it would be okay for a follow-up call to be done post-discharge during the pre-teaching encounter. In the future, advertising flyers and conducting in-services can be marketed to the MDs, RNs, case managers, and patients for the post-discharge outreach nutrition program. Additionally, collaboration among other Interprofessional teams within the Organization is part of the goal of serving the patient by providing quality care.

Finances and Resources

Resources

The Project Lead volunteered her time to perform the outreach calls. Also, a co-lead helped complete the outreach calls and was trained by the Project Lead for 3 hours during her usual work hours, paid for by the medical center. Additionally, the project lead trained her on the post-discharge follow-up workflow process for conducting the outreach calls. Follow-up calls were three to four hours daily (see Figure 1).

Part of the roles of the RN, RD, and pharmacy provider was to provide education on enteral nutrition therapies through bedside teaching and to provide an outstanding customer and patient experience. Also, part of the role of the Project Lead was to maintain the continuity of care by reinforcing the tube-feeding education. Understanding this, the medical center paid for enough office supplies to meet the project's implementation needs. An anticipated outcome is that the project will help the medical center see an increase in new patient referrals for enteral services and revenue growth.

Figure 1*Finances and Resources*

Expenses			Revenue	
Category	Cost Breakdown	Total Cost	Category	Cost
Labor	In-kind donation of project lead time.		Potential increase in patient volume related to follow-up care	Average cost G-Tube placement: \$4633.54 - \$6000.00
	Estimated cost: 1 RN @ \$50/hr. x 60min/patient x3 ENT pts/day	\$150/day - \$200/day		(Patel et al., n.d)
	1 RD @ \$42/hr. x 60min/patient x3 ENT pts/day	\$126/day - \$168/day	Potential healthcare savings related to ED visits to address complications	\$74,438 per year \$1071 (average) per patient ED attendance
Tube Feeding Guide Handbook	Donation from Abbott			(Barrett et al., 2021)
Training	Volunteer time: 3-4 hours/day	\$0		

Final Results / Outcome Analysis

The Project Lead examined the results, outcome analysis, and data to carefully assess the post-discharge experiences of the patients on tube feedings at two critical time points: 48 hours and 30 days after their hospital discharge. The questionnaires delivered invaluable insights into the transitional period from hospital to home, care quality, and patient satisfaction levels, shedding light on immediate and more sustained post-hospitalization outcomes. The Project Lead captured a snapshot of the early stages of the transition period from

hospitalization to home tube feeds, where patients were likely to adjust to their home environment and address any acute issues and self-care plans on their tube feeding instructions.

Patients were recruited from a single medical center with discharge dates between July 2023 and October 2023. Patients included were those newly started on tube feedings during this period. Patients receiving oral nutrition supplements and IV nutrition were excluded. Data collected included de-identified demographics, diagnosis information, independence level, and pre-discharge instructions on enteral nutrition. Patients were called to assess their status and to complete the questionnaire (See Appendix C), with the qualitative responses to each question recorded both times. When patients were not available for follow-up calls, information was obtained from chart reviews. Additionally, after the 30-day interview, patients were asked to participate in a 5-question post-follow-up survey regarding their experience (See Appendix D). This survey was scored on a 5-point Likert scale from 1 to 5, representing strongly disagree to strongly agree, respectively. Data were recorded in a password-protected Microsoft Excel document stored on the secure institutional drive. Qualitative analysis of the data was performed using Microsoft Excel.

Final Results

Thirty-two patients participated in the project. The average age of patients was 64 years, and the group consisted of 12 females (37.5%) and 20 males (62.5%). The majority of the patients (62.5%) were able to function independently, and the remainder had a caregiver. Patient diagnoses included malignancies, neurologic problems, and dysphagia. All patients were given pre-discharge instructions prior to discharge from the hospital.

Of the 39 patients enrolled, 32 patients completed the 48-hour survey. Those who did not complete the questionnaire after 48 hours had been readmitted to the hospital at the time of the

call and consequently were not included in the 30-day follow-up. Eighty-one percent of the patients who completed the 48-hour survey completed the 30-day survey. Six patients did not complete the 30-day survey. Three had been readmitted to the hospital; two had converted to total parental nutrition, and one no longer required tube feedings. However, chart review was utilized to obtain data to answer some questions for these patients.

Forty-eight Hours Post-discharge Follow-up

Concerning the knowledge/self-care management category, 100% of the patients surveyed understood why they were hospitalized. Twenty-seven patients verbalized that a clinician or infusion provider visited the patient for their nutrition education before they were discharged. Twenty-nine patients understood their nutrition orders from their doctor. Twenty-five patients verbalized they understood how to keep their tube feeding site clean. Twenty-six patients knew how much water to flush their tubes before and after each feeding. Eighteen patients understood how to manage potential complications such as clogs, diarrhea, dehydration, abdominal distention, accidental removal, hypergranulation, infection, and leakage. Lastly, 29 patients verbalized that they had help at home if immediate assistance was needed.

Regarding the problems and complications category, two patients verbalized that they had gastrointestinal symptoms and feeding complications such as nausea, vomiting, and constipation. Nine patients verbalized that they had a scheduled follow-up with their doctor within two weeks of their discharge date. Two patients stated that they had an ED visit or had been readmitted to the hospital since their discharge date. For the technology navigation category, 27 patients verbalized access to refills for their tube feedings. Twenty-seven patients verbalized receiving their supplies on time. Two patients verbalized they did not receive their supplies on time.

At the end of the questionnaire, patients were given the opportunity to express any additional concerns. Five patients expressed additional concerns after the survey including education, supply/equipment, and follow-up issues. Of note, however, not all patients who reported an issue or concern on the survey chose to provide additional commentary. Other concerns patients or their caregivers expressed included difficulty with other medical care providers, dissatisfaction with hospital services, difficulty obtaining durable medical equipment (DME), and disposition (See Table 2, Figures 4 and 5).

Thirty-day Post-discharge Follow-up

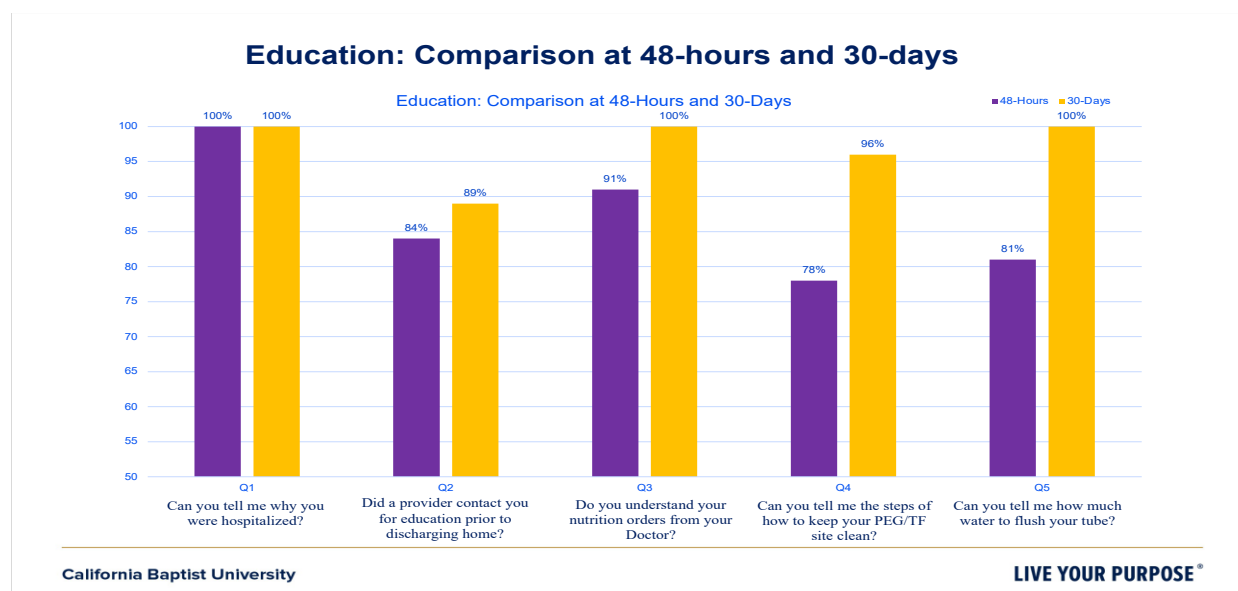
The 30-day survey focused on follow-up, providing tube feeding education, and reinforcing patient well-being. Regarding the patient knowledge/self-care management category, 26 patients understood their nutrition orders from the doctor. Twenty-four patients verbalized that a clinician or infusion provider contacted them for their nutrition education before being discharged home. Twenty-five patients verbalized understanding of how to keep their tube feeding site clean. Twenty-six patients knew how much water to flush their feeding tube before and after each feeding. Twenty-one patients knew how to manage potential complications and who to call for urgent matters. Twenty-six patients had help at home if they needed immediate assistance. Twenty-five patients knew how to access refills for their tube feeding and received their supplies on time. Three patients had equipment issues. One patient had gastrointestinal symptoms such as diarrhea. Seven patients shared other comments to help support their needs. Twelve patients have gone to the ED or been readmitted to the hospital since discharge. Lastly, 23 patients had a follow-up with their doctor.

Qualitative Comparison Between 48-hour and 30-day Follow-up

There was an improvement in patient understanding, self-monitoring, and navigation between the two survey timepoints. Regarding patient education, there was an improved understanding of nutrition orders from 91% to 100%, steps to keeping tube feeding site clean from 78% to 96%, and knowledge of water flushed before and after each feeding from 81% to 100% at the 48-hour and 30-day timepoints, respectively. Regarding self-monitoring, there was an increase in the verbalization of managing potential complications from 56% to 81% and access refills from 84% to 96% at 48 hours and 30 days, respectively. Furthermore, 84% of patients reported receiving supplies on time by 48-hours, whereas 96% reported this by 30 days (See Figures 2 and 3).

Post-study Survey

All patients who participated in the 30-day questionnaire were given the opportunity to complete a post-follow-up survey on their experience. Nineteen patients elected to participate. 100% of patients reported satisfaction with understanding their post-discharge tube feeding self-care, nursing care, follow-up calls, and addressing questions. Eighty-four percent of patients endorsed timely management of health concerns and timely delivery of equipment and supplies.

Figure 2*Education: Comparison of 48-Hours and 30 days*

This figure represents patients' responses to education questions at 48 hours (purple) and 30 days (yellow).

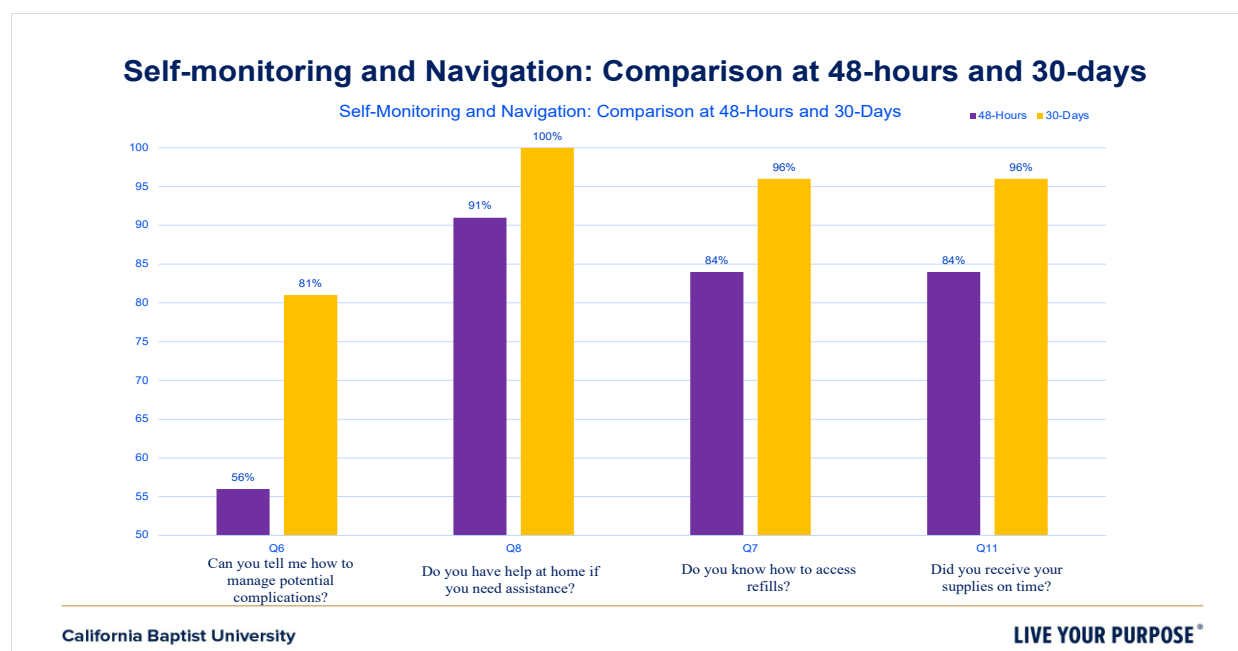
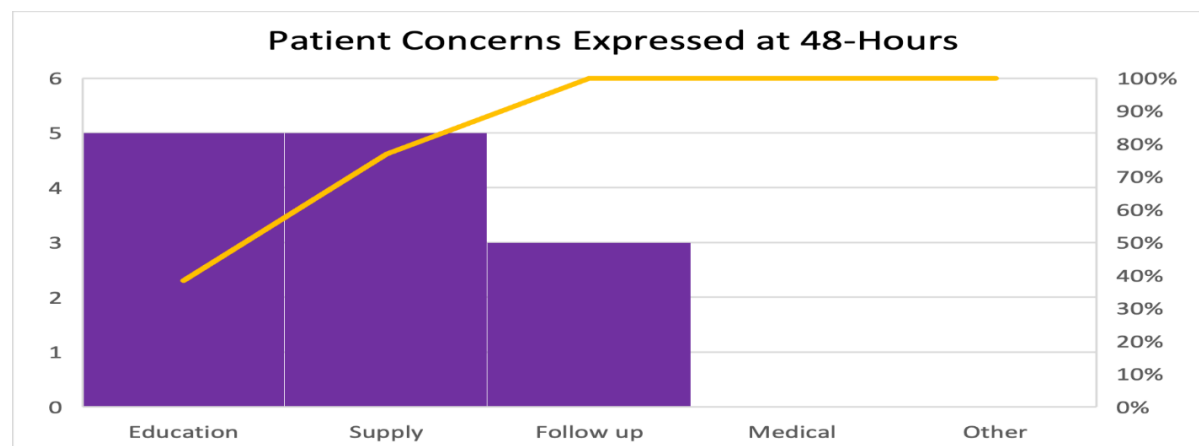
Figure 3*Self-Monitoring and Navigation: Comparison at 48-Hours and 30 Days*

Table 2*Additional comments and concerns addressed*

Concern	48 hours	30 days
Total Concerns	13 (from 12 patients)	20 (from 16 patients)
-Education	5 (38.5%)	6 (30%)
-Supply/equipment	5 (38.5%)	1 (5%)
-Follow up	3 (23.0%)	1 (5%)
-Medical Concern	0 (0%)	8 (40%)
-Other	0 (0%)	4 (20%)

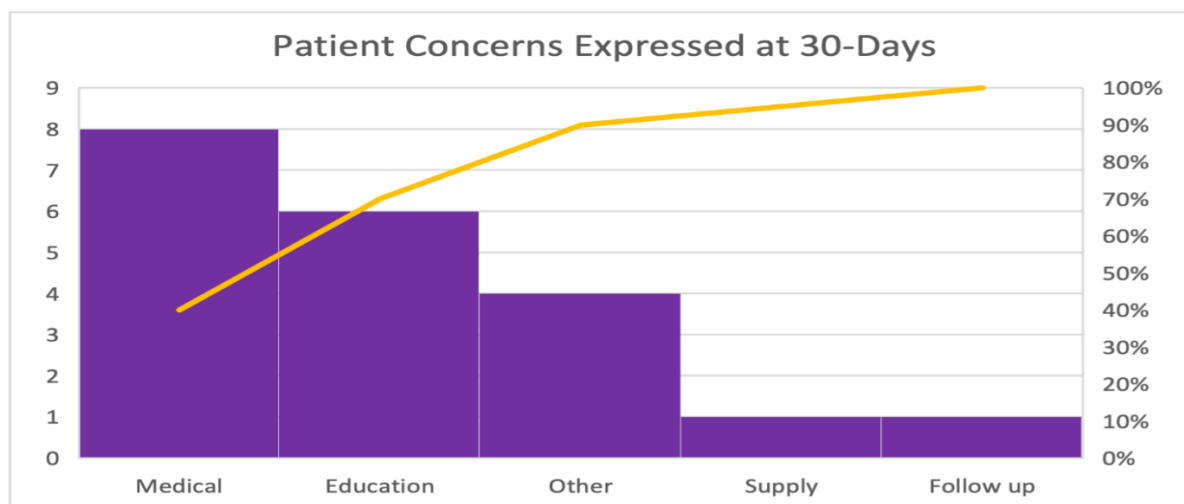
*This table represents the patients who expressed other concerns. Some patients expressed more than one concern, so these concerns are described individually.

Figure 4*Pareto Chart: Patient Concerns Expressed at 48-Hours*

The Pareto chart shows the breakdown of categories of concerns expressed at the end of the 48-hour questionnaire. The purple bars represent the number of patients expressing concern in each category, and the yellow line represents the cumulative total of the combined responses.

Figure 5

Pareto Chart: Patient Concerns Expressed at 30 Days



The Pareto chart shows the breakdown of categories of concerns expressed at the end of the 48-day questionnaire. The purple bars represent the number of patients expressing concern in each category, and the yellow line represents the cumulative total of the combined responses.

Outcome Analysis

The Project Lead found that one of the key factors that worked exceptionally well was the practical resource of the adult tube feeding guidebook (Appendices E-O). For example, the project lead directed patients to the handbook and walked them through the steps of potential tube feeding complications and treatment. Another factor that went well was the immediate responsiveness from the NST, which was a key driver of success. Patient inquiries about nutrition, formula, and equipment were addressed in real time during the patient encounter, and the problem was resolved within 24 hours. The Dietitians and leaders on site were always available, and the patients expressed gratitude for the prompt responses. The NST's support played a pivotal role in the project's success and allowed it to progress smoothly.

Unforeseen circumstances such as medication safety, nutritional status changes, and hospital readmissions were handled responsibly by the medical center, and the project continued as these events were captured for the project team's reference. Medication education was not part of the post-discharge questionnaire, yet patient safety was the priority during this encounter. For example, the patient's caregiver informed the Project Lead a nausea symptom that was bothering the patient. Upon assessing the patient and reviewing the latest encounter notes from the doctor in the chart, the patient was noted to be taking the previously prescribed blood pressure medication rather than the newly prescribed medication. The caregiver was instructed to start administering the newly prescribed medication and, if symptoms worsen, to go to the ED.

A few patients were no longer on tube feeds and were tolerating a full diet by mouth at the 30-day follow-up. Therefore, there was no need to move forward with the questionnaire. The readmissions were captured by reviewing the chart that displayed "hospital admission," and the patients verbalized some. Some readmissions were related to tube-feeding complications and other underlying health ailments.

Gaps

One potential gap identified between expected and actual outcomes was low health literacy among the patients, which could significantly impact their level of independence and education. Providers generally assume that independent individuals will proactively seek out resources. However, individuals with low health literacy often have a low independence level and may face challenges in comprehending and applying tube-feeding knowledge (and may rely more on healthcare personnel to provide information). In this case, their independence level was measured by selecting self-administration or caretaker involvement on the Excel spreadsheet according to the narrative notes in the chart. According to Ballard & Hill (2016), plain language

is categorized as a reading level at or below the fifth grade, and written materials with three main points with pictures are the preferred communication strategy when considering health literacy.

Therefore, achieving SMART objectives 1 and 2 at 100% may not have been accurate because of the patients' possible low comprehension levels when referring to the tube feeding guide handbook.

SMART objective one, which identified care gaps for equipment and supplies, was met. Five patients reported they did not know how to access refills. These patients were re-educated following the 48-hour survey. All five patients (100%) verbalized improved understanding. Five patients reported not receiving supplies on time, and in all cases (100%), the tube feed infusion provider and on-call case manager were contacted to address the issue. Two patients endorsed equipment issues due to not receiving the "tree connector." In both cases, the patients had called the infusion provider before the 48-hour survey, with no response from a provider in each case. In one case, the patient's husband returned to the hospital nursing unit to obtain the "tree connector" before the NST follow-up; however, the issue was resolved by the time of follow-up. In the other case, this was discovered at the 48-hour follow-up, and the NST instructed the patient to keep the current "tree connector" until a new one was delivered. The NST also contacted the tube feed infusion provider to facilitate delivery of the missing tree connector piece. In both cases, issues were addressed within 24 hours of NST being made aware.

SMART objective two, which involves identifying patient concerns and complications, was met. Two patients reported health complications. One of the patients reported constipation, and the NST reinforced education and the importance of referencing the Adult Feeding Tube Booklet for managing constipation. The patient verbalized better understanding. The other patient stated they had a health care issue with the tube feed formulation; however, when asked

further, the patient reported that they recently had a formulation change (prior issue) that had been subsequently addressed with the new formula and was tolerating their feeds much better. In both cases, these health issues were addressed within 24 hours of the NST being made aware.

SMART objective three was met when patients verbalized understanding of their nutrition regimen and self-care. Based on the 30-day follow-up survey, this objective was met when patients demonstrated an understanding of their nutrition regimens and self-care. Twenty-five patients (96%) correctly stated all steps for cleaning their tube feeding site. All 26 patients (100%) correctly described the water flushing technique before and after each feed. Twenty-one patients (81%) reported feeling comfortable managing potential complications and identifying their doctor as the point person for contact.

SMART objective four was met in all categories used to measure the timely delivery of tube feed supply and response to patient needs. Based on the 30-day survey, 25 patients (96%) reported timely delivery of supplies and equipment. One patient reported that their formula had been delivered late. The post-follow-up survey evaluated patient satisfaction with addressing their healthcare concerns. Among the 19 patients who participated in the post-follow-up experience, 84% (mean Likert score 3.9) reported their concerns were adequately addressed. Patients reported being dissatisfied with follow-up due to late delivery of formula, malfunction of tube feeding equipment, and difficulty scheduling follow-up appointments.

SMART objective five was met in all components of post-follow-up call satisfaction assistance with the post-follow-up survey. The survey was scored using the Likert scale. Scores of 1 or 2 were considered dissatisfaction, whereas 3, 4, or 5 were considered satisfaction. This objective was met with 100% of patients reporting satisfaction with understanding their post-discharge tube feeding self-care (mean Likert score 4.8), nursing care (mean Likert score 4.6),

follow-up calls (mean Likert score 4.6), and having questions addressed (mean Likert score 4.6). Although not all patients elected to participate in this component, no patients reported a negative experience with the phone calls.

Long-term Goals

The long-term objectives were discussed with the NST leadership. This DNP quality improvement project positively influenced patient outcomes, specifically educational components. Moreover, there were discussions of plans for ongoing communication and channels to monitor the impact of the change, resources allocated to sustain the recommended change over time, and potential financial barriers to maintaining the difference.

Theoretical Framework Support

By using the PDSA theoretical framework, the team planned the specific changes in workflow, implemented the scripted questionnaire during the outreach call sessions in a controlled and measured manner, studied the results comprehensively, and acted to make necessary adjustments. One of the key strengths of the PDSA model was its ability to encourage team collaboration between the Dietitians and Nurses. Frequent communication updates between the Project Lead and the NST regarding census and patient outreaches took place weekly. Furthermore, the PDSA framework promptly identified and addressed any unexpected issues. The team ensured the project remained flexible and adaptable, which allowed team members to respond effectively to changes in the environment or patient needs. When patient situations deviated from the expected outcomes, the team acted in real time to rectify them. The PDSA theoretical framework proved instrumental in supporting the project by confirming a systematic and evidence-based approach to accomplishing the goals while nurturing an organizational culture of continuous improvement.

Biblical/faith Influence

According to Cooper et al. (2020), spirituality considers the person's physical and mental well-being interconnected with holistic and empathetic care. During the outreach calls, there was a connection between the Project Lead and the patient related to "Spirit-guided care" (Murphy & Walker, 2013, p. 149). Regarding question 14, the Project Lead actively listened to the patients' shared hospitalization and post-hospitalization experiences. The connection encouraged participation and collaboration between the providers and patients, with open communication and shared decision-making. Empathetic care was provided to the patients and their caregivers struggling to find the right providers to contact for their specific needs. The Project Lead engaged patients in focusing on their health and well-being by asking questions regarding their durable medical equipment (DME) and planning other specialized follow-up appointments with their doctor.

There was a sense of patient satisfaction when they answered the questions, as reflected by the patient satisfaction follow-up experience survey (Appendix D). At the end of the post-discharge follow-up questionnaire, some patients stated that they felt cared for on all levels, eventually leading to higher patient satisfaction.

Implications for Practice

Nurses foster a professional culture by identifying care gaps and increasing patient awareness of their self and care management for tube feedings. Providing high-quality post-discharge follow-up calls focused on improving patient outcomes by addressing real-time health problems. Promoting evidence-based practice from various literature sources allowed the Project Lead to strategize ways to involve teamwork, focus on education, and impact patient outcomes (White et al., 2016). Patient education was sustained at the post-discharge follow-up using the

organization's adult tube feeding handbook as a resource guide. This handbook included guidance on administering tube feedings, recognizing potential complications, and understanding when to seek medical attention. Educators can use the tool in other specialty areas of the organization as part of their quality improvement training to enhance patient care and system performance.

For this quality improvement project, the nursing implication promoted high-quality care through education promotion and effective communication to help bridge care gaps and sustain the continuity of care. The education captured a patient's understanding of nutrition orders and steps on tube feeding care, readmissions, issues with supplies and equipment, comfort level in managing complications, and ability to self-monitor. The project addressed issues early, supported pre-discharge education, and improved communication by engaging in opportunities to address concerns and reinforce medical instructions. This structured post-discharge follow-up program proactively addressed problems related to tube feeding regarding education, self-monitoring, and navigation of supplies and equipment.

The Project Lead is eager to embark on the next phase of the project, which involves discussing plans to disseminate the findings and achievements at the American Society of Parenteral and Enteral Nutrition (ASPEN) conference in the future. The annual meetings serve as a platform to bring together interdisciplinary personnel such as nurses, dietitians, researchers, clinicians, and experts in clinical nutrition and metabolic support (ASPEN, 2023). This event is an excellent opportunity for attendees to learn about the latest trends and practices in nutrition therapy, share research findings, and engage in discussions on patient care, quality improvement, and best-demonstrated practices.

Conclusion and Recommendations

The discussion about post-discharge outreach calls to the Enteral community allowed the team to identify care gaps and potential complications during the outpatient encounters. The Project Lead provided high-quality care through the promotion of education and demonstrated a caring heart that aligned with the Project Lead's faith and the organization's mission and vision statement. The literature review provided evidence to support hospital initiatives and synthesized vital themes that surface to improve patient outcomes for tube feedings.

Strategies to sustain the change within the organization were discussed with the NST leadership and Operational teams. One strength acknowledged was the favorable patient feedback regarding their follow-up experience. The NST valued the patients' input because they were committed to ensuring they had all the knowledge and support needed for self-care, especially regarding tube feedings. This was an opportunity to enhance the NST's services because this act of kindness demonstrated compassion for distressed patients. Also, the Director of the Nursing Research Council strongly advocated for the publication of this quality improvement project, emphasizing its potential to raise awareness, and highlighting its essential benefits and opportunities for further advancement.

The best advice for other healthcare organizations or specialty departments considering implementing a similar quality improvement project is to develop a post-discharge follow-up program for patients discharged from specialty service lines such as neurology or oncology teams. Implementing a robust system for quality monitoring and reporting patient outcomes could be added to the hospital initiatives. Regularly assessing key performance indicators and sharing reports with other significant stakeholders can increase the possibility of maintaining

positive outlook changes and serve as a cornerstone in the organization's performance improvement.

Enteral nutrition therapy is a recognizable specialty within the healthcare realm. Therefore, monitoring patient outcomes is essential to delivering safe, high-quality, patient-centered care. Future studies may consider further exploring the benefit of the structured post-discharge follow-up call by comparing the standard of care tube-feeding discharges with the standard of care in addition to the structured follow-up phone calls. Consequently, incorporating an RN educator role would be a strong gatekeeper for the NST in the hospital setting. This role would be vital in coordinating and managing the unit's resources efficiently and focusing on the needs of the patients' post-discharge. The effective implementation of the development of a post-discharge outreach enteral nutrition program not only signifies a meaningful stride in elevating patient care but remains as a testament to translating nursing practice for quality improvement.

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Appendix A

Summary of key findings

Author (Year)	Country	Study Aim	Key Findings
PART A – Qualitative Studies			
Ang <i>et al.</i> (2019)	Singapore	Understand patients' and carers' experience upon initiation of long-term HEN	Patient perspectives:
			<ul style="list-style-type: none"> • Lack of knowledge about PEG insertion increased anxiety • Access to a nutrition nurse and technical support was viewed positively
Green <i>et al.</i> (2019)	UK	Understand patients' and carers' experience of long-term HEN	Patient perspectives:
			<ul style="list-style-type: none"> • More training on managing the ET would be welcome before leaving hospital • Strong preference for ET-related issues to be managed at home if they arise • Most common ET issues were dislodgement, stoma infection, and over-granulating tissue • HEN significantly impacts on the management of everyday activities • Access to support from HCPs was variable
Thomas <i>et al.</i> (2019)	UK	Establish the impact of HEN on daily life of those with a diagnosis of head and neck cancer	Patient perspectives:
			<ul style="list-style-type: none"> • Knowledge and skill development enabled more effective adaptation to HEN • Facilitating patient autonomy in managing the ET was important • HEN significantly impacted everyday activities of daily living, e.g., meals, sleep, travel, work

Author (Year)	Country	Study Aim	Key Findings
			<ul style="list-style-type: none"> • HEN curtailed social activities due to feeding duration and anxiety over damage to ET <p>Patient perspectives:</p> <ul style="list-style-type: none"> • Need for more specificity in educational material on what to expect with HEN, e.g., complications • Ongoing education on practical logistics of HEN would be welcome • Most common ET issues were leaking, dislodgement, and pain at stoma site • Most common GI side effects were constipation, nausea, and diarrhea <p>Patient perspectives:</p>
Asiedu <i>et al.</i> (2018)	USA	Understand patients' and carers' experience of long-term HEN	<ul style="list-style-type: none"> • HEN impacted sleep due to presence of tube, pain at stoma site, or noise from pump • Access to HEN team and support from dietitian around care of ET and stoma site, was appreciated • Support from and knowledge of primary care providers around HEN viewed less positively <p>Patient perspectives:</p>
Halliday <i>et al.</i> (2017)	UK	Understand patients' and carers' experience of living with a jejunostomy feeding tube in the first months after surgery	<ul style="list-style-type: none"> • Necessary to provide verbal and written education on multiple occasions • Education on daily care of ET, managing complications, and accessing support was important • Those who struggled most did not feel sufficiently prepared and lacked support from HCPs • Despite physical limitations and GI side effects of HEN, patients were grateful that HEN treatment
Bjuresäter <i>et al.</i> (2015)	Sweden	Understand the impact of HEN on daily life and how the situation can be managed	

Author (Year)	Country	Study Aim	Key Findings
			meant survival and enabled them to stay at home
			GP perspectives:
Madigan <i>et al.</i> (2007)	Northern Ireland	Explore GPs' knowledge, attitudes, and skills relating to enteral feeding in the community	<ul style="list-style-type: none"> Perceived HEN as positive but had concerns about managing patients in a primary care setting Highlighted their lack of training on patients on HEN and problems that may arise Agreed training on HEN was needed and that such training should coincide with them having a patient on HEN rather than at random
			Patient perspectives:
Brotherton <i>et al.</i> (2007)	UK	Understand patients' and carers' experience of living with a PEG	<ul style="list-style-type: none"> HEN was time-consuming, impacted sleep, and curtailed social activities but relieved pressure to consume a nutritionally adequate oral diet 20% of patients reported needing more support from HCPs
			Patient perspectives:
Jordan <i>et al.</i> (2006)	UK	Understand patients' experience of living with a PEG	<ul style="list-style-type: none"> HEN impacted sleep and restricted participation in social activities Most common ET issues were leakage, dislodgement, and blockage Perceived that GPs and district nurses lacked knowledge Lack of knowledge of HCPs in ED increased burden of treatment for four patients Mean SF12 physical and mental health scores were below the average for the general population in the USA and below those for UK residents with chronic illness

Thompson <i>et al.</i> (2006)	USA	Understand patients' experience of long-term HEN and how HCPs can support those on HEN	<p>Patient perspectives:</p> <ul style="list-style-type: none"> • Physical limitations of HEN or underlying disease impacted daily activities • Lack of support from HCPs resulted in patients attempting to resolve issues themselves • 83% noted that inadequate HEN instruction led to confusion or fear around managing HEN • Perceived that HCPs lacked expertise to address HEN-related problems • Education and monitoring should include individualized care, discussing problems before they occur, and providing HEN education in stages
Liley <i>et al.</i> (2003)	UK	Understand patients' and carers' experience of HEN	<p>Patient perspectives:</p> <ul style="list-style-type: none"> • Practical aspects of managing feeding and equipment were inadequately covered during education • All felt that HEN was worth undertaking and essential to survival • Inexperience of some HCPs resulted in distress for some patients
L'Estrange (1997)	Northern Ireland	Understand patients' and carers' perspectives on HEN	<p>Patient perspectives:</p> <ul style="list-style-type: none"> • Most noted that training had adequately prepared them for HEN • Patients would benefit from more emphasis on managing ET issues, e.g., leakage, blockage • 37% of patients were not satisfied with support from HCPs • Patients expressed concern about lack of district nurse experience around HEN and stoma care

PART B – Quantitative Studies

Martin <i>et al.</i> (2012)	Sweden	Investigate patients' experience of living with a PEG and increase	Patient perspectives:
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		understanding of patients' need for support	<ul style="list-style-type: none"> • 73% of patients were satisfied with PEG, and 82% did not feel limited in daily activities by PEG • 60% did not find feeding too time-consuming; however, this varied by age and education level • Need for specialized and multidisciplinary care in managing HEN • 80% of patients preferred to contact the PEG outpatient clinic, followed by home care team, then the dietitian, and primary care team
			<p>Patient perspectives:</p> <ul style="list-style-type: none"> • 73% felt they received sufficient support from HCPs • 13% stated that feeding regimen was not appropriate for home feeding • 93% perceived HEN as successful, and 80% believed QoL was acceptable • HCP perspectives: • 65% of dietitians and 83% of nurses believed that support from HCPs was sufficient • 100% of dietitians believed that feeding regimen was appropriate for home feeding • Patients' QoL viewed less positively by HCPs than by patients themselves <p>Patient perspectives:</p> <ul style="list-style-type: none"> • HEN impacted autonomy in 43% of patients • Advantages were physical well-being, less pressure to eat, hope for survival, and staying at home • Mean values for psychological and physical functioning were relatively low • Mean satisfaction score for social functionality was higher than psychological and physical scores
Brotherton <i>et al.</i> (2007)	UK	Compare the perceptions of patients, carers, nurses, and dietitians around home PEG feeding	
Paccagnella <i>et al.</i> (2007)		Assess the impact of HEN on QoL of patients and carers	

Loeser <i>et al.</i> (2003)	Germany	A prospective cross-sectional study with a longitudinal follow-up of 4 months to assess QoL in patients on HEN	Patient perspectives:	<ul style="list-style-type: none"> • When compared to EORTC reference data, functional scales were lower, and symptom scales were higher at baseline • Over four months, some aspects of QoL improved in both competent and non-competent patients • EORTC scores increased for physical, emotional, and global functional scales but decreased for social functioning
McNamara <i>et al.</i> (2001)	Ireland	Assess the contribution of HCPs to the care of patients on HEN	HCP perspectives:	<ul style="list-style-type: none"> • 24% of GPs had ≥ 1 patient(s) on HEN under their care, and 65% had experience with HEN • GPs who attended nursing homes (77%) had significantly more exposure to tube feeding than those who did not • Dietitians and nurses employed by nutrition companies noted inconsistent follow-up of the nutritional care needs of patients • Almost all the company representatives felt that both GPs and PHNs need more education on EN
Roberge <i>et al.</i> (2000)	France	Evaluate the impact of HEN on QoL of life in patients treated for head and neck or esophageal cancer	Patient perspectives:	<ul style="list-style-type: none"> • Global, physical, and social functioning QLQ-C30 scores of QoL improved slightly between assessment on Day 7 of HEN and Day 28 • HEN was responsible for not visiting family or close relations in 15% of patients and not going out in public in 23%
Schneider <i>et al.</i> (2000)	France	Assess QoL of patients on long-term HEN and evolution of QoL after initiation of HEN	Patient perspectives:	<ul style="list-style-type: none"> • EQ-5D and SF-36 scores of HEN patients were lower than reference values for age- and sex-matched general population

- All 38 patients felt that HEN had been at least 'quite' beneficial for them
- Mental well-being improved in 17 patients (15 due to HEN) and worsened in 7 patients (3 due to HEN)
- Physical well-being improved in 26 patients (25 due to HEN) and worsened in 1 patient (not due to HEN)

Appendix B**IRB Review**

RE: IRB Review

IRB No.: 165-2223 DNP

Project: Post Discharge Outreach Nutrition Program

Date Complete Application Received: 6/20/2023

Date Final Revision Received: 6/20/2023

Principle Investigator: Desiree Barrientos

Co-PI: N/A

Faculty Advisor: Dr. Lorraine Shields

College/Department: CON

IRB Determination: DNP Project Application **Approved** – Faculty research using anonymous survey questionnaires; no minor participants; no more than minimal risk/risk appropriately mitigated; no deception utilized; acceptable consent procedures and documentation; acceptable data protection procedures. Data collection may begin, in accordance with the final submitted documents and approved protocol.

Future Correspondence: All future correspondence about this project must include all PIs, Co-PIs, and Faculty Advisors (as relevant) and reference the assigned IRB number.

Approval Information: (Expiration: Full Review Only) Approval is granted for one year from date below. If you would like to continue research activities beyond that date, you are responsible for submitting a Research Renewal Request with enough time for that request to be reviewed and approved prior to the expiration of the project. In the case of an unforeseen risk/adverse experience, please report this to the IRB immediately using the appropriate forms. Requests for a change to protocol must be submitted for IRB review and approved prior to implementation. At the completion of the project, you are to submit a Research Closure Form.

Researcher Responsibilities: The researcher is responsible for ensuring that the research is conducted in the manner outlined in the IRB application and that all reporting requirements are met. Please refer to this approval and to the IRB handbook for more information.

Date: 7/10/2023

Appendix C

Questionnaire at 48-hours & 30-day post-discharge

Patient Knowledge/Self-Care Management

1. Can you tell me why you were hospitalized?
2. Did a clinician/infusion provider contact or visit you for your nutrition education prior to discharging home?
3. Do you understand your nutrition orders from your doctor?
4. Can you tell me the steps of how to keep your PEG/TF site clean?
5. Can you tell me how much water to flush your tube before and after each feeding?
6. Can you tell me how you would manage potential complications? (Ex: clogs, diarrhea, dehydration, abdominal distention, accidental removal, hypergranulation, infection, leakage) and who you would call?
7. Do you know how to access refills for your tube feedings?
8. Do you have help at home if you need immediate assistance?

Problems/Complications/Readmissions/Unscheduled MD visits

9. Have you had any gastrointestinal symptoms, feeding complications, and dehydration?
10. Have you gone to the ED or been readmitted to the hospital since discharge?
11. Did you receive your supplies on time?

Technology

12. Have you had any equipment issues?

Additional Information

13. Has your follow-up with your doctor been scheduled? If so, when?
14. Is there anything else that you would like to share so I can support your needs?
15. (At day 30) Would you be willing to answer a few more questions about this follow-up experience?

Appendix D

Post-implementation survey

Dear (Patient's Name),

Your transition to home care is important to us, and we're committed to ensuring you have all the knowledge and support you need for your self-care, especially regarding tube feedings, and the support you've received from us.

Please rest assured that your responses will remain completely confidential and separate from your email address. We kindly request your response on the following items listed below. Please indicate your level of agreement on the following scale:

(1) Strongly Disagree, (2) Disagree, (3) Neutral, (4) Agree, (5) Strongly Agree

1. I understand the extent of my knowledge of self-care since discharge.
2. I believe all my questions were addressed during the post discharge follow-up calls.
3. I received timely management of equipment/supply/health concerns since discharge.
4. I feel supported by the nurses.
5. I was satisfied with the follow-up calls.

Thank you for taking the time to help us enhance our services. We greatly appreciate your input.

Warm regards,

Desiree Barrientos, RN
Nutrition Support Team

Appendix E



Types of Tube Feeding at Home

Tube Feeding Methods

Your health care provider will determine the delivery method for your tube feeding, along with your feeding schedule.

There are three ways to deliver a tube feeding: **syringe feeding**, **gravity feeding**, and **pump feeding**.

Always refer to the feeding plan recommended by your health care provider.

Syringe Feeding

- In syringe bolus feeding, formula is placed into a syringe without a plunger and flows slowly into the feeding tube. The height of the syringe controls the feeding rate.
- In push syringe feeding, the formula can be injected gently into the tube, using the syringe with a plunger.

Gravity Feeding

- In gravity feeding, formula is placed in a container hung above you. Formula flows through the tubing into your body.

Pump Feeding

- In pump feeding, formula is placed in a feeding container and is pumped through the tubing into your body. This is the preferred method for feeding into the jejunum of the small bowel. It is also possible to pump formula into the stomach if it is clinically appropriate.

Feeding Methods	Delivery Methods
Bolus	Syringe or Gravity
Intermittent	Gravity or Pump
Continuous	Gravity or Pump



Preparing Your Feedings

Follow these steps to prepare the tube feeding:

1. Wash your hands.
2. Gather all the equipment you need:
 - a. The formula
 - b. A feeding container (a gravity bag, syringe, or pump and pump set)
 - c. An IV pole or wall hook
 - d. A 30-mL to 60-mL syringe
 - e. A clean cloth
 - f. Tap or bottled water
3. Write the date and time on the feeding container when the formula is opened.
4. Wash hands thoroughly when finished.

Appendix F

Keep head raised at 30 degrees or more while administering tube feeding. **DO NOT** lie flat during your feeding; and wait for 1 hour after your feeding before you lie down (lying down can cause you to vomit or cough). Vomiting or coughing up small amounts of liquid can be dangerous, causing you to inhale extra water or formula into your lungs.

Syringe (Bolus) Feeding

In syringe feeding, formula flows slowly into the feeding tube, or it can be injected gently into the tube. Follow the syringe feeding method recommended by your health care provider. You can also use a syringe to give extra water or fluids.

Before each syringe feeding:

1. Ask your health care provider how often you should check the tube position.
2. Flush the feeding tube, per your health care provider orders.

Gravity Syringe Method:

1. Remove the plunger from the barrel of the syringe.
2. Place the syringe tip into the feeding tube.
3. Hold the syringe above your stomach.
4. Pour measured formula into the syringe. This may take multiple syringe fillings based on your feeding prescription.
5. Slow the flow by lowering the syringe, or speed the flow by raising the syringe.
6. Allow the formula to flow into the feeding

7. If your health care provider has told you to take extra water after feedings, pour the prescribed amount into the syringe.
8. Flush tube with water per prescription after the feeding.

Push Syringe Method:

1. Flush the tube with water per prescription before the feeding.
2. Use the plunger of the syringe to draw the formula from the measuring cup into the syringe.
3. Place the syringe tip into the feeding tube.
4. Inject the formula into the feeding tube slowly and gently until gone (about 10 to 15 minutes). This may take multiple syringe fillings based on your feeding prescription.
5. If your health care provider has told you to give extra water after feedings, use the plunger of the syringe to draw the prescribed amount into the syringe.
6. Inject the water into the feeding tube slowly and gently.

After each syringe feeding:

1. Flush the feeding tube with the amount of water prescribed by your health care provider.
2. Close the cap on the feeding tube until the next feeding.

Ask your health care provider about care of the container and syringe, and if/how often the syringe should be replaced.

Appendix G



Gravity Feeding

Before each gravity feeding:

1. Prepare feeding (see page 10).
2. Flush the feeding tube with the amount of water prescribed by your health care provider.

Follow these steps:

1. Hang the feeding container above (about 2 feet) and to the side of your bed.
2. Remove the cover from the end of the feeding set.
3. Prime the feeding set. Let formula flow until it comes out the end of the tube.
4. Insert the tip of the feeding set into the feeding tube.
5. Slowly open the clamp on the tubing.
6. Set the flow to the gravity flow rate written on your feeding plan. Use the clamp to control the flow until you achieve your desired rate. Make the flow faster by slowly opening the clamp. Make the flow slower by partially closing the clamp.
7. When the feeding is complete, close the clamp.
8. If your health care provider has told you to take extra water after feedings, pour the prescribed amount into the container. Once again flush after with syringe.
9. Open the clamp and let the water flow until gone.
10. Close the clamp and disconnect the feeding set.

After Each Gravity Feeding:

1. Flush the feeding tube with the amount of water prescribed by your health care provider.
2. Close the cap on the feeding tube until the next feeding.

For intermittent and continuous feeding, throw away container and feeding set every 24 hours. Ask your health care provider about care of the container and feeding set between feedings.

Pump Feeding

In pump feeding, a pump moves the formula through the feeding tube and into the stomach or small intestine.

Before each pump feeding:

1. Prepare feeding (see page 10).
2. Ask your health care provider how often you should check the tube position.
3. Flush the feeding tube with the amount of water prescribed by your health care provider.

Appendix H

Follow these steps:

1. Hang the filled feeding container or place it in an ambulatory carrier.
 2. Connect the feeding set to the pump.
 3. Remove the cap from the end of the feeding set.
 4. If your feeding set has a clamp, open it completely.
 5. Prime the feeding set.
 6. Insert the tip of the feeding set into the feeding tube.
 7. Turn on the pump and set the flow rate. Refer to your pump user manual for complete pump programming information.
 8. Start the pump.
 9. After the feeding container is empty or dose has been fed, stop pump, disconnect from feeding set, and flush tube with the amount of water prescribed by your health care provider. If your care professional has told you to take extra water after the feedings, pour the prescribed amount into container. (not applicable if ready to hang (RTH) container). Start the pump.
 10. When the water is gone, stop the pump.
- Ask your health care professional about care of the container and feeding set between feedings.

Hang Time and Storage

Cover any unused formula and write the date on it. Store it in the refrigerator.

For formula that has been hung for a feeding, follow the guidelines below:

- Hang reconstituted formula (restored to its original state by the addition of water) up to 4 hours.
- Hang ready-to-use formula decanted to a bag (open system) up to 8 hours.
- Hang ready-to-use formula (closed system) up to 48 hours, unless a shorter hang time is specified by the manufacturer set.
- Hang home blenderized formula up to 2 hours.

Throw away any open, unused ready-to-use formula that has been stored in the refrigerator after 48 hours. Throw away any open, unused reconstituted powdered formula or blenderized formula after 24 hours.

Appendix I

Causes of Intolerance Symptoms

■ **Medication side effects.**

Many medications in liquid form contain sorbitol, a sugar alcohol, that may cause diarrhea in some people.

■ **Type of formula doesn't meet your nutrition needs.**

■ **Formula is going in too fast.**

When you are new to tube feeding, feedings may be started and advanced at a slow rate. This allows your gastrointestinal tract to adjust to the formula and method of delivery. Some prescribing health care providers start tube feeding at lower volumes or rates and work up to a final volume or rate. Check with your health care provider to see what they recommend.

Bolus feeding may be reserved for tube feeders who have demonstrated tolerance to a continuous method of feeding.

■ **Formula is spoiled from contamination during preparation, storage or administration.**

■ **Formula is the wrong temperature.**

Taking formula out of the refrigerator and administering it before it has had time to rise to room temperature can lead to abdominal cramping and other intolerance-related symptoms.

■ **Volume of formula is too large.**



Your head should be raised 30 degrees or more while tube feeding.

Appendix J

Nausea, Vomiting, and Abdominal Discomfort

Possible Causes	Prevention and Treatment
Not tolerating the formula	<ul style="list-style-type: none"> • Work with your health care provider to determine cause and talk about switching to a different formula.
Formula may be going in too fast	<ul style="list-style-type: none"> • Begin at a slow rate. • Increase the rate and amount gradually over 24-48 hours.
Formula may be spoiled or contaminated during preparation or delivery	<ul style="list-style-type: none"> • Wash and dry your hands prior to preparing a feeding or touching the feeding tube. • Avoid touching any part of the feeding tube system that will come in contact with the formula. • Record date and time on can after it is opened and store covered in the refrigerator. • Discard unused formula after 48 hours or as recommended by formula manufacturer.
Incorrect position or incorrect tube placement during and after feeding	<ul style="list-style-type: none"> • Confirm tube placement prior to feeding if recommended by your health care provider. • Elevate your head 30 degrees or more by propping yourself up in bed or on a couch. • Keep your body in a raised position for at least one hour after feeding.
Medication side effects	<ul style="list-style-type: none"> • Ask the health care provider or your pharmacist to see if an alternative medication is available. • Sometimes switching to another form of the medication (i.e. from liquid to pill) can help alleviate side effects.
Stomach, esophagus, or intestine not working properly	<ul style="list-style-type: none"> • Health care provider may order additional tests following examination.

Appendix K

Diarrhea

Possible Causes	Prevention and Treatment
Not tolerating the formula	<ul style="list-style-type: none"> You may have an intolerance to specific formulas. It may be necessary to switch to a different formula. Switching to a fiber-containing formula can sometimes help alleviate the diarrhea. Note that there are multiple medical causes of diarrhea. Consult with your health care provider or pharmacist if needed.
Small intestinal bacterial overgrowth	<ul style="list-style-type: none"> Diagnosis is typically made once other causes are excluded.
Medication side effects	<ul style="list-style-type: none"> Ask your health care provider or pharmacist to review your medication list. Diarrhea can be worsened by antibiotics or by medications containing sorbitol, magnesium or phosphorus.

Bloating and Constipation

Possible Causes	Prevention and Treatment
Not taking enough liquids or fiber	<ul style="list-style-type: none"> Ask the health care provider how much extra water (free water) you should be taking in each day. If the current formula does not contain fiber, discuss changing to a fiber-containing formula with the health care provider.
Medication side effects	<ul style="list-style-type: none"> Ask the health care provider if any of your medications could be causing constipation. Pain meds, iron and anti-diarrheals are common medications that can contribute to the development of constipation. Ask if there is an alternative medication that may have fewer side effects. Note that there are multiple medical causes of constipation. Consult with your health care provider or pharmacist if needed.

Appendix L

Tube Site Complications

Prevention and early intervention are key to decreasing the risk of complications associated with the feeding tube site. (For comparison, here is a healthy tube feeding/stoma site located right.) Tube site complications can include:



A healthy feeding tube/stoma site

■ Hypergranulation Tissue

Thick, red, raised tissue that can form around the feeding tube where it enters the body. The tube site will be red and may bleed easily. In some cases, a clear or cloudy discharge may be present. This discharge can lead to breakdown of the skin at the tube site.

■ Tube Site Infection

These infections can occur with all types of abdominal feeding tubes. Infection usually is limited to the skin and tissue below the skin, although more severe infections can occur. Tube site infections are usually from yeast or bacteria. Your health care provider should see you to make a proper diagnosis and recommend a treatment to you.

■ Leakage Around G-Tube

Drainage of any type of liquid around the exit site of the tube allows risk for skin breakdown and infection. Leakage is considered a symptom of an underlying problem such as:

- Inward or outward movement of the tube
- Tube tract enlargement
- Overfeeding
- Balloon deflation
- Delayed gastric emptying

Healthy Stoma Site

Look for:

- Stoma pink in color; no redness or drainage
- No rash, ulcers or swelling in the surrounding skin
- No inflammation or excess skin at stoma site
- Free of odor

Types of discharge from around the tube site can include: gastric content, secretions from stoma tissue, tube feeding formula, or medications. Talk to your health care provider if you have discharge from your stoma.

Appendix M

Bolus Feed Instructions

Patient: _____

Dietitian: _____

Feed Supplier / Phone Number: _____

Bolus feeds are administered with a syringe into the feeding tube. A specific volume of formula is administered over a short period of time (< 30 minutes) at set times throughout the day. Water boluses are administered between bolus feeds for hydration.

- Store unopened cartons of formula in a cool dry place.
- Partially used cartons of formula should be kept in the refrigerator to be used at the next feeding. *Remember to replace the cap on the carton of formula.*
- Discard open cartons of formula that have not been used within 24 hours of opening.
- Administer the prescribed amount of formula at each feed.
- Flush the feeding tube with 30 mL water before and after each feeding to prevent tube clogging.
- Do not administer more than 500 mL of water or formula (2 cartons) at a time.
- Hand wash syringes with dish soap after every use.

Prescription:

Formula	Osmolite 1.5
Volume per Feed	5.4 carton
Number of Feeds	4
Water Bolus	320 mL
Number of Water Bolus	4

****If you prefer, can administer 1 carton x 5 times and 0.4 carton (3 oz) x 1 time.**

Bolus Feed Schedule: Administer formula every 3-4 hours *during waking hours only.*

Suggested Time	Amount
8:00 am	320 ml
12:00 pm	320 ml
4:00 pm	320 ml
8:00 pm	320 ml

Water Bolus Schedule: Administer water between feeds to avoid abdominal discomfort and nausea.

Suggested Time	Amount
9:00 am	200 ml
1:00 pm	200 ml
5:00 pm	200 ml
9:00 pm	200 ml

Appendix N

Continuous Pump Feed Instructions

Patient: _____

Dietitian: _____

Feed Supplier / Phone Number: _____

Continuous pump feeds are administered into the feeding tube at a consistent rate over 24 hours.

- Store unopened cartons of formula in a cool dry place.
- Partially used cartons of formula should be kept in the refrigerator to be used at the next feeding.
Remember to replace the cap on the carton of formula.
- Discard open cartons of formula that have not been used within 24 hours of opening.
- Each bag of formula can hang for up to 12 hours.
- Use a new feeding bag every day.
- Hand wash syringes with dish soap after every use.


Prescription:

Formula	Vital 1.5
Rate and Duration	50 mL/hour x 24 hours (~ 5 cartons/day)
Water Bolus	150 mL/bolus x 6/day if unable to drink

Instructions:

1. Wash hands with soap and water.
2. Gather supplies: new feeding bag, syringe, water, and formula.
3. Flush feeding tube with 30 mL of water before start of feeding.
4. Fill bag with 2.5 cartons of formula
5. At 9:00 pm, set the pump for 50 mL/hour for 12 hours and start pump.
6. At 9:00 am, pause pump.
7. Rinse the bag and refill with 2.5 cartons formula.
8. Set the pump for 50 mL/hour for 12 hours.
9. Discard the bag after the infusion completed.

Appendix O

	Outpatient Feeding Tube Placement Outpatient feeding tube placement can be an involved process requiring multidisciplinary coordination. All patients should receive nutrition evaluation prior to feeding tube placement to ensure appropriate education and set up of enteral supplies.
Referring Clinic or provider	<ul style="list-style-type: none"> • Provider identifies patient requires placement of feeding tube and refers to clinic dietitian for evaluation and recommendations. Note: If referring clinic does not have a dietitian, provider/clinic contacts the Nutrition Support Team (NST) via pager #6929 (may enter consult to Ambulatory Referral to Nutrition Services if patient does not need immediate placement). • Patient navigator/clinic assistant obtains authorization for feeding tube placement and finds an accepting pharmacy for home enteral supplies as appropriate. • Clinic dietitian completes assessment, provides recommendations, coordinates home enteral supplies, provides or arranges for education, and connects with NST dietitian as appropriate. • Clinic dietitian and/or clinic nurse ensures provider signature for the home enteral nutrition prescription and faxes prescription and other needed information to accepting pharmacy. • Clinic nurse provides site care instruction if accepting pharmacy does not offer this service and assists clinic dietitian to find pharmacy and home health as needed.
Service Placing Feeding Tube	<ul style="list-style-type: none"> • Completes preliminary evaluation prior to scheduling placement of feeding tube and evaluates appropriateness. • GI or IR scheduler notifies NST pager #6929 prior to the procedure to ensure appropriate enteral set up and instruction completed. • The day of the procedure, an Adult TPN/Enteral consult is entered in LLEAP. • Provides care instructions, orders when "okay to use tube for feeding," and provides contact information for post procedure questions/concerns.
Nutrition Support Team Dietitian pager # 6929	<ul style="list-style-type: none"> • Receives notification of the scheduled feeding tube placement and assigns the patient to dietitian as appropriate*. Assigned dietitian will contact referring clinic as needed for assistance. <i>*Plan is to assign the patient prior to the procedure to allow time for chart review and coordination of care with patient/family/pharmacy.</i> • Completes assessment, provides recommendations for home enteral supplies, and coordinates with clinic dietitian as needed. • Reviews written instructions re: home tube feed regimen with patient/family/caregiver. Provides copy of instructions and <i>Guide to Adult Tube Feeding</i> to patient/family/caregiver. • Requests bedside nurse or charge nurse provides tube site care education to patient/family/caregiver prior to discharge using Clinical Reference handouts.
Recovery Nurse	<ul style="list-style-type: none"> • Notify NST dietitian via pager #6929 to ensure NST involvement in home tube feed set-up. • Provides tube site care education to patient/family/caregiver prior to discharge using Clinical Reference handouts and as ordered by service placing feeding tube. • Instructs patient/family/caregiver to follow up with their primary care physician with questions/concerns regarding tube feeding tolerance (e.g. constipation, diarrhea, vomiting, abdominal pain).
Accepting Pharmacy	<ul style="list-style-type: none"> • Provides site care instruction and education regarding water flush, administration of formula (syringe vs pump), and storage of supplies • Arranges for delivery or pick up of enteral feeding supplies. • Available to patient/family/caregiver post discharge with questions/concerns regarding tube feeding tolerance (e.g. constipation, diarrhea, vomiting, abdominal pain) and enteral feeding supplies.

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