5-2020

Creating A Patient Handout For Venting Gastrostomy Catheter: A Quality Improvement Project

Sally A. Mathews
Prairie View A&M University

CREATING A PATIENT EDUCATION HANDOUT FOR VENTING GASTROSTOMY CATHETER CARE: A QUALITY IMPROVEMENT PROJECT

SALLY A. MATHEWS

DOCTOR OF NURSING PRACTICE

COLLEGE OF NURSING
PRAIRIE VIEW A&M UNIVERSITY

2020

CREATING A PATIENT EDUCATION HANDOUT FOR VENTING GASTROSTOMY CATHETER CARE: A QUALITY IMPROVEMENT PROJECT

A DNP PROJECT

by

SALLY A. MATHEWS

Submitted to the Office of Graduate Studies of
Prairie View A&M University
in partial fulfillment of the requirements for the degree of

DOCTOR OF NURSING PRACTICE

May 2020

Major Subject: Nursing

CREATING A PATIENT EDUCATION HANDOUT FOR VENTING GASTROSTOMY CATHETER CARE: A QUALITY IMPROVEMENT PROJECT

A DNP PROJECT

by

SALLY A MATHEWS

Submitted to the Office of Graduate Studies of
Prairie View A&M University
in partial fulfillment of the requirements for the degree of

DOCTOR OF NURSING PRACTICE

Approved as to style and content by:

[redacted]
Abida Solomon
Chair of Committee

[redacted]
Vivian Dawkins
Member

[redacted]
Sharisse Hebert
Member

[redacted]
Chloe Gaines
Head of Department

[redacted]
Jerrel Moore
Member

[redacted]
Betty Adams
Dean, College of Nursing

[redacted]
Dorie J. Gilbert
Dean, Graduate Studies

Major Subject: Nursing

May 2020

ABSTRACT

Creating a Patient Education Handout for Venting Gastrostomy Catheter Care: A Quality Improvement Project (May 2020)

Sally A. Mathews, BSN, MSN, DNP

Chair of Advisory Committee: Dr. Abida Solomon

At the University of Texas MD Anderson Cancer Center (MDACC), approximately 200 patients undergo placement of a venting gastrostomy catheter annually (venting G-catheter). About 10% of these patients are later seen in the emergency room (ER) for complications related to venting G-catheters. These complications include leakage, infection, skin irritation, and dislocation that require interventions ranging from topical management to exchange of the catheter. The purpose of this project was to create an MDACC-designed patient education handout regarding the care of venting G-catheters as a means of improving patient care and reinforcing these concepts for clinical nurses, thus improving their knowledge.

The process for creating the patient education handout included four main steps: synthesis of published evidence-based research findings on the care of venting G-catheters for patients with malignant bowel obstruction; review of the MDACC link for baseline information on the number of patient ER visits; conduct of a pilot study to obtain clinical nurses' expert opinions on the care of venting G-catheters; and validation of the handout's readability using the Flesch–Kincaid Grade Level formula.

Monthly ER visit rates for venting G-catheter–related complications decreased, from 2.85% of patients with venting G-catheters visiting the ER pre-intervention, to 2.07% visiting the ER post-intervention. This change corresponds to a 28% reduction in ER visits following

implementation of the intervention. Survey responses also revealed that the nurses' overall knowledge and awareness regarding use of the patient education handout had improved.

These results demonstrate that the patient education handout developed in this project is a useful tool for communicating patient care information regarding venting G-catheters, particularly with respect to discharged patients.

DEDICATION

To God Almighty and to my family.

ACKNOWLEDGMENTS

I thank my committee chair, Dr. Solomon, and members of the committee, Dr. Dawkins, Dr. Hebert, and Dr. Moore for their guidance and support throughout the course of this project. I also thank Dr. Kelly, Dr. George, Dr. Jessy, and Ms. Jane as well for all of the guidance and support they provided.

Thanks to all my friends, colleagues, department faculty, and staff for making my time at Prairie View A&M University a great experience. I also extend my gratitude to the University of Texas MD Anderson Cancer Center for providing me the opportunity and all the necessary support for the completion of my project.

TABLE OF CONTENTS

Page

Page

Page

LIST OF FIGURES

FIGURE Page

LIST OF TABLES

TABLE Page

CHAPTER I

INTRODUCTION

Background

Educational materials such as handouts, brochures, and flyers are well-known tools used for communicating patient care information to both healthcare professionals and patient populations. These text-based materials allow patients to read the information at their own pace as time permits. Patient education has been defined as "any set of planned educational activities designed to improve patients' health behaviors and/or health status" (John et al., 2011, p.123). Patient education is an integral component of the care most patients receive, and it begins on the first day of a patient's admission. The use of educational material is generally effective in guiding patients towards healthier behaviors, and it allows patients to assume greater responsibility in the oversight of their own personal healthcare activities at home (Seligman, 2007). Patient education handouts provide an outline of key information in a simple, written format, with little or no medical jargon. Illustrated materials (such as handouts) are often better understood and remembered by patients (Kripalani et al., 2007).

Although medical concepts and language can be complex, patients must be able to understand pertinent health information, regardless of their age, background, or reading level. To create an effective and efficient patient education handout, the author must know the target audience in terms of their common reading level, cultural background, and demographic data. Patient education handouts generally include information regarding the importance of certain medications, their side effects, diet and caloric intake, daily activities, the importance of follow-up visits, catheter or drain care and dressing change instructions. Although education handouts

---

This DNP follows the Publication Manual of the American Psychology Association, 7th Edition.

have proven to be effective per se, their effectiveness can be further enhanced by the explanation of the content by the health care provider.

So, it is important to provide additional guidance when patients have any peripheral wounds or external percutaneous catheters, including feeding tubes, venting gastrostomy catheters (G-catheters), biliary catheters, regular Foley catheters, or nephrostomy catheters. It is the responsibility of nurses to educate and prepare patients and their family members to continue their care at home, particularly when the patient is discharged with catheters. For example, the function of a venting G-catheter differs from that of a feeding percutaneous endoscopic gastrostomy (PEG) catheter in that it has an inbuilt vent that enables drainage of fluid or air out of the stomach during feeding. Clinical nurses educate patients and their family members regarding proper care of venting G-catheters. Nurses frequently encounter difficulties in patients' ability to differentiate the functions of venting and feeding G-catheters because patients often cannot fully remember verbal instructions at discharge.

Therefore, it is far more beneficial to provide patients and their families with written materials to take home as a means of reinforcing the importance of self-care instructions. Patient education handouts are most effective when they are patient-friendly, cost-effective, increase the patient's knowledge, and assuage the patient's fears after discharge. Discharge education becomes easier if patients receive printed education handouts in conjunction with verbal instructions. Moreover, the use of printed health materials is widespread due to their perceived apparent benefits and convenience. It has been observed that patients who receive written materials coupled with verbal reinforcements are considerably more compliant than those who receive only verbal communications.

Nursing knowledge of proper care of venting G-catheters is a major component of the care of patients with advanced gastrointestinal (GI) cancers or malignant bowel obstruction (MBO). Nurses working in the oncology unit should be educated on the care of patients who are admitted with venting G-catheters. It is important for patients to understand venting G-catheter care, the differences in the types of catheters, proper usage of these catheters, and the management of venting G-catheters.

Description of Problem

A 2018 review of patient education revealed that there were no MD Anderson Cancer Center-designed patient education handouts available describing the care of venting G-catheters for patients who were admitted to oncology units. While general education can be provided via the electronic health record, more specific information related to the oncology population is important for improving patient care outcomes. Improved outcomes can be achieved by enhancing knowledge among clinical nurses regarding the reduction of catheter-related risks for complications. Currently, venting G-catheters are placed in interventional radiology (IR) and ambulatory patients who recover and are discharged from the Post Anesthesia Care Unit (PACU). Hospitalized patients are most commonly admitted to regular medical oncology units.

At MD Anderson Cancer Center, approximately 200 patients undergo placement of venting G-catheters annually. Of these patients, approximately 10% are seen in the emergency center for G-catheter-related complications, which commonly include leakage around the placement site, local infection, skin irritation, dislodgement, and loose or non-intact stitches that require interventions ranging from topical management to exchange of the catheter. Such interventions can also require hospitalization for further patient care, including intravenous antibiotics or catheter exchange in IR. These drain complications can be very costly for patients

and the institution. Based on a detailed discussion with the patient education center and working closely with the team, it was noted that no specific educational handout outlining the care of venting G-catheters exists at the institution. Hence, this project was designed to create a specific patient education handout for the care of venting G-catheters to improve patient care and reinforce care concepts and nursing knowledge related to venting G-catheter care. Patient education handouts have been found to improve patient care and the overall discharge process. This quality improvement project focused on the improvement of patient care outcomes and an ultimate decrease in the number of ER visits related to catheter complications by creating a patient education handout for the care of venting G-catheters.

Population, Intervention, Comparison, and Outcome Process (PICO) Questions

The PICO questions that guided this study were:

1. Will educating nurses on the care of venting G-catheters improve nurses' knowledge to reinforce the patient care concepts provided to patients?

2. Will a patient education handout for the care of venting G-catheters improve patient care outcomes and ultimately decrease the number of ER visits?

PICO Definitions

P: Population: The target population includes patients with ER visits due to venting G-catheter-related complications and clinical nurses who work in the oncology unit.

I: Intervention: Create an evidence-based patient education handout for the care of venting G-catheters and educate clinical nurses on the care concepts of venting G-catheters, which will ultimately improve patient care outcomes.

C: Comparison: Pre-intervention knowledge of nurses regarding care concepts pertaining to venting G-catheters and the rate of ER visits by patients with venting G-catheter-related complications prior to the intervention.

O: Outcome: Create an evidence-based patient education handout for the care of venting G-catheters that would be provided to patients upon discharge as a means of improving patient care of venting G-catheters, enhancing nurses' knowledge regarding venting G-catheter care, and decreasing the number of ER visits for catheter-related complications.

Purpose of the Study

The purpose of the study was to create an evidence-based patient education handout describing the proper care of venting G-catheters as a means of improving patient care and increasing clinical nurses' overall knowledge concerning/regarding the management of venting G-catheters.

Goals and Objectives

The primary focus of this study was to create a patient education handout for discharged patients on the care of venting G-catheters. Thus, the objective was to demonstrate the importance of a "patient education handout" for patients discharged with the diagnosis of MBO. The overall goal was to improve patient care outcomes and subsequently reduce unplanned patient ER visits for venting G-catheter-related complications.

Definition of Terms

Education Handout

Education handouts are the most effective means for patients and healthcare providers to communicate about health problems. Handouts describe medical treatments and promote healthy behaviors.

Practice

The practice is repeated performance or systematic exercise to gain skills or proficiency (Practice [n.d.]).

Quality Improvement

Quality improvement is systematic and continuous actions that lead to measurable improvement in healthcare services and the health status of targeted patient groups (Lynn et al., 2007).

Clinical Registered Nurses

A registered nurse (RN) is a nurse who holds a nursing diploma or associate degree in nursing and has passed the NCLEX-RN exam administered by the National Council of State Boards of Nursing and has met all other licensing requirements mandated by his or her state's board of nursing. Registered nurses (RNs) treat patients and provide advice and emotional support to patients and their families. RNs also educate patients as well as the public about medical conditions (McKay, 2017).

Decompression Gastrostomy Catheters

Fluoroscopic-guided placement of a percutaneous decompression gastrostomy catheter is used to improve obstructive GI symptoms of patients with malignant bowel obstruction and achieve related symptom control.

Venting G-catheter or Percutaneous Venting G-catheter

Venting or decompression tubes, also called venting PEG, or venting G-catheters, are used to significantly reduce the symptoms of nausea and vomiting in patients with metastatic GI obstruction due to primary GI malignancies (Teriaky, Gregor, & Chande, 2012).

Percutaneous

Percutaneous refers to passage through the skin by needle punctures, including the introduction of wires and catheters (Percutaneous, 2012).

Qualtrics

Qualtrics is a simple-to-use, web-based survey tool for the conduct of research, evaluations, and other data collection activities (Qualtrics, 2015).

ICD-10 Code

ICD-10 stands for International Statistical Classification of Disease and Related Health Problems, 10th Revision, which is updated regularly by the World Health Organization. ICD-10 codes are alphanumeric codes used by physicians, health insurance companies, and public health agencies worldwide to represent diagnoses. Every known disease, disorder, injury, infection, and symptom has its own ICD-10 code (Davis, 2018).

Flesch-Kincaid Readability Grade Level

Flesch-Kincaid readability scores are the most used and trusted of all readability scoring formulas and, therefore, ideal for general usage. The formula is equivalent to the US educational grade level required by a reader to be able to understand a text passage.

CHAPTER II

LITERATURE REVIEW

Introduction

The literature review was undertaken using the Current Index to Nursing and Allied Health Literature library, Google Scholar, and PubMed. The search terms were based on a combination of keywords: venting gastrostomy, care of percutaneous catheters, non-vascular catheters, MBO, patient education handouts, and importance of patient education handouts combined with verbal talk. Article availability was limited when conducting searches related to care specific to venting G-catheters. Therefore, the majority of articles selected for use in this project considered venting G-catheters on both feeding tubes as well as venting in common, regular percutaneous catheters, or non-vascular catheters. The articles were refined to include those published between 2007 and 2017, full-text articles, and articles published in academic journals.

Theoretical Framework

Knowles' Adult Learning Theory. Various models exist to provide successful transfer of evidence-based knowledge to clinical settings. There is no single accepted theory on how adults learn; rather, it depends on who the learner is and their motivation for learning, as well as the complexity of the information. The adult learning theory was applied for this quality improvement (QI) project (Pappas, 2013). It is necessary to identify different learning styles, types, and models, as well as to determine the application of learning theories in approaches to teaching in clinical settings.

The goal of this project is to create a patient education handout on venting G-catheter care for oncology nurses to use in patient teaching and face-to-face communication with patients and their families. The underlying study principle was a recognition that adult learners are

autonomous and self-directed individuals who strive to learn as a function of motivation and who apply choice and responsibility. Malcolm Shepherd Knowles was an American educator, well-known for use of the term "andragogy" as applying to adult education. Based on andragogy—the art and science of adult learning theory—Knowles identified six ways in which adults learn differently than children. The theory is based on the concept that adults bring prior experiences with them into the learning process, and these experiences subsequently affect how they retain information. Health education in relation to adult learning is often focused on finding the appropriate information that will cause a change in behavior and, in turn, positively impact outcomes (Pappas, 2013).

Knowles' Adult Learning Theory (KALT) expands on the concept of the needs of learners and focuses on self-directed learning, which teaches adults to be in control of their learning. The theory is based on the six elements needed for optimal learning to occur: (a) a need to know for one's learning; (b) the role of experience as a resource in one's life situation; (c) a readiness or applicability of the information to one's life situation; (d) motivation to learn; and (e) problem-centered learning with real-life problems. These elements may not always occur together, particularly in a new area of learning.

However, adult education should aim to support these elements because bedside nurses need to develop an understanding of the learner and give considerable direction at the outset. There is not a single accepted theory regarding how adults learn. When designing patient education materials, adult learning concepts should be considered to help patients understand, retain, and implement their education. It is important to ensure that patients are in charge of their own education so that they are empowered for home care. Adult learning is not always accomplished the same way, and it should be designed to reach all types of adults: low-income

seniors, highly educated professionals, and people from all different cultural traditions. Adult learners are motivated when they can see the benefit (Bowers et al., 2015).

Figure 1 shows the framework of an adult.

Figure 1

Theoretical Framework

Assumptions of Adult Learners

Andragogy: Tapping into Prior Experience. KALT, which was developed to attempt to elucidate a specific model describing how adults learn, is based on several assumptions of adult learning. One assumption is that adults are motivated to know why they are learning something. Adults also have a need to be self-directed, and they bring more work-related experiences into learning situations (Pappas, 2013). Adults are generally motivated to learn by both extrinsic and intrinsic motivators. Knowles suggested four assumptions about the characteristics of adult

learners (i.e., andragogy) that differ from assumptions about child learners (i.e., pedagogy). Knowles later added a fifth assumption: (a) Self-Concept, (b) Adult Learner Experience, (c) Readiness to Learn, (d) Orientation to Learning, and (e) Motivation to Learn. KALT describes each of the components of these assumptions (Pappas, 2013).

1. Self-concept: As individuals mature, their self-concept transitions from a dependent personality toward a self-directed human being.
2. Need for knowledge: Adults need to know "why" they should learn something.
3. Motivation to learn: As individuals mature, the motivation to learn is internalized.
4. Orientation to learning: As individuals mature, their perspective changes from postponed applications of knowledge to a need for its near-term application. In turn, their learning orientation shifts from subject-centeredness to problem-centeredness.
5. Readiness to learn: As individuals mature, their readiness to learn becomes oriented increasingly toward the developmental tasks of their social roles.
6. Adult learner experience: As individuals mature, they accumulate a reservoir of experiences that becomes a resource for learning.

There are various models available to guide the successful transfer of evidence-based knowledge to clinical settings (Pappas, 2013). KALT specifies that educational programs for adults must reflect how adults learn (i.e., self-directed) and their psychological profile (i.e., they are responsible for learning). Learning-based problems must be immediately important, and learners must be informed why they must solve those problems. An informational pamphlet should generally be provided to patients who have any new procedures, receive newly placed catheters, or start on any new medications; the guide should explain the need for new medications and list resources for additional information (Pappas, 2013).

Experiential Learning: Tying Reality to Create Meaning

Human beings are shaped by their experiences; for adults, no textbook learning can supplant the knowledge, clarity, and wisdom that come from experience. The experiential learning theory states that the essence of adult learning is making sense of experiences. Adults learn best when they learn by doing and when they are directly involved with experiencing the learning instead of memorizing numbers and definitions from a book.

Kolb's experiential learning theory works on two levels: a four-stage cycle of learning and four separate learning styles (McLeod, 2013). Much of Kolb's theory is concerned with the learner's internal cognitive processes. Kolb posited four stages of experiential learning:

1. Concrete experience: Adults learn best when the learning experience goes beyond the "chalk-and-talk" routine, such as when a new situational experience is encountered or there is a reinterpretation of an existing experience.
2. Reflective observation: Adults need to engage with and reflect on their experiences to glean insights and acquire knowledge (e.g., scenario-driven activities, case studies).
3. Abstract conceptualization: The success of experiential learning lies in the learners' ability to decode abstract concepts from their reflections, generalize these ideas, and realize the relevance to their reality. Assessments are designed to encourage learners to exercise their "critical thinking" abilities so that they can formulate concepts and procedures. Reflection gives rise to a new idea or modification of an existing abstract concept.
4. Active experimentation: Learners apply their experiences to the world around them to determine what results might result from an activity. Learners engage in role-playing

activities, internships, and other hands-on tasks. This stage allows learners to apply their learning and thus truly "learn by doing" (Gutierrez, 2018).

Patient Education Materials or Handouts

Patients often receive educational documents to take home with them upon hospital discharge. It is important that these documents be written at an appropriate grade level, as some patients have low health literacy and, thus, may be unable to read certain materials. The use of printed health materials is widespread due to their perceived benefits and convenience. Education materials should emphasize patient-on-patient care by empowering patients and caregivers through a consistent plan that involves written education material, workflows, standardization, and governance. Readability, which is an important aspect of any written material, can affect a reader's ability to clearly understand the content (Eltorai et al., 2014). Written patient education materials are valuable for teaching patients, especially at the time of discharge from inpatient units. However, it is important to realize that adult illiteracy may present a problem when written discharge instructions are used.

Handouts are important because even if only a few patients change their behavior as a result of the information presented in the handout, the cost benefits can be significant. A handout for the care of venting G-catheters may prevent a single patient from returning to an emergency center with drain complications, thus preventing an unnecessary trip and expense for that individual. Patient education handouts can enhance the transfer of knowledge, which may heighten patients' confidence to properly care for their venting G-catheters and effectively prepare them for discharge. Clinical nurses are encouraged to use education materials along with verbal discharge instructions, and a teach-back method can be included as a standard part of the discharge instructions (Eltorai et al., 2014).

The Agency for Healthcare Research and Quality found that patients who have a clear understanding of their after-hospital care instructions are 30% less likely to be readmitted or visit emergency departments than patients who lack education regarding the care of catheters, tubes, drains, and medications (Ledue, 2009). Hospital stays can be a confusing and stressful time for patients; therefore, it is important that clinicians ensure that patients are prepared to leave the hospital with necessary information to care for themselves and recover at home.

The patient education handout is a widely used means of providing care information to patients when they transition to home. It is important for authors to use short sentences and conversational styles in order to improve the readability and comprehension of written text in patient education materials. Readability can also be improved by selecting familiar words and using them consistently (Badarudeen & Sabharwal, 2010). It is also important to customize health-related education materials that match an individual patient's reading skill level. Currently, most organizations recommended that the readability of patient education materials be no higher than the sixth- to eighth-grade level (Badarudeen & Sabharwal, 2010). A readability tool can be used to assess patient education materials to determine whether they are at the sixth-grade reading level.

Patient education materials can be presented in different formats, including full-color pictures, handouts, brochures, graphics, and charts to help patients understand their conditions and reinforce important messages regarding care. Every healthcare facility is encouraged to specially design patient education materials on a variety of healthcare topics in different forms that can be made widely available for their patients. The educational topics should be designed in consideration of patients' specific cares and needs to provide them with relevant, consistent information to facilitate self-care or care by their family and friends.

Patient education materials educate and promote patient preferences, allow patients to engage in their medical care and treatment decisions, and often reduce costs and lead to better outcomes. Moreover, these are helpful educational tools that enable nurses to thoroughly prepare and empower patients for self-care after discharge. The patient education center indicates that no specific education handout for venting G-catheter care exists; therefore, care for this particular type of catheter is categorized collectively under the management of non-vascular percutaneous catheters. Upon discharge, nurses and healthcare team members educate patients regarding their medications, diet, activities, and care of specific tubes if they are discharged with a catheter. The effectiveness of discharge education can be enhanced by employing associated educational materials and customizing patient education handouts can help in preventing complications (e.g., infections) for patients discharging from hospitals while preventing equipment malfunctions. General information on dressing change procedures, including changing supplies and flushing instructions should be specific for percutaneous catheters. Normal saline or soap and water is used for cleaning of the catheter site (Fernandez & Griffiths, 2012).

Previous studies have demonstrated the effectiveness of educational handouts for patient self-care. Pascual et al. (2015) assessed whether patient education materials on epilepsy self-management and seizure first aid reduced epilepsy-related ER visits in the four months following patient education. The study concluded that providing patients with educational handouts on epilepsy care, seizure first-aid, and determining when an ER visit is warranted was correlated with a significant decrease in ER visits. The findings of the study support the hypothesis that patient education is a valuable tool for reducing ER utilization, which may, in turn, reduce healthcare costs (Pascual et al., 2015).

Morgan et al. (2013) conducted a systematic review of the effect of patient education on various medical conditions. The researchers found significant reductions in ER use (ranging from

21% to 80%) following interventions. The interventions examined included the use of booklets, e-articles, and in-person educational sessions. Three studies reported on non-ER use, with one study finding a 3% increase in clinic visits per person and a reduction in ER use; all three studies reported on health outcomes, and no significant adverse events were noted (Morgan et al., 2013). Eltorai et al. (2014) studied the readability of patient education materials and found that clear instructions and non-technical text could improve patients' understanding and positively affect health outcomes.

Kripalani et al. (2007) studied the importance of patient education using both verbal and written communication as a means of improving patient care. They found that communication could significantly reduce medical errors in the post-discharge transition period from hospital to home. The authors indicated that discharge counseling should concentrate on a few key points that are most important to patients, such as diagnosis, medications, follow-up appointments, and self-care instructions—including whom to contact if problems develop. Healthcare staff, including nurses, pharmacists, physical therapists, occupational therapists, and nutritionists, should be involved in reinforcing these key points.

Providing suitable patient education materials is important for nurses to be able to guide patients in the type of care needed at home. Graham and Brookey (2008) suggested that written materials should be created in a patient-friendly manner to promote increased comprehension. In practice, this means using simple words, short sentences in bulleted format, and ample white space. In addition, medical jargon should be avoided, and simple pictures should be used. Finally, written materials should emphasize what patients should do and avoid inclusion of unnecessary information. Suter et al. (2009) proposed that the professional responsibilities of nurses include obtaining knowledge through the use of available resources and effective communication. All

professional responsibilities are core competencies necessary for collaborative, patient-centered practice to achieve positive outcomes for patients and providers.

Venting G-Catheter or Percutaneous Venting G-Catheters: Indications and Use

Percutaneous is defined as passage through the skin by needle punctures, including the introduction of wires and catheters (Percutaneous, 2012). A percutaneous venting G-catheter is commonly used for stomach decompression and may also be called a venting gastrostomy tube. Venting G-catheters are used to significantly reduce the symptoms of nausea and vomiting in patients with MBO due to primary GI malignancies in which metastasis to the bowel has caused obstructions (Teriaky et al., 2012). The common symptoms of MBO are abdominal pain, abdominal distention, bloating, nausea, and vomiting. Placement of a venting G-catheter improves symptoms and quality of life in patients with an MBO. The associated complications of venting G-catheters include infection, leakage around the site, cellulitis at the site, non-intact sutures, and accidental pullout. Nurses are considered to be the most influential team members and play a critical role in preventing issues related to venting G-catheters. Clinical nurses regularly perform venting G-catheter care throughout patients hospital stay and provide education to equip both the patient and their family for continuing care at home.

Spector (2012) indicated that education materials for management of venting G-catheters should include routine care such as assessing sites for abnormalities, stabilizing or securing the tube, cleaning the skin around the tube with mild soap and water, and changing dressings every other day or as needed for soiled dressings. Nursing assessment includes evaluation of the gastrostomy site for redness, swelling, induration, tenderness, or any drainage (including amount and color), as well as ensuring that the tube is not too loose or too tight (Spector, 2012).

Farber (2014) reviewed basic gastrostomy care materials and tools, highlighted goals of the materials, ensured their portrayal of basic care of a child with a venting G-catheter, and

demonstrated important information that nursing staff should know. The materials covered basic care of a child with a feeding or venting G-catheter, clarified the different catheter types, daily care and use of venting G-catheter, and indicated how to troubleshoot common problems. The materials also included pictures, hands-on work skills, and nurses' responsibilities for safe delivery of care to their patients (Farber, 2014).

Tuca et al. (2012) found that patients with venting G-catheter placement had a 94–98% success rate for GI symptom control. These patients achieved adequate control of symptomatology in 84% of cases over a mean time of 70 days, even in cases presenting with peritoneal carcinomatosis, ascites, or gastric infiltration (Tuca et al., 2012).

Laval et al. (2014) performed a systematic literature review to develop a practice guideline for indications and uses of the various available treatment options for relieving intestinal obstructions or their symptoms in patients with peritoneal carcinomatosis. The study found that venting gastrostomy is very rarely indicated for patients with malignant small bowel obstruction and should only be considered as a last resort. Nearly 15% of all gastrostomy procedures are venting gastrostomies, which are mainly indicated by the presence of a high obstruction resistant to medical treatment, accompanied by intractable nausea and vomiting (Laval et al., 2014). Medical interventions can be used to achieve initial resolution of an obstruction and for aggressive management of obstructive symptoms with corticosteroids alone or in combination with additional drugs (Laval et al., 2014).

Lyons and McQueen (2015) investigated the difference between feeding catheters and venting G-catheters. They found that venting G-catheter insertion performed either endoscopically or under IR to vent (as opposed to enteral feeding) are usually placed lower in the gastric anatomy. The venting G-catheter is inserted to remove gastric contents and help relieve nausea and vomiting where a total bowel obstruction or stasis is present. The venting G-catheter

is primarily used in a more terminal stage of a malignant disease to provide symptomatic relief of nausea and vomiting as well as ease obstructive GI symptoms in most patients with advanced gynecologic cancer and MBO. The venting G-catheter also allows most patients to have end-of-life care at home or an inpatient hospice, in addition to cost-effective procedures associated with low morbidity and mortality.

Shaw et al. (2013) reported that MBO is a common manifestation in individuals with advanced intra-abdominal or pelvis-related cancers. Palliative relief is achieved by the use of a venting G-catheter. MBO is a common complication of various advanced malignancies, particularly pancreatic, colorectal, and peritoneal carcinomatosis of ovarian cancer. Treatments focus primarily on both alleviating the obstruction and managing symptoms. Shaw et al. (2013) also reported that the etiology of bowel obstructions in patients with advanced cancer is multifactorial but primarily results from mechanical compression of bowel loops or impairment of bowel peristalsis, frequently manifesting as extensive peritoneal carcinomatosis in patients with terminal cancer. Most patients present with persistent GI symptoms of obstruction, including abdominal pain, abdominal distention, nausea, and vomiting.

Teriaky et al. (2012) researched the advantage of using percutaneous venting G-catheters or decompression of malignant gastrointestinal obstructions. Venting gastrostomy allows patients to spend most of their final palliative time at home and is effective at controlling refractory nausea and vomiting caused by malignant gastric outlet or small bowel obstruction (Teriaky et al., 2012)

Dalal et al. (2011) detailed decompression or venting G-catheters, which allows patients to have intake of liquids and soft foods orally while the device is clamped for 30–60 minutes. A percutaneous venting G-catheter is placed either endoscopically or fluoroscopically to palliate the obstructive GI symptoms and avoid the need for nasogastric suction, allowing terminally ill

patients to be cared for at home or in hospice. The fluoroscopic-guided placement of a percutaneous venting G-catheter is also used to palliate advanced oncology patients with malignant bowel obstruction (MBO) through possible gastric decompression (Dalal et al., 2011). Intra-peritoneal catheters can also be used to manage ascites and facilitate placement of a venting G-catheter.

Venting G-Catheter-Related Complications

Common venting G-catheter-related issues include catheter malfunction, redness and swelling at the tube site, catheter-site infections, non-intact stitches, blocked or clogged gastrostomy tubes, and accidental withdrawal. Clogged catheters cause recurrent nausea, vomiting, abdominal pain, and abdominal distention that can lead to increased ER visits and associated increased healthcare costs.

Shaw et al. (2013) found that most complications (70%) related to decompression, venting gastrostomy, or palliative venting G-catheters appear after discharge. In their study, the longest time to complication was 90 days after placement in a patient who developed an enterocutaneous fistula. The venting G-catheter passed through the small bowel, and the patient became symptomatic only after the catheter was removed. Fifty-one patients were discharged home, 26 of whom received home hospice services. Of the remaining patients, 16 were discharged to an inpatient hospice facility, 2 to long-term acute care facilities, and 3 died in the hospital at 1, 14, and 44 days after decompression or venting G-catheter placement. Mortality data indicated 95.7% survival (67 of 70) of patients who underwent successful catheter placement. The median overall survival time was 28.5 days (Shaw et al., 2013).

Feil (2017) reported that although nurses are primarily responsible for the care and maintenance of percutaneous venting G-catheters, such care was not often included in nursing

skills textbooks. Every institution should have in place standard recommendations on best practices and strategies to decrease risks associated with securing and properly positioning venting G-catheters and preventing, recognizing, and managing dislodgements (Feil, 2017). It is important to teach patients and family members proper venting G-catheter care, including steps to prevent, recognize, and manage dislodgements. Feil (2017) found that in order to provide optimal care for patients with venting G-catheters, nursing staff must have access to current nursing textbooks and procedure manuals that reflect best-practice evidence. Patients receive better care when nurses have the necessary resources to deliver excellent care and use evidence-based approaches in clinical practice settings.

Malhi and Thompson (2014) explored the management of blocked percutaneous catheters and found that blocked tubes are detrimental to patients. Nurses are the immediate care providers for patients with post-percutaneous catheter placement and generally identify and manage complications post-operatively. The most common complications discussed in the study related to percutaneous catheters or non-vascular tubes included infection at or around the site, coupled with discharge, pain, or discomfort (Malhi & Thompson, 2014).

Mori et al. (2009) found that complications associated with venting G-catheters can be prevented through early venting G-catheters and that early signs and symptoms must be brought to the attention of healthcare providers. Their study suggested that management of complications requires the use of healthcare resources that often can be found only in acute care settings and may necessitate referral to IR or endoscopy (Mori et al., 2009).

Malignant Bowel Obstruction (MBO)

MBO generally has a poor prognosis, particularly in patients with advanced GI or gynecologic cancers with metastasis to the small or large bowel. Multimodal treatments may be used to relieve symptoms in patients with MBO; however, there is no consensus regarding the

optimal treatment and no strong evidence that supports the efficacy of any one treatment in improving patient quality of life or prolonging survival. Although MBO is considered a common palliative care problem in clinical practice, achieving a consensus on its management is difficult, as treatment selection can be affected by the location and degree of obstruction, cancer stage, patient functional status, survival time, and comorbidities (Chen et al., 2013). In patients with intractable symptoms, placement of a nasogastric tube (NGT) or venting G-catheters can be considered to provide relief. Side effects of NGTs are generally limited to mild discomfort related to placement, and they are usually considered for short-term use due to related complications, including aspiration pneumonia, mucosal irritation, mucosal ulceration, pharyngitis, and sinusitis. When removal of an NGT is unfeasible, venting gastrostomy placement via endoscopic or interventional radiologic guidance is a reasonable alternative. Palliative venting G-catheter placement should be considered early due to the safety of the procedure (Chen et al., 2013).

Soriano and Davis (2011) determined that treating MBO requires a highly individualized approach tailored to each patient's medical condition, prognosis, and care goals. Surgery should not be done routinely, and less-invasive approaches such as gastric and colonic stenting may be useful. A venting G-catheter should be considered if drug therapy fails to reduce nausea and vomiting to acceptable levels. A nasogastric tube can be used only as a temporary measure until symptoms are controlled medically or a venting G-catheter is placed. Oncologists may also consider total parenteral nutrition for patients with intermediate life expectancy who may otherwise die of starvation. Patients with poor performance status, rapidly progressing disease, peritoneal carcinomatosis, life expectancy of less than 30 days, or multiple levels of obstruction would benefit from placement of a percutaneous endoscopic venting G-catheter rather than surgery if symptoms do not respond to drug therapy.

Importance of Educating Nurses on Patient Education and Improving Nurses' Knowledge

Aghakhani et al.'s study (2012) found that patient education is an essential nursing practice standard that meaningfully impacts a patient's health and quality of life. Nurses must have optimum knowledge on care of the venting G-catheter in order to adequately prepare patients for self-care at home. Training nurses about patient education and the use of available materials can increase nurses' knowledge and improve nurses' performance. Aghakhani (2012) determined that the failure to adequately educate patients may be attributed to a lack of patient adherence, deficiencies in nurses' knowledge and skills, or insufficient funding. It is important that nurses develop and master information-seeking skills so that they can access and find information resources that can be offered directly to patients and caregivers. Nonetheless, some patients and caregivers may doubt that their information needs are adequately addressed because the resources may not be available in the clinical unit (Jones et al., 2011). It is clear that educating nurses has the potential to improve their knowledge and ultimately the care of hospitalized patients.

Lehwaldt and Timmins (2007) examined the need for nurses to have in-service education in order to provide the best care for their patients. Their study discussed how to identify nurses' level of knowledge with regard to drain management and ascertaining how nurses remain informed about developments related to the care of patients with different drains. Nurses are encouraged to identify educational needs as a means of improving resources and to seek out in-service and web-based education through ongoing professional development (Lehwaldt & Timmins, 2007).

A study conducted by Gemmil et al. (2011) discussed providing ongoing nurse education concerning colorectal cancer ostomy care through continuing education involving teaching methods such as educational videos, handouts, and other educational materials. The authors reported that care of colorectal cancer ostomy patients is complex and includes both specialized

care of the ostomy and teaching patients to care for themselves after discharge. Patient care also involves providing supportive educational materials and resources for use after discharge. Educational needs for nurses in this area are especially high when low-volume patients, such as colorectal patients with an ostomy, are involved (Gemmil et al., 2011).

Assistive Tools

Assistive tools such as interactive educational sessions and care reminders have proven effective in producing professional behavior changes, which in turn improves nurses' knowledge assessment survey results. Survey questionnaires are effective tools commonly used to collect, analyze, and interpret information obtained from a group of people from a particular population. Surveys can be used to assess thoughts, opinions, and feelings, thus allowing respondents to express their views openly; they are used commonly among medical school students in the healthcare field.

Shehab (2017) evaluated nurses' knowledge in relation to key components of urinary catheterization and care. The study determined that professionals must have updated knowledge related to the specific management of patient care. The data collection tool used was a structured survey questionnaire and nurses' knowledge assessment. The study also recommended providing in-service education for nurses to update their knowledge related to care of patients undergoing catheterization and any associated problems, which would promote patient care. Statistically significant improvements in the total score measuring nurses' change in knowledge regarding care of patients undergoing urinary catheterization were observed.

Eltorai et al. (2014) noted that health literacy is the capacity to obtain, interpret, and understand basic health information and services as a means of enhancing personal health. The average American adult reads at an eighth-grade level. Approximately 47% of adults in the

United States "experience considerable difficulty in performing tasks that required them to integrate or synthesize information from complex or lengthy texts" (Eltorai et al., 2014). Nearly one-fifth of adults in the United States cannot comprehend text written at a fourth-grade level. The reading comprehension level is an indicator of how "readable" written text must be so that readers can understand it.

As mentioned earlier, the Flesch-Kincaid Grade Level (FKGL) formula is a commonly used, validated instrument for determining the readability of written materials in the context of U.S. academic grade levels (Eltorai et al., 2014). An individual's health literacy is an independent predictor of his or her health-related quality of life, with low health literacy associated with increased frequency of hospitalization, increased complications requiring more hospital attention, poor understanding of disease conditions, and an overall increase in healthcare cost.

The FKGL formula was used to develop a patient education handout for the care of venting G-catheter. The FKGL, created by Rudolf Flesch in 1975, uses a target score of <8–10 as a way to interpret a United States grade level from the Reading Ease Formula. Flesch originally created this formula for the U.S. Navy to use in analyzing the readability of their technical materials. The test is designed to indicate the difficulty of understanding a given passage of text written in English. The tool reports scores greater than 12 as 12. FKGL readability scores are the most widely used and trusted of all readability scoring formula and, therefore, ideal for general usage (Linney, 2017).

The Qualtrics Online Questionnaire Survey is a web-based tool used to create and distribute survey instruments, administer surveys, store survey data, and conduct analyses. Qualtrics can also be used for teaching, evaluating programs, planning events, voting, and obtaining general feedback within a clinical department. Qualtrics is the standard software used to create and distribute surveys at this study institution. MDACC has current protocols, policies, and

procedures related to the use of online surveys for research, especially in relation to Institutional Review Board (IRB) approval, which applies to QI projects involving both patients and non-patients (see Appendix A).

Synthesis of Literature Review

The literature review provided information necessary to draft recommendations for developing a patient education handout describing the care of venting G-catheters for patients with MBO. Many studies support nurses' use of descriptive education materials to provide information to patients and family members in addition to face-to-face communication. Written documentation ensures important facts are imparted to patients and enhances patients' understanding and recall of information at a time when their memory might be compromised. For cases in which surgery for MBO is impossible, medical management may help bring about resolution of the symptoms. The literature review also indicated that patient education handouts describing venting G-catheter care are crucial for empowering patients, as they give patients the confidence to ask questions, learn about their condition, and ultimately engage in the types of self-care behaviors that are crucial to successful recovery and disease management.

The main goal of MBO management is palliation of symptoms in order to improve patients' quality of life. There is evidence that the use of venting G-catheters can alleviate nausea and vomiting with low complications rates and may be considered in combination with medications when prognosis for survival is greater than two weeks. Patients must be adequately prepared and informed in order to manage their disease, receive instructions from their physicians, and become aware of the potential side effects of any intervention. Patients with venting G-catheters should have adequate knowledge about what type of care to continue after

discharge and what they can expect in terms of reduced disruptions in daily function. The literature indicated that the use of patient education materials is the most effective way for patients to understand the abovementioned information and to feel confident in their knowledge.

CHAPTER III

METHODS

Introduction

The Quality Improvement (QI) project was conducted at MD Anderson Cancer Center, a renowned cancer center located in Houston, Texas, that ranks among the worlds' leading cancer research hospitals. MDACC is a magnet institution that encourages its employees to engage in quality improvement (QI) projects and supports evidence-based QI projects.

Health literacy and patient satisfaction play a major role in determining healthcare outcomes. It is the responsibility of all healthcare providers and clinical nurses to ensure that patients are educated about both the care they receive during their hospital stay and what they should continue doing after discharge. Use of patient education materials (e.g., handouts) could lead to improved comprehension, compliance with self-care, and better outcomes, all of which may ultimately lead to decreased ER visits. Educating patients on their health needs and self-care has positive health effects. Patient education will reduce the number of unnecessary ER visits, phone calls to physicians, and hospital visits, thus reducing costs and time spent per patient for healthcare organizations.

IRB approval was obtained from Prairie View A & M University. The study was classified as a QI project, and there were no research subjects involved; therefore, the study was considered exempt from the IRB approval process. The QI project was accepted, and an approval letter was provided by the Quality Improvement Approval Board at MDACC to gain access to and obtain data related to venting G-catheter complications at the hospital. Data were collected through IT services; confidentiality of patient health information was maintained in accordance with the Health Insurance Portability and Accountability Act (HIPAA) Privacy Rule. Patients' demographic data and medical record numbers were protected. No name, age, or medical record

numbers were used. The goals of this project were to create an MDACC-designed patient education handout for the care of venting G-catheters as a patient education resource and to improve clinical nurses' knowledge on the care of venting G-catheters. Clinical nurses who work in oncology units should possess the best knowledge for educating their patients on the home care of venting G-catheters in order to achieve improved patient outcomes. One way to improve the process of educating patients on self-care is by developing patient education materials that include handouts on specific health-related topics.

At MD Anderson Cancer Center, many GI cancer and gynecologic cancer patients undergo placement of venting G-catheters. About 10% of these patients are seen at some point in the emergency center for complications related to their venting G-catheter. These complications include leakage, infection, skin irritation, and dislocation requiring interventions ranging from topical management to full exchange of the venting G-catheter. Such interventions also may involve hospitalization for management, including intravenous antibiotics and venting G-catheter exchange in Interventional Radiology (IR). Currently, all percutaneous tubes, including venting G-catheters, are placed in IR, and ambulatory patients recover in and are discharged from the Post-Anesthesia Care Unit (PACU). Conversely, hospitalized patients are most commonly admitted to the regular floors. Gastrostomy tube-related complications are thus costly for both patients and institutions.

Project Design

This QI project focused on the creation of a patient education handout for patients with venting G-catheters using evidence-based recommendations on the care of venting G-catheters. Through informal discussions with the associate director, nurses, and clinical nurse leaders in the medical oncology (G22) unit, the importance of developing a specific patient education handout for the care of venting G-catheters was established. A web-based questionnaire survey was

created using Qualtrics to obtain data on nurses' knowledge regarding the care of venting G-catheters to develop the patient education handout. The institution has current protocols, policies, and procedures related to the use of online surveys for research that remain in place, especially as they relate to IRB approval, which in turn relates to QI projects involving both patients and non-patients. The instrument used for the project was a survey questionnaire administered via Qualtrics to assess nurses' knowledge regarding the care of venting G-catheters and the need to create a patient education handout for use in the discharge process. The survey questionnaire was distributed to nurses in the medical oncology unit using MDACC's group e-mail for clinical nurses, which included all RNs on the unit.

This QI project involved four phases:

1. Perform a systematic review of the literature regarding the use and complications of venting G-catheters.
2. Use the percutaneous catheters report link to determine the number of patients who visited the ER monthly and annually with complications associated with venting G-catheters.
3. Obtain information from expert clinical nurses using a nursing knowledge survey.
4. Validate the readability of the patient education handout using validated indices (Flesch-Kincaid) to calculate the grade reading level of the written material.

Phase 1: Systematic Review of the Literature Regarding the Care of Venting G-catheters

The project involved a preliminary systematic search conducted using the Medline, PubMed, and Google Scholar databases for the years 2007 through 2017. The initial search produced over 3,630 articles, but the exact match included only 331 articles that were reviewed and used for the study. The results of the Medline database search produced more abstracts than

PubMed or Google Scholar, but no full articles, which prevented further searches for the management of venting gastrostomy.

The search was conducted to identify current evidence-based reports published in the last 10 years related to patient education materials, venting G-catheters, catheter use, and related complications. The insertion of venting G-catheters is not a common procedure among oncology patients with MBO. The search of Google Scholar produced limited applicable results using key terms pertaining to patient education, percutaneous catheters, venting G-catheters, and patient education handouts. The search of Google Scholar using key terms for topics related to palliative venting gastrostomy returned approximately 1,900 articles, but the topics were not specific to patient education materials for venting gastrostomy care or management.

A search using with the same database was filtered and narrowed to return articles on care of venting G-catheters in patients with MBO, yielding 15,200 results. Of this total, most articles centered on when to consider venting gastrostomy or venting gastrostomy complications. Few articles focused on how to reduce symptoms of MBO and to reduce discomfort from a nasogastric tube via medical management. Some articles discussed the management of bowel obstructions and described venting G-catheters as long-term alternatives to maintain an NGT, but care of venting G-catheters was absent. Results of a Google Scholar search for self-care of venting G-catheters yielded approximately 3,630 articles, with advantages of patient education handouts producing 18 matches, EBSCO is an abbreviation for Elton B. Stephens Co., founded by Elton Bryson Stephens Sr. (1911—2005), a provider for many databases (EBSCO (n.d.)). EBSCO produced 47 matches, and a search of the advantages of patient education handouts yielded 331 articles as presented in Table 1. Some articles were found that described venting G-catheters, but these articles did not detail specific care of venting G-catheters.

Table 1

EBSCO Search Results

Topic	Number of Matches		
	Google Scholar	PubMed	Medline
MBO and Medical Management	1,900	30	83
Management of Venting G-catheter/Self-care	3,630	5	58
Patient Education Handouts/Materials & Improved Patient Outcomes	8,030	18	47
Advantages of Patient Education Handouts	17,000	9	331
Assistive tools	320,000		
Importance of educating nurses and improving knowledge	217,000		
Inclusion Criteria	*		
Exclusion Criteria	**		

* Included only specific results related with full articles

**All abstracts not relevant to topics were excluded and resulted in few matches, filtered by specific year

Phase 2: Obtain Data on the Number of Patients Who Visited the ER with Gastrostomy Drain Complications

Drain complication data were obtained using an intranet MDACC file known as the "percutaneous catheters report", which does not contain sociodemographic or personal identification data. The report link indicated the number of patients who came through the ER with drain complications from January 2018 until August 2019 was 191. The data obtained through this process supported the development of this patient education handout to help patients and their families educate themselves and encourage self-care of venting G-catheters, drains, tubes, or catheters. Table 2 shows the number of patients visiting the ER annually with venting G-catheter-related complications.

The intranet MDACC percutaneous catheters report link was accessed to determine the number of patients that visited the ER with venting G-catheter-related complications from January 2018 until February 2019, yielding a total of 279 patients. Table 2 shows the number of patients that came to the ER with venting G-catheter-related complications.

Table 2

Patients Visiting The ER Per Month With Venting G-catheter Complications

Timeframe	Number of ER Visits Per Month	Average monthly patient population
	Pre-intervention	
Jan-2018	17	814
Feb-2018	24	713
Mar-2018	-	-
Apr-2018	23	804
May-2018	24	862
June 2018	24	750
July-2018	28	830
Aug-2018	12	569
Sept-2018	23	697
Oct-2018	29	811
Nov-2018	22	708
Dec-2018	19	796
Jan-2019	15	743
Feb-2019	19	680
Total Jan-18 to Feb-19	**279**	**9777**
Mar-2019	19	817
Apr-2019	16	78

Table 2 continued

May-2019	19	811
Jun-2019	13	823
Jul-2019	16	752
Aug-2019	18	754
Sep-2019	12	772
Oct-2019	17	775
Total Mar-19 to Oct-19	**130**	**6285**

Table 2 displays the number of ER visits by month relating to venting G-catheters beginning in January 2018. The number is fairly constant, with 17 patients in January, 24 in February, 19 in March, 23 in April, 24 in May, 24 in June, 28 in July, and 12 in August.

Phase 3: Expert Clinical Nurses Knowledge Assessment Using The Qualtrics Survey

A 13-item Qualtrics survey questionnaire was developed based on the results of a review of current literature regarding the care of venting G-catheters; this survey was used to assess nurses' knowledge regarding the nursing care of venting G-catheters. Both pre- and post-education session assessments of nurses' knowledge were carried out using a questionnaire survey. The questionnaire took 5–10 minutes to complete. Before administering the questionnaires to assess nurses' knowledge regarding the care of venting G-catheters, a pilot assessment was conducted with five nurses who were skilled in the content area and with more than five years of oncology experience; their knowledge was incorporated into the survey

questions before its dissemination to the study population. They reviewed the questionnaire survey for clarity, understandability, and ease of administration; these five expert nurses were excluded from the study sample. The nurses also asked to provide feedback and opinions about current practices regarding venting gastrostomy care and complications for inclusion in the patient education handout. All five nurse participants in this pilot assessment reported that the survey questionnaire was suitable for the given purpose, and only minor changes suggested.

These modifications were made based on informal feedback from the nurses prior to dissemination of the survey to the study population. An initial invitation email to participate in the survey was sent to 67 nurses who work in the oncology unit; however, complete pre- and post-test data for the analysis were available for only 30 nurses. Of the 67 subjects, 42 individuals participated, but only 30 nurses completed the full pre and post survey. These values corresponded to a participation rate of 44.8%. The survey was made available for two months, with monthly reminders via work email.

Interactive Education Session

A short interactive education session was conducted with a group of nurses working in the medical oncology unit regarding the content of the patient education handout. The pre- and post-survey was administered in conjunction with an interactive education session for the clinical nurses. These sessions lasted approximately 15–20 minutes each. The key concepts of venting G-catheter management were reviewed and evaluated using the pre- and post-knowledge assessment survey questionnaires. In addition, a 4-item demographic questionnaire was administered post-testing, and a 7-item questionnaire was administered at baseline only. The post-test survey was administered immediately after the educational session using the education handout (Algarni et al., 2019). The survey consisted of 13 items and included both multiple choice and "check all that apply" questions (Fattah et al., 2018).

The first session of the survey collected socio-demographic data pertaining to the nurses via open-ended questions regarding age, educational level, and experience by years. The second session assessed the nurses' knowledge regarding the care of venting G-catheters. The nurses' knowledge assessment survey questionnaire was designed based on the results of a review of the recent literature to assess the nurses' knowledge regarding nursing care provided to patients undergoing gastrostomy or placement of different types of catheters. Knowledge data were collected via the Qualtrics survey using multiple-choice questions, and the survey responses were collected from the nursing staff via institutional email. Participation in the survey was voluntary, and the survey was sent prior to the educational session.

Phase 4: Validating the Readability of the Patient Education Handout Using Validated Indices (Flesch-Kincaid)

The FKGL formula is a validated instrument commonly used to determine the readability of written materials according to United States academic grade level (Eltorai et al., 2014). The grade reading levels of the materials used in the patient education handout were validated using an online readability calculator. The web-based Flesch-Kincaid Index was used to analyze the grade level of English text for the QI study to calculate the grade reading level. Readability indices are mathematical formulas used to assign passages of text a grade reading level based on word and sentence length. Word length is a proxy for semantic or meaning difficulty, and sentence length is a measure of syntactic complexity (Eltorai et al., 2014).

The patient education handout on the care of venting gastrostomy was prepared (see Appendix A), and the staff coordinator from the patient education center was asked to assist with the readability grade level assessment using the designated tool for patient education materials at MDACC. The patient education handout was then reviewed by subject-matter experts, including

an interventional radiologist, a general internal medicine physician, a nurse educator, and experienced registered nurses in the oncology unit.

Validity and Reliability of the Survey Instrument

Measurement, measuring tools such as surveys and questionnaires are assessed for content validity before use to ensure that they measure the intended variable (McLeod, 2013). Content validity refers to the accuracy with which survey questions measure various aspects of the specific constructs in the question, and it is typically assessed by subject-matter experts (Clause, 2017). Reliability refers to the extent to which an instrument is consistent in measuring a concept. Reliability is directly related to the validity of the measure. Cronbach's alpha is one measure of the strength of internal consistency (Goforth, 2016). A minimum alpha coefficient of 0.65–0.8 is recommended for most studies, with a value of less than 0.5 considered unacceptable (Goforth, 2016). Reliability is the extent to which a questionnaire, test observation, or any measurement procedure produces the same result in repeated trials. In summary, it is the stability or consistency of scores over time or across raters.

The reliability of the survey instrument in the present study was established by computing an internal consistency reliability score using statistical software. The Cronbach's alpha value assessing the internal consistency of the scale was 0.686. Validity was established using a pilot assessment with five nurses with expertise in survey instruments and venting G-catheter care. These five experts evaluated the appropriateness of the Qualtrics survey instrument, its clarity and understandability, time require to complete the survey, potential flaws, and ease of administration. The content of each question was examined for accuracy.

The reliability of the tool examined by calculating Cronbach's alpha value to assess the internal consistency of the scale. The suggestions of the five-nurse expertise with more than five

years of oncology experience incorporated into the survey questions before its dissemination to the study population. These five expert nurses were excluded from the study sample.

Data Analysis

A descriptive statistical analysis was performed using sociodemographic information gathered from chart reviews. The information gathered from the first and third phases of this project helped generate the patient education handout on care of the venting G-catheter. The survey questionnaire data regarding the assessment of nurses' knowledge upon the completion of survey was also statistically analyzed. Appropriate statistical tests included the chi-square test for assessing the significance of differences in proportions in contingency tables and the McNemar test (Agresti, 2012) to evaluate the significance of differences between proportions when paired data were used. In addition, the Wilcoxon test (Agresti, 2012) was more appropriate for analyzing ordinal level data, such as that collected using Likert-type items (Agresti, 2012). The analyses indicated that changes in each Likert-type item were statistically significant at an alpha level of 0.05.

Ethical Considerations

This project was an educational initiative that did not involve any patient contact. An informal inquiry using the intranet percutaneous catheter report was performed to evaluate how many patients returned due to drain complications. The chart review process was informal, and confidentiality of medical record numbers, age, and name was not applicable to this inquiry process. The Qualtrics survey system was used for survey administration and collection of data regarding the assessment of nurses' knowledge on the concepts of the patient education handouts. The Qualtrics survey was able to meet HIPAA guidelines, MDACC compliance, legal

benchmarks, and information security department guidelines (University of Texas MD Anderson Cancer Center, 2016). Confidentiality of patient health information in accordance with the Privacy Rule of the HIPAA was maintained. There was no risk of coercion since the survey was voluntary and directly administered to the subjects via an institutional email with a link to the survey. Participants were sent a link to the assessment (see Appendix B), and MD Anderson QI approval was obtained (see Appendix C). The purpose of the survey was clearly stated, and the Principal Investigator's contact information was provided in the initial and reminder emails along with a link to opt out of the survey (see Appendices D & E). Participants consented by completing the survey, which was clearly stated in the initial survey request email (see Appendix D). Prairie View A&M IRB approval was obtained prior to conducting the study (see Appendix F).

CHAPTER IV

RESULTS

The goal of this project was to improve the quality of care for patients who use venting G-catheters by establishing a new organizational process to improve nurses' capability to deliver effective patient education. The QI project focused on providing training to nurses about proper use of venting G-catheters, approaches to patient education, and development of patient education handouts.

Table 2 presented earlier shows the number of patients who received venting G-catheter placement or venting G-catheter care and visited the ER before and after the intervention. Based on a cross-tabulation table, the pre-intervention number of patient-months (n = 9,777) was notably larger than the post-intervention number of patient-months (n = 6,285), because only approximately six months passed after implementation of the intervention. In contrast, data were available for 13 months pre-intervention. These data indicated a statistically significant decrease between the pre- and post-intervention rates (2.85% versus 2.07%) as indicated by chi-square test: $\chi^2 = 9.51$, $p<0.01$. The chi-square test was used to evaluate the independence between the time periods before and after the intervention and visit to the ER. A statistically significant result here would indicate that the proportion of patients who visited the ER with venting G-catheter complications differed before and after the intervention. An examination of Table 4 suggests that the rate of venting G-catheter-related visits to the ER decreased after implementation of the intervention. As indicated by the chi-square test, the decrease was statistically significant.

Table 3

Cross-tabulation By The Intervention And ER Visits

	Pre-intervention		Post-intervention		Total
Visited ER	279	2.85%	130	2.07%	**409**
No visit to ER	9,498	97.15%	6,155	97.93%	**15,653**
Total	**9,777***		**6,285***		**16,062***

**These figures represent the number of patient-months.*

ER Visits

The analysis of the potential impact of the intervention on venting G-catheter complications that required an ER visit had limited data to fully assess this impact. Although the total number of ER visits with venting G-catheter-related complications was known, it was not known with certainty whether the patients who made a visit to the ER were all from the same facility IR unit where the intervention took place or from some other healthcare facility. Nonetheless, the latter is believed to have been unlikely; and even if there were outside patients, then the number of these patients would be negligible and relatively constant over the study period. Hence, the presence of the outside patients was unlikely to influence the outcome of this analysis.

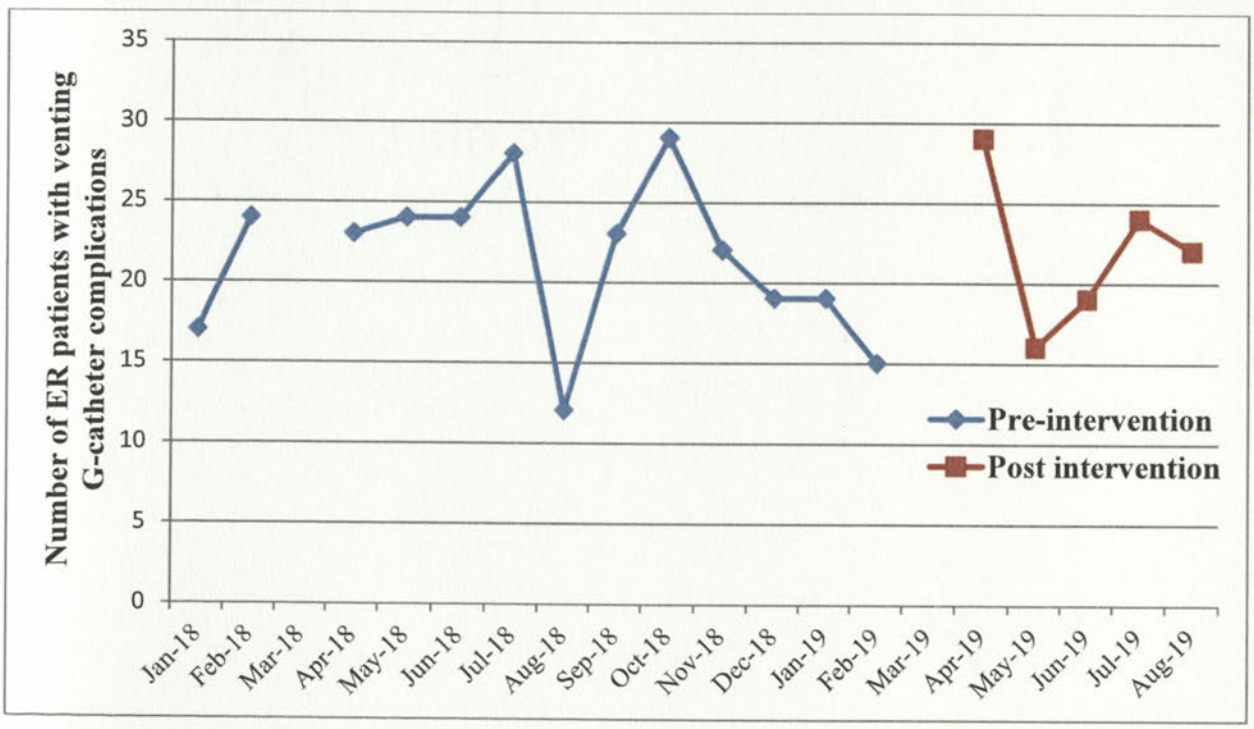
The next step of the analysis examined monthly ER visit rates. The ER visit rate was computed by dividing the total number of patients with venting G-catheter-related complications by the total number patients with gastrostomy catheters. Table 3 shows the rates of ER visits for G tube patients. On average, 2.85% of patients with venting G-catheters made ER visits during

the pre-intervention period. After implementing the intervention, the rate decreased to 2.07%. This change corresponds to an odds ratio of 0.72 (95% confidence interval, 0.59 to 0.90). This odds ratio can be interpreted as a 28% reduction in ER visits following implementation of the intervention.

The following descriptive and inferential statistics were used to assess clinical nurses' knowledge regarding the care of venting G-catheters and identify areas needing improvement.

Figure 2

Rates of ER Visits Due To Venting G-catheter- Or Percutaneous Venting G-catheter-related Complications



Description of Sample/Demographic Variables/Completion Rate of the Survey

Table 4 presents demographic characteristics of the sample. The data indicated that nurses were predominantly female (90%), and only 10% were male. Two-thirds of the nurses were between 25 and 44 years old. Ninety percent of the participants had nursing experience that exceeded five years. The duration of experience in the oncology unit was generally shorter, as 60% of nurses had equal to or less than 5 years of experience in the oncology unit.

An initial invitation email to take the survey was sent to 67 nurses; however, complete pre- and post-test data for the analysis was available for only 30 nurses. These values corresponded to a participation rate of 44.8%. Moreover, the survey was made available for two months, with monthly reminders via work email. Of the 67 subjects, 42 individuals participated, but only 30 nurses completed the full survey.

Demographic data are presented in Table 4. The mean age of the nurses who participated in the survey was with a standard deviation of work experience. Work-related data for nurses who participated in the survey revealed that 90% were female and ranged in age from 18 to 64 years. A total of 3.3% of participants had less than one year of experience as a nurse, 6.7% had between two and five years, 30% had five to 10 years, 36.7% had between 10 and 20 years, and 23.3% had more than 20 years of experience. The survey results revealed that 3.3% of nurses had less than one year of experience on the oncology unit, whereas 13.3% had two to five years, 30% had between five and 10 years, 43.3% had between 10 and 20 years, and 10% had greater than >20 years of experience.

Table 4

Demographic Characteristics Of The Sample (n = 30)

Variable	n	%
Gender		
Female	27	90.0
Male	3	10.0
Age		
18–24 years	1	3.3
25–34 years	10	33.3
35–44 years	10	33.3
45–54 years	7	23.3
55–64 years	2	6.7
Year of experience as a nurse		
less than 1 year	1	3.3
2–5 years	2	6.7
5–10 years	9	30.0
10–20 years	11	36.7
more than 20 years	7	23.3
Years of experience in the oncology unit		
less than 1 year	7	23.3
2–5 years	11	36.7
5–10 years	5	16.7
10–20 years	4	13.3
more than 20 years	3	10.0

Secondary Analysis

On the knowledge and attitudes survey, there were two types of questions, Likert-type and multiple choice, with only one correct answer. Because the type of questions differed, the analysis was separated into two parts. In the first part of the analysis, Likert responses were analyzed; multiple-choice questions were analyzed in the second part.

Table 5 shows pre- and post-test comparisons of the 5-point Likert-type items. Unless stated otherwise, a score of 1 corresponds to strongly disagree, and a score of 5 corresponds to strongly agree. A Wilcoxon test was used to compare within-group changes in score for each question between pre- and post-test. The advantage of the Wilcoxon test is that it does not require assumptions of normality to be satisfied. In addition, the Wilcoxon test is more appropriate for analyzing ordinal-level data, such as data collected using Likert-type items (Agresti, 2012). The analysis indicated that the change for each Likert-type item was statistically significant at an alpha level of 0.05. Pre- and post-test differences indicated that there was a statistically significant change in knowledge and attitudes of nurses after implementation of the intervention.

Table 5

Pre- and Post-test Comparison Of Likert-type Items

Question	Pre-test M	Pre-test SD	Post-test M	Post-test SD	Wilcoxon
1. I believe the current educational materials available for patients undergoing placement of a venting G tube are appropriate to meet patients' needs	1.80	0.76	4.17	0.75	z=4.61, p<0.01
2. I know where to access educational materials for patients undergoing placement of a venting G tube	1.87	0.90	4.63	0.56	z=4.79, p<0.01
3. Washing hands before as well as after the care of a venting G tube is crucial to prevent catheter-related infections	2.13	0.90	4.3	1.12	z=4.39, p<0.01
4. I understand it is important to educate patients as well as their family on care of specific drains or catheters for an effective transition from hospital to home care	2.10	1.03	4.33	0.96	z=4.35, p<0.01
5. It is important to give a copy of education handouts to patients upon discharge to refer to when they have concerns regarding venting G tube care	2.37	1.27	4.03	1.16	z=3.76, p<0.01
6. Patient education handouts always help in facilitating effective transition towards home care for improved patient care	2.13	0.90	3.9	1.06	z=4.3, p<0.01
7. The new patient education handout could enhance clinical nurses' knowledge to effectively educate patients on self-care for the venting G tube, thus effectively preparing patients for discharge	2.10	0.99	4.17	0.91	z=4.3, p<0.01

Questions 5 through 9 and question 13 (see Appendix B) evaluated the knowledge level of nurses about clinical applications of the venting G-catheter. Questions 5 and 8 were multiple choice, where a respondent had to select several response options simultaneously in order to correctly answer the question. Questions 6, 7, and 9 were simple multiple-choice questions in which a respondent had to select only one answer from the available options in order to answer the question correctly. This analysis compared the number of questions answered correctly before and after implementation of the intervention.

Table 6 shows the proportions of nurses who correctly answered questions about the use of venting G-catheter. For example, 31.1% of nurses answered Question 5 correctly at pre-test, and 86.4% answered this question correctly at the post-test ($p<0.01$). The p-values shown in Table 6 were obtained using the McNemar test, which is appropriate for testing differences between proportions when paired data are used (Agresti, 2012). In this study, the data were considered paired because pre-test and post-test responses were received from the same participants.

Table 6

Proportions Of Participants Who Answered Questions Correctly (n = 30)

Question	Pre-test % correct	Post-test % correct	p-value*
Q5	31.1	86.4	<0.01
Q6	34.6	83.0	<0.01
Q7	44.9	91.2	<0.01
Q8	41.6	83.0	<0.01
Q9	24.3	93.3	<0.01
Q13	56.7	96.7	<0.01
Total correct	41.7	94.4	<0.01

The data indicated that there were statistically significant improvements in the knowledge and attitudes of nurses regarding the use of venting G-catheters after the intervention. The proportion of questions assessing venting G-catheter knowledge correctly answered by nurses increased from 41.7% to 94.4%. Nurses' attitudes and capabilities to deliver effective patient education also improved. Following the intervention, nurses were more likely to agree that educational materials met patients' needs, that nurse placed greater importance on patient education, and that nurses knew where to locate patient education materials. Improved knowledge, more positive attitudes of nurses, and the availability of patient education handouts may enable nurses to provide improved patient education and potentially reduce rates of ER visits.

CHAPTER V

CONCLUSION AND FUTURE WORK

Summary

This QI project focused on the development of a patient education handout to decrease complications of venting G-catheters as a means of decreasing the number of ER visits related to venting G-catheter compilations. This would help improve nurses' knowledge regarding the care of venting G-catheters and proper use of venting G-catheters and improve patient safety and potential approaches to patient education. The project was successfully completed in February 2019, and the resulting handout was uploaded to the patient education link in order to make it available for nurses to print a copy for patients and to use during discharge education. Clinical nurses were encouraged to use the evaluation with discharge education and to give a copy to patients along with other instructions. Nurses and clinical nurse leaders kept the education handout readily available for patients in every unit. The project results indicated that in general, promoting the use of patient education materials should be considered an important step in quality improvement efforts due to its excellent cost-benefit ratio.

The results of the survey suggest that the educational program improved nurses' knowledge on reducing venting G-catheter-related complications among patients. This outcome resulted in patients receiving improved discharge instructions and having a lower risk of developing venting G-catheter-related complications. A reduction in the number of ER visits was noted after the intervention, which indicates reduced rates of venting G-catheter–related complications. The analysis also indicated that improved nursing care may have resulted in a reduced number of ER visits.

As a result of the project, clinical nurse leaders committed to sustaining a change in practice by establishing a routine patient education session for nurses who provide care to patients with venting G-catheters. The outcomes observed in this project were consistent with those of other studies that found that education of nurses, patients, or both reduced the risk of venting G-catheter-associated complications, improved patient satisfaction, and reduced care costs (Arca et al., 2017; Barry et al., 2018; Correa et al., 2014). For this reason, the outcome of this project was not unexpected.

Gokula, Smith, and Hickner's study (2007) found that following intervention, there was a strong trend towards increased and more-appropriate use of catheters; an increase in physician orders for catheter placement; and most importantly, a dramatic decrease in the total number of urinary catheters placed in the ED. It is clear that the high level of awareness created through education with continuous reminders reinforced ED staff and physicians to limit inappropriate catheter use (Gokula et al., 2007).

Strengths and Limitations

Following reports from unit nurses that patient education using the education handout has improved since the implementation of the project, patients were also given information on the patient education link included in the handout. One of the significant limitations of this project was that it was not feasible to reliably link the intervention, which was focused on nurses, to ultimate patient outcomes. Although nurses' knowledge, skills, and capabilities to care for venting G-catheter patients improved, in the absence of a control group, it was not possible to assume that these improvements were the reason behind the reduction in ER visits. Another limitation of the project concerns the external validity of the study, as it is impossible to determine whether the results obtained at the MD Anderson Cancer Center are applicable to other facilities.

Conclusion

This project found that nurse education can significantly improve not only nurses' knowledge about caring for patients with venting G-catheters, but it can also lead to a reduction in the number of ER visits. Such a reduction is a valuable benefit considering the rapidly escalating costs of healthcare and pay-for-performance arrangements. Furthermore, the project achieved these improvements with modest investments. This finding implies that, in general, promoting the use of patient education materials should be considered as an important step in quality improvement efforts due to its excellent cost-benefit ratio.

Future Work

Providing ongoing in-service education for nurses to update their knowledge related to the care of patients undergoing venting G-catheter placement is warranted. Future studies should examine the impact of the intervention that was implemented in this project on patient outcomes. Specifically, higher-quality results may be obtained by tracking the utilization of the ER by patients who received appropriate venting G-catheter instructions from nursing personnel. In addition, future studies may identify patients who presented to an ER with venting G-catheter-related complications and describe the root causes of these complications. Knowledge of root causes may suggest practical strategies to prevent venting G-catheter complications from developing. Finally, future studies may examine nurses' perspectives about venting G-catheter education in order to identify approaches to optimize learning. The lack of patient education handouts describing the care of venting G-catheters was just one of many possible factors identified; oncology units should continue to explore other factors involved in the observed phenomena related to catheter complications.

REFERENCES

Algarni, S. S., Sofar, S.M., & Wazqar, D. Y. (2019). Nurses knowledge and practices toward prevention of catheter -associated urinary tract infection at King Abdulaziz University Hospital. *Journal of Health Medicine and Nursing, 4*(1), 39-62.

Agresti, A. (2012). *Categorical data analysis* (3rd ed.). Hoboken: John Wiley & Sons

Arca, M. J., Rangel, S. J., Hall, M., Rothstein, D. H., Blakely, M. L., Minneci, P. C., Shah, S. S., Heiss, K. F., Snyder, C. L., Berman, L., Browne, M., Vinocur, C. D., Raval, M . V., & Goldin, A. B. (2017). Case Volume and Revisits in Children Undergoing Gastrostomy Tube Placement. *Journal of Pediatric Gastroenterology and Nutrition*, *65*(2), 232–236. https://doi.org/10.1097/MPG.0000000000001523

Badarudeen, S., & Sabharwal, S. (2010). Assessing readability of patient education materials: Current role in orthopedics. *Clinical Orthopedics and Related Research*, *468*(10), 2572-2580. doi: 10.1007/s11999-010-1380-y

Barry, W. E., Barin, E. N., Marshall, L. C., Doherty, M., Nguyen, E., McLaughlin, C., Kaplan, L., Stein, J. E., & Jensen, A. R. (2018). Preoperative educational intervention decreases unplanned gastrostomy-related health care utilization. *The American Surgeon*, *84*(10), 1555–1559.

Bowers, N., Brandon, M., Hill, C. D., & Sandberg, M. (2015). Survey instruments for knowledge, skills, Attitudes and Behavior Related to Evidence based Practice in Occupational Therapy; A Systematic Review. *Occupational Therapy International*, *23*, 59-90. http://dx.doi.org/10.1002/oti.1398

Chen, J. H., Huang, T. C., Chang, P. Y., Dai, M. S., Ho, C. L., Chen, Y. C., & Kao, W. Y. (2013). Malignant bowel obstruction: A retrospective clinical analysis. *Molecular and Clinical Oncology*, *2*(1), 13-18. doi:10.3892/mco. 2013.216

Clause, C. (2017). Content validity: Definition, index & examples. http://study.com/academy/lesson/content-validity-definition-index-examples.html

Correa, J. A., Fallon, S. C., Murphy, K. M., Victorian, V. A., Bisset, G. S., Vasudevan, S. A., Lopez, M. E., Brandt, M. L., Cass, D. L., Rodriguez, J. R., Wesson, D. E., & Lee, T. C. (2014). Resource utilization after gastrostomy tube placement: defining areas of improvement for future quality improvement projects. *Journal of Pediatric Surgery*, *49*(11), 1598–1601. https://doi.org/10.1016/j.jpedsurg.2014.06.015

Dalal, K. M., Gollub, M. J., Miner, T. J., Wong, W. D., Gerdes, H., Schattner, M. A., Jaques, D. P., & Temple, L. K. (2011). Management of patients with malignant bowel obstruction and stage IV colorectal cancer. *Journal of Palliative Medicine, 14*(7), 820-828. doi: 10.1089/jpm.2010.0506

Davis, E. (2018). What are ICD-10 codes and how do they work? Understanding insurance codes and medical billing codes. Retrieved from https://www.verywellhealth.com/icd-10-codes-and-how-do-they-work-1738471

EBSCO. (n.d.). Abbreviations. Retrieved https://www.abbreviations.com/term/242954

Eltorai, A. E., Ghanian, S., Adams, C. A., Jr., Born C. T., & Daniels, A. H. (2014). Readability of patient education materials on the American Association for Surgery of Trauma website. *Archives of Trauma Research, 3*(2), e18161. doi: 10.5812/atr.18161

Farber, L. (2014). Basic gastrostomy care. sph.unc.edu/files/2014/09/nciph-sn14-farber-gastro-tube.pdf

Fattah, A. A., Abdel Fattah A. Z., & Fattah, S. A. (2018). The effect of educational program on nurse knowledge and practices about nasogastric tube feeding at neonatal intensive care units. *Journal of Education and Practice, 8*(8), 21-27. http://d.doi.org/10.5430/jnep.v8n8p21

Feil, M. (2017). Dislodged gastrostomy tubes: Preventing a potentially fatal complication. *Journal of Patient Safety, 14*(1), 9-16.

Fernandez, R., & Griffiths, R. (2012). Water for wound cleansing. *Cochrane Database of Systematic Reviews*. doi: 10.1002/14651858.CD003861.pub3

Gemmil, R., Kravits K., Ortiz, M Anderson, C., Lai, L., & Grant, M., (2011). What do surgical oncology staff nurses know about colorectal cancer ostomy care? *The Journal of Continuing Education in Nursing, 42*(2), 81-88.

Goforth, C (2016) Using and Interpreting Cronbach's alpha. Retrieved from http://data.library.virginia.edu/using-and-interpreting -cronbachs-alpha/

Gokula, R. M., Smith, M. A., & Hickner, J. (2007). Emergency room staff education and use of a urinary catheter indication sheet improves appropriate use of a urinary Foley catheters. *American Journal of Infection Control, 35*(9). 589-593. http://doi.org/10.1016/j.ajic.2006.12.004

Graham, S., & Brookey, J. (2008) Do patients understand? *The Permanente Journal, 12*(3), 67-69. doi: 10.7812/tpp/07-144

Gutierrez, K. (2018). 3 Adult Learning Theories Every E-Learning Designer Must know. Association for Talent Developer. https://www.td.org/insights/3-adult-learning-theories-every-e-learning-designer -must-know-Journal/Magazine Article-with Author

John, H., Hale, E. D., Bennett, P., Trehame, G. J., Carroll, D., & Kitas, G. D. (2011). Translating patient education theory into practice: Developing material to address the cardiovascular

education needs of people with rheumatoid arthritis. *Patient Education and Counseling, 84*(1), 123-127. doi: 10.1016/j.pec.2010.06.023

Kripalani, S., Jackson, A. T., Schnipper, J. L., & Coleman, E. A. (2007). Promoting effective transitions of care at hospital discharge: A review of key issues for hospitalists. *Journal of Hospital Medicine, 2*(5), 314-323. doi: 10.1002/jhm.228

Laval, G., Marcelin-Banazech, B., Guirimand, F., Chauvenet, L., Copel, L., Durand, A., Francois, E., Gabolde, M., Rebischung, C., Servois, V., Terrebonne, E., & Arvieux, C. (2014). Recommendations for bowel obstruction with peritoneal carcinomatosis. *Journal of Pain and Symptom Management, 48*(1), 75-91. doi: 10.1016/j.jpainsymman.2013.08.022

Ledue, C. (2009). Patient education reduces readmissions and ER visits, saves money. https://www.healthcarefinancenews.com/news/patient-education-reduces-readmissions-and-er-visits--saves-money-Journal/Magazine

Lehwaldt D, & Timmins F. (2007). The need for nurses to have in service education to provide the best care for clients with chest drains. *Journal of Nursing Management, 15*, 142-148.

Linney, S. (2017). The Flesch Reading Ease and Flesch-Kincaid Grade Level. https://readable.com/blog/the-flesch-reading-ease-and-flesch-kincaid-grade-level/

Lynn, J., Baily, M. A., Bottrell, M., Jennings, B., Levine, R. J., Davidoff, F., Casarett, D., Corrigan, J., Fox, E., Wynia, M., Agich, G., O'Kane, M., Speroff, T., Schyve, P., Batalden, P., Tunis, S., Berlinger, N., Cronenwett, L., Fitzmaurice, J., Dubler, N., & James, B. (2007). The ethics of using quality improvement methods in healthcare. *Annals of Internal Medicine, 146,* 666-673. doi: 10.7326/0003-4819-146-9-200705010-00155

Malhi, H., & Thompson, R. (2014). PEG tubes: Dealing with complications. *Nursing Times, 110*(45), 18-21. https://www.nursingtimes.net/Journals/2014/10/31/s/q/x/051114-PEG-tubes---dealing-with-complications.pdf

McKay, D. R. (2017). What is an RN? https://www.thebalance.com/registered-nurse-526062

McLeod, S. (2013). What is Validity? Retrieved from http://www.simplypsychology.org/validity.html

Morgan, S. R., Chang, A. M., Alqatari, M., & Pines, J. M. (2013). Non–Emergency Department (ED) interventions to reduce ED utilization: A systematic review. *Academic Emergency Medicine, 20*(10), 969–985. doi: 10.1111/acem.12219

Mori, M., Bruera, E., & Dev, R. (2009). Complications of a gastrostomy tube used for decompression of an inoperable bowel obstruction in a patient with advanced cancer. *Journal of Pain and Symptom Management, 38*(3), 466-472. doi: 10.1016/j.jpainsymman.2008.11.009

Pappas, C. (2013). The Adult Learning Theory—Andragogy—of Malcolm Knowles. https://elearningindustry.com/the-adult-learning-theory-andragogy-of-malcolm-knowles

Pascual, F. T., Hoang, K., Hollen, C., Swaeringen, R., Hakimi, A. S., King, J. A., & Thompson, D. (2015). Outpatient education reduces emergency room use by patients with epilepsy. *Epilepsy & Behavior, 42*, 3-6. doi: 10.1016/j.yebeh.2014.10.024

Percutaneous. (2012). Farlex Partner Medical Dictionary. https://medical-dictionary.thefreedictionary.com/percutaneously

Qualtrics. (2015). http://csulb.libguides.com/qualitrics

Shaw, C., Bassett, R. L., Fox, P. S., Schmeler, K. M., Overman, M. J., Wallace, M. J., Gupta, S., & Tam, A. (2013). Palliative venting gastrostomy in patients with malignant bowel obstruction and ascites. *Annals of Surgical Oncology, 20*(2), 497-505. doi: 10.1245/s10434-012-2643-5

Shehab, M. S. (2017). Impact of protocol of care of patients undergoing urinary catheterization on nurses' knowledge. *International Journal of Caring Sciences, 10*(2), 1013-1020. http://www.internationaljournalofcaringsciences.org/docs/41_shehab_original_10_2.pdf

Soriano, A., & Davis, M. P. (2011). Malignant bowel obstruction: Individualized treatment near the end of life. *Cleveland Clinic Journal of Medicine, 78*(3), 197-206. https://www.mdedge.com/ccjm/article/95491/oncology/malignant-bowel-obstruction-individualized-treatment-near-end-life/page/0/4

Spector, G. (2012). Care of the child with a gastrostomy tube: What the school nurse should know. https://www.childrens.com/wps/wcm/connect/childrenspublic/886fe0f1-ca58-48fb-af84-d035b74393ff/Care-child-g-tube.pdf?MOD=AJPERES&CVID=kGXlCAw&CVID=kGXlCAw

Suter, E., Arndt, J., Arthur, N., Parboosingh, J., Taylor, E., & Deutschlander, S. (2009). Role understanding and effective communication as core competencies for collaborative practice. *Journal of Interprofessional Care, 23*(1), 41-51. doi: 10.1080/13561820802338579

Teriaky, A., Gregor, J., & Chande, N. (2012). Percutaneous endoscopic gastrostomy tube placement for end-stage palliation of malignant gastrointestinal obstructions. *The Saudi Journal of Gastroenterology, 18*(2), 95-98. doi: 10.4103/1319-3767.93808

Tuca, A., Guell, E., Losada, E., & Codomiu, N. (2012). Malignant bowel obstruction in advanced cancer patients: Epidemiology, management, and factors influencing spontaneous resolution. *Cancer Management and Research, 4*, 159-169. doi: http://dx.doi.org/10.2147/CMAR.S29297APPENDIX A: Link to Newly Created MDACC-designed Patient Education Handout for the Care of Venting Gastrostomy Catheters

Appendix A: Link to Newly Created MDACC-Designed Patient Education Handout for the Care of Venting G-Catheters

https://www.mdanderson.org/patient-education/Internal-Medicine/Venting-Gastrostomy-Tube-Care-Instructions_docx_pe.pdf

Appendix B: Qualtrics Questionnaire Survey Nursing Knowledge Assessment

http://mdanderson.co1.qualtrics.com/jfe/form/SV_eEE9xypzhwNaPLn

Appendix C: MD Anderson Cancer Center Quality Improvement Board Approval Letter

THE UNIVERSITY OF TEXAS
MD Anderson Cancer Center
Making Cancer History®

QUALITY IMPROVEMENT ASSESSMENT BOARD (QIAB)

Lara Bashoura, MD, Chair

Project Title: Create a patient education handout for the care of venting gastrostomy catheter: A quality improvement Project
ID: 347 – Mathews, Sally A
Submitted by: Mathews, Sally A
Date submitted to QIAB: 01-28-2019

The Quality Improvement Assessment Board has reviewed this submission and approved it as a quality improvement project.

lbashoura

QIAB Chair or Designee

02-12-2019
Date

Appendix D: Initial Email for Taking the Survey

Dear RNs, you are invited to participate in an online questionnaire survey for a QI project entitled "Create a Patient Education Handout for the Care of Venting Gastrostomy Catheters to Decrease ER Visits and Related Admissions". A nurses' knowledge assessment survey will be done using Qualtrics on the key concepts of venting G-catheter management. This will be evaluated using a pre- and post-knowledge assessment survey to be administered in conjunction with an educational intervention for the staff. The survey will be for novice and experienced clinical nurses on venting gastrostomy catheter care and management. Your participation in the study will contribute towards the rationale for this patient education handout in relation to care of venting gastrostomy catheters. Your participation in this project is voluntary and will be confidential. The criteria include: 1) currently a registered nurse working in oncology unit; 2) must be at least 21 years of age; 3) RN who has more than 6month of experience. You may decline to answer any question, and you have the right to withdraw from participation at any time. If you do not want to participate, simply close the browser window. If you would like to participate, please click on the link below or cut and paste the link into your web browser, which will take you to the short survey that will take approximately 3 minutes to complete. If you have any questions, you can contact the principal investigator.

Questionnaire survey link:

http://mdanderson.co1.qualtrics.com/jfe/form/SV_eEE9xypzhwNaPLn

Appendix E: Email Reminder and Survey Link Below

Dear RNs, you are invited to participate in an online questionnaire survey for a QI project entitled "Create a Patient Education Handout for the Care of Venting Gastrostomy Catheters or Venting G Tubes for Oncology Patients". The purpose of this survey is to obtain a knowledge assessment for both novice and experienced clinical nurses regarding venting gastrostomy catheters and their overall management. Your participation in the study will contribute towards the rationale on the need for creating this patient education handout in relation to care of cancer patients with venting gastrostomy catheters. Your participation in this project is voluntary and will be confidential. The criteria include: 1) currently a registered nurse working in a general medical oncology unit; 2) must be at least 21 years of age; 3) RN who has more than at least 6 months of experience. You may decline to answer any question, and you have the right to withdraw from participation at any time. If you do not want to participate, simply close the browser window. If you would like to participate, please click on the link below or cut and paste the link into your web browser, which will take you to the short survey that will take approximately 5–6 minutes to complete. If you have any questions, please contact the principle investigator.

http://mdanderson.co1.qualtrics.com/jfe/form/SV_eEE9xypzhwNaPLn

Appendix F: Prairie View A&M University IRB Approval

PRAIRIE VIEW A&M UNIVERSITY
A Member of the Texas A&M University System

To: **Sally A. Mathews**, Graduate Student, Principal Investigator
Abida Solomon, Ph.D., Faculty Advisor

From: **Donna Pulkrabek, M.B.A., RLATg, CPIA, CIP,** Director of Research Compliance

Date: February 19, 2019

Re: Create a patient education handout for the care of percutaneous venting gastrostomy catheter (PVGC): A Quality Improvement Project

After review of your application, it has been determined that the proposed activities described do not meet the definition of research with human subjects according to Federal regulations and IRB approval is not needed.

Thank you for the time and effort put into preparing and submitting your application. If you have any further questions, please call the Office of Research and Graduate Studies at (936) 261-1588.

Donna Pulkrabek, M.B.A., RLATg, CPIA, CIP
Director of Research Compliance
Office: 936.261.1588
Email: djpulkrabek@pvamu.edu

Sally Abraham Mathews

sallymathews1@gmail.com

CURRICULUM VITA

EDUCATION

Prairie View A&M University, Houston

Major: *Masters of Science in Nursing*, Family Nurse Practitioner — May 12, 2012

Punjab University, India, Chandigarh

Major: *Bachelor of Science in Nursing* — May 30, 1990

EXPERIENCE

- MD Anderson Cancer Center — October 2006 - Present
  Advanced Practice Provider
- Bayshore Medical Center — October 2004- Oct 2006
  Registered Nurse

PROFESSIONAL WORK RELATED AND SKILLS

- Read and speak English, Hindi and Malayalam, fluently
- Proficiency in Microsoft Word, Excel and Power point.
- Excellent oral and written communication skills and work efficiently with multidisciplinary clinical team

PROFESSIONAL ACHIEVEMENTS AND PUBLICATIONS

- Oncology Nursing Society, American Association of Critical Care Nursing
- Trained Nurses Association of India (Lifelong).
- American Association of Critical Care Nursing
- Honor Society Membership at Eta Delta Chapter
- Houston Area Nurse Practitioner
- American Association of Nurse Practitioners (AANP)