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Educational Material for Nurses in Managing Patients With Neurogenic Bladder

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Abstract

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MS, Walden University, 2016

BS, Nebraska Wesleyan University, 2014

Project Submitted in Partial Fulfillment

of the Requirements for the Degree of

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Abstract

Neurogenic bladder is common in patients with traumatic brain injury, spinal cord injury, spinal bifida, and stroke. Many patients who have these diseases struggle to control their bladder. Neurogenic bladder can be defined as the inability to completely empty the bladder. For managing the bladder, clinicians usually opt for using an indwelling urinary catheter for those patients. Indwelling urinary catheters are a source of infection and do not help the patient regain continence. Research findings show that frequent toileting and monitoring with bladder scanning benefit patients with neurogenic bladder and help patients restore continence. To address a knowledge gap, this new procedure of bladder management was taught to direct care nurses and addressed whether teaching the new procedure of bladder management would be effective in increasing nurses' knowledge to allow them to be more efficient in the use of an evidence-based approach to neurogenic bladder management compared to the older version of using an indwelling catheter for bladder management. Their understanding of this new procedure in neurogenic bladder management took place with a pre posttest design. A PowerPoint presentation was done to educate them on the topic of managing NB with the bladder protocol that incorporated the idea of the toileting program. A pretest was first given to them to followed by the presentation. Then a posttest were presented to them to evaluate if learning has occurred The result shows that 100% of staff nurses (N= 10) scored higher on the posttest, suggesting that learning of the bladder protocol and managing NB had occurred. This new practice is anticipated to change patients' lives and provide a positive social change.

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Dedication

To all the patients suffering the consequences from neurogenic bladder dysfunction. This protocol is to help them regain continence and help improve their health and well-being.

Acknowledgments

To my family, my husband, my sons, and my mother who supported me throughout this long studying process. Shawn, thanks for being patient and taking care of the kids while I was studying or away for clinical. Rain, Ryan, Rivers, and RJ, thanks for giving mommy time to study and your understanding while I dropped you guys at the daycare to go to clinical or study, and RJ, you were only one week old when I signed up for my DNP. I was breastfeeding you while reading my books, and now, you are two years old, and I am about to graduate and have time to spent with you. Shawn, my husband, thanks for taking care of the boys while I was away studying or in clinical. Mom, thanks for traveling from Canada several times to assist me in taking care of my children while I leave every morning for clinical and then for work. You raised my children for me while I was busy with school, and thank all of you for your support. Thanks to Jessica and Tiffany Armstrong, my clinical instructors. You are great, and I learned a lot from you.

Thanks to my academic chair members, Doctor Amy Wilson and Doctor Hahn, thanks a lot for your guidance and your support and help when I was lost and did not know how and what to do. You always provide me with instruction and guidance. I want to thank my preceptors and instructors at Walden University, who guided and coached me throughout this program, leading to the project's completion.

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Section 1: Nature of the Project

Introduction

Neurogenic bladder (NB) is a prominent health disorder in many patients with stroke, spinal bifida, traumatic brain injury (TBI), or spinal cord injury. It is characterized by the inability to control the bowel and bladder, leading to incontinence and infection. The nature of this project is to develop teaching material in a PowerPoint format to educate the nurses about managing patients with neurogenic bladder. Before the PowerPoint presentation, a pretest was presented to the nurses to measure their knowledge of the subject then a posttest was later presented to them to see how much they learned from the presentation.

To manage neurogenic bladder, we recommend teaching a new procedure that providers and direct care nurses can utilize to help those patients. The new procedure proposed is to offer a toileting schedule for those patients along with a routine bladder scanning after each toileting schedule and to perform intermittent catheterization, if necessary, based on the urine residual. It has been successful for many patients suffering from these diseases. It has shown a lot of difference in the overall health of those patients and will provide a significant social change to this population as it will increase their health status and well-being.

Problem Statement

Neurogenic bladder sphincter dysfunction (NBSD) can develop because of a lesion at any level in the nervous system, including the cerebral cortex, spinal cord, or peripheral nervous system (Verpoorten & Buyse, 2008). Traumatic brain injury, spinal

cord injury, stroke, and spinal bifida patients are at risk of developing a neurogenic bladder (NB). A traumatic brain injury is an injury that affects how the brain works. It may be caused by a bump, blow, or jolt to the head or penetrating injury. People commonly get TBIs from a fall, firearm-related injury, motor vehicle crash, or assault. According to the Centers for Disease Control and Prevention (CDC), there were approximately 223,050 TBI-related hospitalizations in 2018 and 60,611 TBI-related deaths in 2019. Spinal cord injuries are also rising, with the number of motor vehicle accidents increasing.

Many patients lose their voiding sensation, and an indwelling urinary catheter is initiated for voiding. Indwelling urinary catheters are a significant cause of urinary tract infections (UTI), which can lead to sepsis. The National Institute for Health and Care Excellence (2017) identifies patient safety as the cornerstone of patient care. As the length of time a catheter is in place increases, so does the risk of catheter-associated urinary tract infection (CAUTI). Reducing the inappropriate use of catheters can help prevent such healthcare-acquired infections (Greene et al, 2014). It costs, on average, $2,000 to treat one urinary tract infection episode. This project will provide a standardized protocol to assist the nurses in managing the bladder of those patients and avoid increase infections and retrain their bladder for less incontinence issues. Loveday et al., (2014) emphasize that the sequel of catheter uses, such as pain, trauma, and mobility/activity restriction, will also decrease.

This doctoral project will use evidenced-based data to develop a protocol for bladder health. This new clinical practice is based on numerous research studies. Those

studies advise using bladder retraining and frequent toileting instead of indwelling urinary catheters to manage neurogenic bladder. There are a lot of success stories when patients are introduced to the new procedure of frequent toileting and bladder scanning. Many patients regain continence which impacts well-being and reduces the risk of infection.

Purpose Statement

Clinical issues include urine retention and complications associated with neurogenic bladder, such as infection. Many patients that have experienced neurological insults experience some bladder dysfunction and need assistance managing their bladder. Many of these patients experience the use of an indwelling urinary catheter for bladder management instead of a toileting program and frequent bladder scanning.

Regulatory agencies recommend limiting the use of indwelling urinary catheters in hospitalized patients and patients in general. Hospitals can get penalized for the use of indwelling urinary catheters without appropriate medical reasons. The most important interventions to prevent bacteriuria and infection are to limit indwelling urinary catheter use and, when a catheter is necessary, to discontinue the catheter as soon as clinically feasible (Nicolle, 2014). Early management of a neurogenic bladder is essential for controlling symptoms and preventing urinary tract damage. The goal is to preserve renal function, decrease potential urologic complications, and improve quality of life by relieving symptoms, improving continence, and supporting independence. Clinicians, including direct care nurses, follow old practices of inserting an indwelling urinary catheter in patients with neurogenic bladder. Due to multiple problems associated with

indwelling urinary catheters, I introduced and taught staff a new evidence-based procedure for bladder management.

A bladder-retraining program that incorporates a toileting program, bladder retraining, and intermittent catheterization is the best method for neurogenic bladder management. It can improve bladder dysfunction and quality and quantity of life. Caldwell et al. (2014) believe that bladder rehabilitation consists of frequent toileting, bladder scanning for residual, and intermittent catheterization. The goal of neurogenic bladder management is to maintain low intra-bladder pressure during the filling phase to prevent upper urinary tract damage and achieve urinary continence by adequately draining urine. The International Consultants on Incontinence concluded that intermittent catheterization (IC) is an effective and safe method in the short and long-term for the management of NB (Jeong & Oh, 2019). This Capstone project will be beneficial in addressing the issue of CAUTI in patients with neurogenic bladder and reduce complications associated with neurological diseases and NB.

Nature of the Doctoral Project

In the population of traumatic brain injury and spinal cord injury, it has become questioned as to how toileting schedules and frequent bladder scans along with intermittent catheterization benefit those patients, compared to the indwelling urinary catheter as bladder management. The intended context of this doctoral project is the education of nursing staff on the importance of this new procedure of bladder management. This new procedure was taught to the direct care nurses in the form of a PowerPoint presentation with a pre and posttest.

I conducted the teaching at the rehabilitation hospital where this project took place during a staff meeting. The education was supported by research-based study findings and evidence-based data. This doctoral project was a staff education project for direct care nurses from a rehabilitation hospital certified in caring for patients with stroke and TBI. A rehabilitation hospital in the Midwest is the setting where this project was accomplished. This hospital specializes in treating patients with TBI, stroke, and spinal cord injury. The team consisted of physicians, therapists, and nurses collaborating in the rehabilitation processes toward functional independence.

This hospital takes continence seriously and has a continence team that meets weekly, addresses patients individually, and develops a care plan to help them stay away from the indwelling catheter and use other approaches to manage their bladder. The data of this project will come from evidence-based research on managing issues with having a neurogenic bladder with the retrieval of evidence through the Walden University library. Evidence for this project was collected through a literature review. I used the Walden Library to access those articles using CINAHL and MEDLINE databases. I used the information and the process of conducting staff education from Walden University's Manual for Staff Education. I referred to the instructional design model, the ADDIE model (Analysis, Design, Development, Implementation, and Evaluation) of Chapter Two of the Jeffery, Longo, & Nienaber textbook as a resource in conducting staff education. I used the terms neurogenic bladder catheterization, incontinence, ladder scanning, pretest, and posttest.

This doctoral project aims to teach direct care nurses the new procedure of managing NB with a pre-and posttest to reduce the risk of CAUTI and renal complications associated with an indwelling urinary catheter. The project will use clinical experience and data from studies done at a rehabilitation hospital in the Midwest. The direct care nurses were educated on this new procedure, and their understanding with be evaluated.

Significance

The goals of management of the bladder are to prevent or minimize secondary damage to the upper urinary tracts and bladder from the primary neurogenic bladder dysfunction and to achieve safe social continence (Verpoorten & Buyse, 2008). With this project, I introduced a new process of managing NB. This new procedure guideline had been submitted to the continence team at the rehabilitation hospital for review and feedback to assess its validity and feasibility. I introduced the procedure to direct care nurses and evaluated their understanding of the guideline following an educational activity that I designed. After this project is completed, it is hoped that the effectiveness of this protocal can be evaluated to documenet the response of this new program in patients with NB. If successful, it may then be made accessible to other hospitals and clinicians. This project will be disseminated through publication including professional nursing journals and health websites. The project has the potential to impact society by improving health and well-being of patients with NB including the reduction of risk of infection.

Summary

NB manifests itself in many patients with a history of stroke, TBI, and spinal cord injury. The management of NB can be complicated, and most clinicians prefer to use an intermittent Foley catheter. This process comes with many drawbacks, such as infection. The new proposed procedure is anticipated to prevent the risks of infection and help the patient regain continence.

Section 2: Background and Context

Introduction

In the United States, neurogenic bladder affects 40–90% of persons with multiple sclerosis, 37–72% of those with Parkinsonism, and 15% of those with stroke. Detrusor hyperreflexia is seen in 50–90% of persons with multiple sclerosis, while another 20–30% have detrusor areflexia. There are more than 200,000 persons with spinal cord injuries, and 70–84% of these individuals have at least some degree of bladder dysfunction (Dorsher & McIntosh, 2012). In patients with neurogenic bladder, is bladder retraining along with intermittent catheterization more beneficial than the use of indwelling urinary catheter? The aim of this project is to develop an education program to introduce an evidence-based protocol for the management of NB that clinicians can use to improve the care of patients. I used theories and concepts to guide the project. I concluded by showing how this project has relevance to nursing practice and healthcare. I elaborated on the role of the DNP nurse and the project team.

Concepts, Models, and Theories

NB is a complicated disease. It is necessary to explain the concepts and words used to explain the disease process to enhance understanding. Emptying the bladder is a mechanism that involves the brain and the bladder. We have to understand how the brain works with emptying the bladder.

Importance of the Brain Functions with Elimination

The bladder has two primary functions: urine storage and voiding. The bladder acts as a reservoir and messages are sent from the brain to the bladder urging an

individual to void. Patients with brain injury lack the sensation to void. They might have altered bladder sensation, less capacity to feel the fullness of the bladder, and a greater sense of urgency. As bladder control relies on an extensive network of brain regions as well as physical functional and cognitive skills (Reyst, 2016).

Understanding Neurogenic Bladder

Neurogenic bladder is a dysfunction that is a serious public health problem in the United States and worldwide. According to the Urology Care Foundation, millions of Americans have a neurogenic bladder. Patients affected by NB include nervous system – stroke, spinal injury, myelomeningocele, and amyotrophic lateral sclerosis patients (Lee, 2021). A neurogenic bladder is characterized by the bladder being unable to empty. Patients suffering from this disorder lack the sensation to void and the part of the brain that releases the signals for the sensation to void is affected, resulting in the incapacity to void

Signs and Symptoms of Neurogenic Bladder

Signs and symptoms of a neurogenic bladder vary, depending on the type of nerve damage. Patients might present with various symptoms, including a urinary tract infection (UTI), frequent urination, urgency, intermittency, and urinary incontinence. (Lee, 2021). Many patients with stroke, traumatic brain injuries, and spinal cord injuries often develop a neurogenic bladder characterized by the unable to empty their bladder, which causes retention.

Some terms that need to be defined to promote a better understanding of this guideline are incontinence, catheterization, bladder scanning, pretest, and posttest.

Incontinence is the fact of being unable to hold the urine in the bladder and voiding in the toilet. Incontinence involves being wet from urine incontinence unconsciously happens to the person. Urinary catheterization is a procedure used to drain the bladder and collect urine through a flexible tube called a catheter. Bladder scanning is using a machine to view the patient's bladder. It displays how much urine volume is in the bladder. A pretest is a test given to evaluate the knowledge of the participants before educational material. A posttest is a test given after the pretest and after the material is taught to the participants. It helps evaluate their learning on a topic.

Relevance to Nursing Practice

Current nursing practice favors the use of indwelling urinary catheters for the management of neurogenic bladder. The gap in nursing is that this practice uses indwelling catheters, which may facilitate the risk of urinary tract infection, and does not allow the opportunity for patients to regain continence. Early management of a neurogenic bladder is essential for improving the patient's symptoms and preventing urinary tract damage. The goal is to preserve renal function, decrease potential urologic complications, and improve quality of life by relieving symptoms, improving continence, and supporting independence in daily care (Phé et al., 2016). Behavioral interventions are effective treatments for NB. They are in part aimed at improving symptoms with patient education on healthy bladder habits and lifestyle modifications, including establishing routine voiding intervals, frequent bladder scanning by nurses, and intermittent clean catheterization (Wyman, Burgio, & Newman, 2009). Those behavioral interventions are proven effective in managing the symptoms of NB and helping the patient regain

continence. The staff education project focuses on introducing the principle of bladder management to the direct care nurses, implementing the process, and evaluating their knowledge of the process. This principle is based on an evidence-based (EBT) protocol for managing NB. The aim is to achieve continence with neurogenic bladder patients by including a bladder retraining program such as frequent toileting and intermittent bladder catheterization based on the bladder scanning residual.

This new procedure is against the use of indwelling catheters and will reduce the risk of infection and renal damage that comes with the indwelling catheter. New literature favors intermittent catheterization, which poses less risk and is more convenient and better for the patient's self-esteem and quality of life.

Local Background and Context

NB is a disease that affects many patients in this country. It is the inability to properly empty the bladder, and this comes with other complications and affects the patients. The management of neurogenic bladder is an important topic. It is also essential to review the protocol for managing this disease as there is room for improvement with new technology. In the past, providers used indwelling urinary catheters to manage the inability to void. Today many other measures can be used to manage a neurogenic bladder.

A rehabilitation hospital in the Midwest focuses on helping patients with stroke, TBI, and spinal cord injuries who are affected by an NB restore continence. The objective is to help patients rehabilitate and become as independent as possible with a return home. They have a bladder committee that meets weekly and identifies patients who will benefit

from working with them. The team performs weekly bladder rounding and identifies a patient who will benefit from a bladder retraining program. This hospital has impacted the whole community with its work as it helped patients regain their continence and avoid using an indwelling catheter.

Clean intermittent catheterization combined with anticholinergics is the standard therapy for NB. Early institution of such treatment can prevent renal damage and secondary bladder-wall changes, potentially improving long-term outcomes (Verpoorten & Buyse, 2008).

This protocol has many benefits as it reduces health risks and improves patients' quality of life. The goal of this project is to educate direct care nurses on the new approach to managing NB. A study by Denys et al. (2006) showed that effective therapies remain a cornerstone of neurogenic bladder treatment. Example of those therapies includes frequent toileting and double voiding. Research has demonstrated the benefit of clean intermittent catheterization over indwelling catheters in managing NB. Staff evaluation programs are necessary tools for assessing nurses' knowledge and skills. Knowledge is essential to promote best practices when treating neurogenic bladder patients.

Role of the DNP Student

In the book, the Doctor of Nursing Practice (DNP), Zaccagnini and White (2015) emphasize the role of doctorate-prepared nurses. They mentioned that the DNP graduates possess a wide array of knowledge gleaned from the sciences and can translate that knowledge quickly and effectively to benefit patients in the daily demands of practice

environments. Nurses are called upon to be societal leaders and constantly improve the healthcare system with new data and evidence-based studies.

As leaders in healthcare, DNP nurses can educate and train other nurses. The goal of this project was to develop staff education for nurses on the topic of neurogenic bladder management and introduce them to an evidenced-based protocol for managing NB.

Many new treatments have been investigated for managing overactive bladder; however, few have been evaluated extensively in neurogenic urinary incontinence (Denys & al, 2006).

As DNP-prepared nurses and educators, we want to incorporate new practice guidelines and evaluate the nurse's knowledge to help clinicians and nurses better manage the patient suffering from the consequences of an NB. I want ed to provide education and teaching on this disease and aid the providers caring for those patients for the potential to impact on society as individuals with NB can become more independent and productive members of society with the restoration of bladder function. In this project, my role was to design the education project following the development of an algorithm and protocol for the nurses as a guide in managing NB. The algorithm was formed based on a review of research studies on NB and its treatment. Many research studies showed that with neurogenic bladder, clean intermittent catheterization (CIC) is the first-choice treatment to empty the bladder adequately (no residue, no infection) and safely (before high-pressure voiding), and it is a valuable tool for achieving continence (Verpoorten & Buyse, 2008).

This new procedure was also based on the results from the study that was undertaken at the rehabilitation hospital. It consisted of participants that were at the rehabilitation hospital. The site studied their continence pattern and introduced some techniques to help them regain continence. Those techniques turned out to be productive in regaining continence for those patients. The study of data collected from this hospital-conducted study contributed to making a guide as a flowsheet for the nurses to use for the patient with NB. Those data include dthe number of patients that regained continence after using the techniques of frequent toileting, bladder scanning, and intermittent catheterization. The data were gathered and studied by the bowel and bladder committee members. A significant number of patients with NB regained continence by using this protocol.

Role of the Project Team

Therapists at the partner site hospital work alongside nurses. The bowel and bladder committee group succeeded in creating a protocol that would help direct care manage NB in select patient populations. I presented this education project to the bowel and bladder committee for review seeking input and comments. The site leader took the lead in providing written feedback on the PowerPoint presentation. The protocol that the committee reviewed and finalized is in Figure 1.

The protocol is presented as a bladder and bowel algorithm as a nurses' guide. Based on the algorithm, nurses would know the next step (i.e., When to bladder scan a patient? When to Intermittent catheterized a patient?). The algorithm emphasizes the

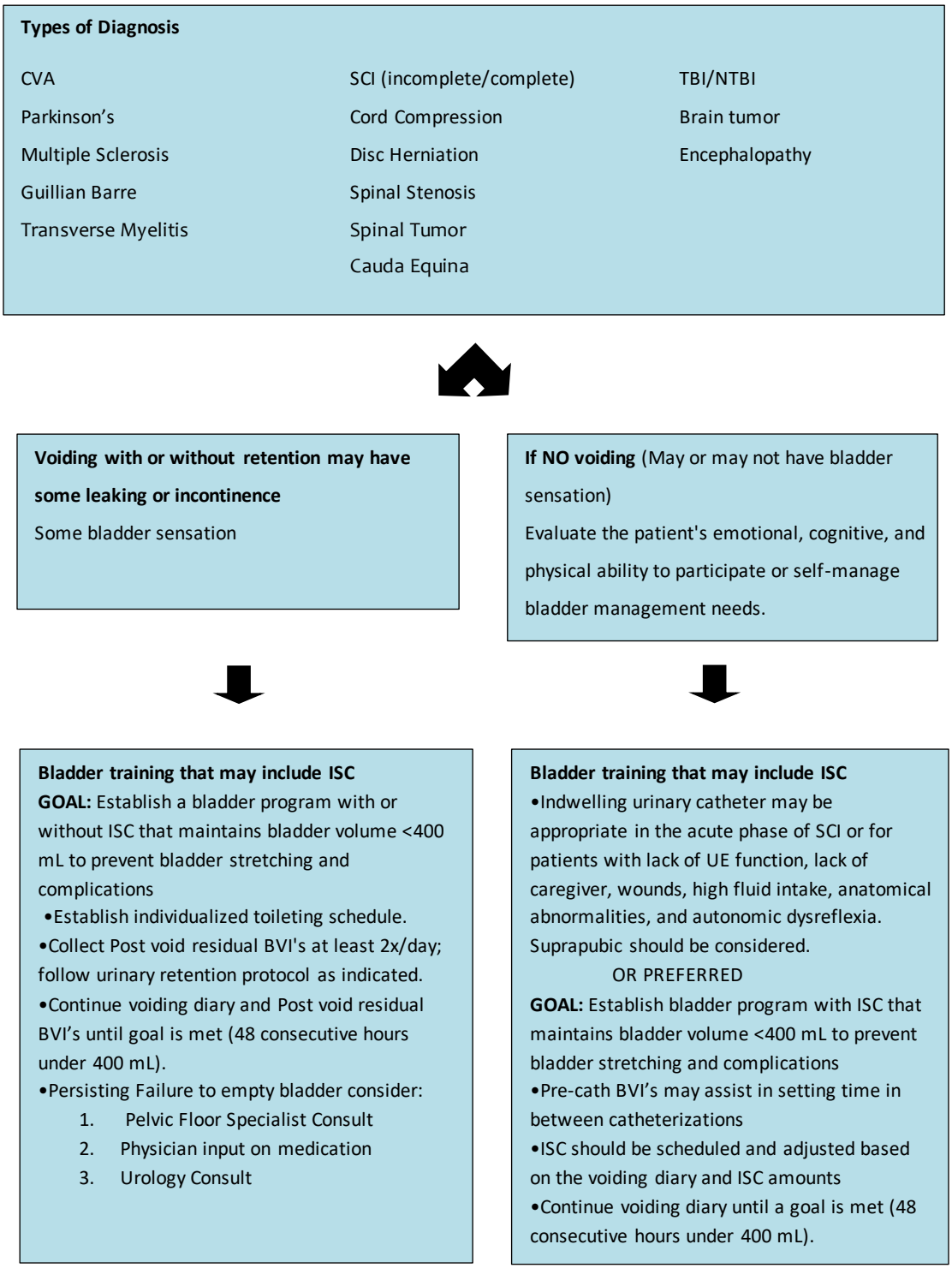
order of a toileting schedule every 3 to 4 hours. It ensures certified nurse assistants (CNAs) follow orders and toilet patients at indicated times.

Nurses and CNAs need education on the importance of toileting schedules. Many need to pay more attention to the meaning of the toileting schedule and its purpose. Also, I observed that several nurses were unsure when to utilize a bladder scanner for a patient and needed to know when to perform intermittent catheterization. The role of the nurses is to identify those patients that struggle with continence and notify the physical therapist and the providers. The physical therapist then puts a toileting schedule that will work with the patients based on their schedule. The nurses also must be diligent and record all inputs and outputs of the patient and follow the protocol when the patient has an issue with voiding which is common with the patient with NB.

Per the protocol, with a residual of more than 400 ml with the bladder scanner, the patient will be asked to try to void. Afterward, nurses will recheck the bladder volume in two hours. If still more than 400 ml, the nurse should follow the protocol that advises the next step: performing a clean intermittent catheterization. Nurses and CNAs utilize a charting system for any patient's urinary output, including continence or incontinence, daily, as this information is used daily by the physical therapist and doctors. Patients will be educated on the plan and protocol to enhance compliance with bladder management (see Figure 1 for the protocol called the *Bladder Algorithm).*

Figure 1

Bladder Algorithm



Reassess the current bladder management plan.

Advance self-catheterization education to use of clean technique.

May require a long-term indwelling catheter if persisting leakage occurs or the patient cannot use the upper extremities for ISC.

Single-use catheter (intermittent self-catheterization) is the gold standard for managing long-term bladder dysfunction.

- Educate and equip the patient to perform 4-5 times per day or every 4-5 hours.
- Provide caregiver training if the patient will need assistance at home.
- Encourage clean intermittent catheterization in a community setting.
- Allow the patient to void first if there is some preserved bladder function, and consider reducing ISC or CIC frequency to twice a day only.

Note: As recovery progresses, reassess the bladder management plan.

Note: Assessment of voiding diary and bladder management plan should occur at least once a shift until a plan is in place that meets the goal sufficiently to eliminate the need for a voiding diary.

Summary

Many patients that experience NB are using an indwelling Foley catheterization to manage the disease. Evidence shows that using the procedure of frequent toileting, bladder scanning, and intermittent catheterization has many benefits and promotes better health status for the patients.

Section 3: Collection and Analysis of Evidence

Introduction

NB affects many patients. Many providers refer to an indwelling urinary catheter that drains urine from the bladder to manage this disease. This practice has many disadvantages, can lead to a UTI, and does not help the patient regain continence. This project's goal was to develop and educate staff nurses on a new procedure that has evidenced-based clinical benefits to patients with NB in managing the disease. It consists of strategies integrated into a protocol for the nurses to practice. I assessed nurses' understanding of this practice by evaluating their knowledge. I used a pretest and posttest to evaluate understanding.

Practice-Focused Question(s)

How effective is a staff education program about a newly revised bladder protocol for patients with NB on increasing staff knowledge about evidence-based bladder management approaches to decline the use of indwelling urinary catheters?

Sources of Evidence

Many research studies show the effectiveness of the new procedure in enabling patients with NB to regain continence. Frequent toileting, bladder scanning, and intermittent catheterization are the gold standard in NB management.

Traumatic brain injury (TBI) often leads to severe bladder dysfunction, including incontinence, lower urinary tract symptoms and retention, and bladder distention. Albayram et al. (2019) used mice to evaluate how TBI patient urinary function is often affected. The ability of voiding requires the control of the frontal regions. A brain injury

that affects that area could lead to a neurogenic bladder. Normal bladder filling and emptying require the processing in the brain and impulses that cause the sensation and the urge to void. When the brain injury affects that part of the body, the person does not have the sensation to void no more. This could lead to multiple bladder problems (Albayram & al., 2019).

Cadwell et al. (2014) used 146 patients, 103 males and 43 females (mean age 40.2) in a rehabilitation hospital. Most patients (85) had a traumatic brain injury, 27 had a subarachnoid hemorrhage, 11 were admitted following other intracranial hemorrhages, and 14 had a hypoxic-ischemic brain injury. With frequent toileting and bowel and bladder management retraining, great results come out of those patients. Half of them regained continence of their bladder and bowel in two weeks. Urinary incontinence following brain injury has been reported in 50% of brain injury rehabilitation inpatients at the time of transfer from acute care, with a success rate, in incontinent patients, from a two-week habituation and bladder retraining program.

Infection prevention is one of the priorities of many hospitals and healthcare settings. When a patient has an indwelling urinary catheter, it increases the risk of catheter-acquired urinary tract infection (CAUTI). It is a preventable issue, and with an appropriate bladder management program such as the one we are proposing, with frequent toileting and bladder scanning. This issue can be avoided in neurogenic bladder patients.

According to Latimer et al. (2019), in 2007, the US Department of Education published a summary report with several recommendations for improving teaching to

reinforce learning. One of them was to "use pre-questions to introduce a new topic." We used a pre- and posttest to educate the staff on this new procedure for managing the bladder.

Current Research Evidence on the EBP

Bladder Retraining Programs

Frequent Voiding. A New Zealand continence team pairing clinical nurse specialists and a female continence physiotherapist has developed a team approach to continence management and bladder retraining in the home setting. Their program consisted of timed voiding, which consists of setting time to use the bathroom. It is also designing a time interval for the patient to use the bathroom (Karon, 2005). Studies show that having a routine and emptying the bladder at the et time can help the regain continence and it will also reduce the period of incontinence. Their findings showed improved urinary symptoms statistically significant reductions in nocturia and episodes of urinary incontinence, as well as an increase in the mean amount of urine voided in milliliters. It also brings about an improved quality of life (Karon, 2005).

Research has shown that bladder retraining can reverse or reduce symptoms of urge or stress/urge incontinence (Karon, 2005). Timed voiding is sometimes referred to as scheduled, routine, or regular toileting. It is characterized by a fixed interval between toiletings. It is generally considered a passive toileting assistance program that is initiated and maintained by a caregiver or caregivers and is generally considered appropriate (Ostaszkieick et al., 2004).

Exercises. Non-invasive medical therapies are the key to improve incontinence,

Exercises such as strong contractions of the pelvic floor muscles (Kegel exercises) strengthen bladder contractions and prevent urgency until the appropriate time to void (Lee, 2021). Additional techniques can be used to evacuate urine, such as voiding at a routine time and the Valsalva maneuvers (Lee, 2021). Clinicians should ensure that patients using the bladder retraining program have the physical and mental capacity as well as social support to accomplish this program and follow-up reliably (Romo et al., 2018).

Clean Intermittent Catheterization. The currency of the science used to address the issue of the neurogenic bladder with patients with TBI and spinal cord injury is to use a combination of frequent toiletings, bladder scanning, and intermittent catheterization. We propose this as management of neurogenic bladder versus the indwelling catheter.

Many research articles point out the indwelling catheter's consequences, including infection and sepsis. Clean intermittent catheterization and pharmacological agents are considered first-line treatments for patients with bladder dysfunction and incontinence. Lee (2021) mentioned the benefits of clean intermittent catheterization. He shows that it promotes complete bladder emptying, avoiding residual urine and the subsequent infection risk.

Bladder Scanning. The required frequency of catheterization depends on the patient's fluid intake, bladder capacity, and bladder filling and voiding pressures. This is why it is important to add bladder scanning to the protocol to assess each patient individually and apply the protocol. The clinical practice recommends catheterization every four to six hours. Bladder scanning before clean catheterization will guide the nurse

if catheterization is needed and perform intermittent catheterization if the post-void volume is more than 400 ml (Lee, 2021).

New literature favors the use of intermittent catheterization, which poses less risk and is more convenient and better for the patient self-esteem and the quality to of life of the patients. Intermittent catheterization is recommended as the preferred method for the management of neurogenic bladder.

A Summary of the Current Science Underlying the Practice

Early management of a neurogenic bladder is important for improving the patient's symptoms and preventing urinary tract damage. The goal is to preserve renal function, decrease potential urologic complications, and improve quality of life by relieving symptoms, improving continence, and supporting independence in daily care. The evidenced-based protocol used as a backbone to educate the nurses on continence for NB patients includes bladder retraining program such as frequent toileting and intermittent bladder catheterization based on the bladder scanning residual. This protocol is not in favor of an indwelling catheter and will reduce the risk of infection and renal damage that comes with the indwelling catheter. New literature favors the use of intermittent catheterization, which poses less risk and is more convenient and better for the patient's self-esteem and the quality of life of the patients. The protocol is proposed to be used as an educational tool for the nurses. Use reduces less risk of infection and better bladder management for the patient with neurogenic bladder.

Evidence Generated for the Doctoral Project

The intended context of this doctoral project is to create an educational tool to educate the nurses on a new procedure that is efficient in neurogenic bladder management. This new procedure has been developed based on evidence from research-based findings and the evidence from conducting this project. This doctoral project will use data from participants of a rehabilitation hospital certified for caring for patients with stroke and TBI. A rehabilitation hospital in the Midwest is the setting to accomplish this project.

In order to assess nurses' understanding of the management of bladder of the NB, we decided to test their basis knowledge on the subject due to a high rate of 75 % of the patients at this rehabilitation facility with incontinence related to NB. It is therefore very important to understand how to care for those patients and help them regain continence and improve their quality of life. To assess the nurses' understanding of this new procedure, I developd a staff education program with a pre- and posttest method.

Analysis and Synthesis

Data were retrieved from the nurse pretest and posttest questionnaires. Nurse participants identifying data was not disclosed. Numbers to pair pre- and posttests were assigned to keep nurse participants' identities confidential. Data will be stored on a laptop computer with password encryption. When not in use the laptop will be locked away and stored in a secure location. The data were analyzed by utilizing IBM's SPSS software. Data were collected and recorded by making entries into an Excel spreadsheet.

The pre-and posttests are used to measure the knowledge gained from participating in a training course. The pre and posttest are a good guide to measure how much the staff has learned. The difference between the pre-post and the pretest scores represents a level of learning.

Summary

The aims and objective of the project were to evaluate the knowledge of floor nurses with educational material on managing the bowel and bladder of patients suffering from NB with the use of a pre-and posttest questionnaire-based evaluation technique. This new educational material is evidenced based practice that will eliminate the use of indwelling Foley catheters to manage NB. The protocoal was shown be beneficial in helping the patient regain continence(.

Section 4: Findings and Recommendations

Introduction

.Neurogenic bladder is a chronic bladder disorder characterized by the inability to empty the bladder completely, leading to complications such as incontinence, skin issues, and infection. The practice gap is that many physicians opt for a Foley insertion to manage NB, which can cause UTIs. In the past, this disorder was managed by inserting a long-term Foley catheter. The project site developed and recommended as management the use of intermittent catheterization along with bladder scanning as a management tool see Figure 1 for a copy of the Bladder Algorithm developed by the project site and used in this staff education.

The purpose of this project was to introduce the floor nurses to the new bladder protocol and evaluate their learning with a pre and posttest. This project emphasizes how, with training the bladder, monitoring the bladder with bladder scanning, and intermittent straight catheterization can be a better way of managing this condition.

Evidence from the literatures emphasized the positive outcome of managing the bladder via those techniques. The practice question addressed whether an education program on a bladder algorithm using a NB toileting program to promote effective NB management would increase staff knowledge of effective strategies for NB to avoid use of indwelling urinary catheters.

Findings and Implications

This project is based on evidence-based practice findings from the literature on management of neurogenic bladder. Many studies from the literatures suggest that NB

can be better managed with a blader retraining program that involves frequent toileting and emptying the bladder via clean catheterization as opposed to an indwelling catheter (Dorsher & McIntosh, 2012).

The sources of evidence generated for the project were based on the content expert review of the project prior to its implementataion and the pre and post test to evaluate expert review of the project prior to its implementation and the pre and posttest to evaluate learner gain when the education as presented to the staff. The project was conducted in an ethical manner with the Walden University's ethic approval (01-19-23-0500647).

Content Expert Review

A review group at the facility was presented to review the content of the project and provided their expert review. The expert review consisted of the bladder committee members and the administration and management of the hospital. They provided some recommendations to the project and suggested some changes that meet the facility bladder protocol. It was a useful feedback. The site management took the lead to provide written feedback on the PowerPoint presentation. The feedback provided was primarily editorial. No substantive changes in the PowerPoint were made based on the feedback provided.

Pretest and Posttest of Learner Gain

A pre and posttest were administered to 10 nurses at the hospital to evaluate the effectiveness of this staff education. Ten registered nurses were invited, and they agreed to participate to the project. They were given the IRB-approved consent form to read and

understand. The 10 nurses were first given a pretest then the education was provided via a PowerPoint presentation. The PowerPoint content was guided toward teaching them the importance of the bladder protocol and the toileting program involved with the bladder protocol. At the end of the presentation, a posttest was administered to the same nurse. The goal was to evaluate their learning after the presentation by comparing the pre and posttest. I noticed when comparing the pretest and posttest that all scores were higher than the pretest suggesting that learning had occurred. The nurses were able to improve their scores in the posttest compared to the pretest. This is shown in Table 1 below.

Table 1

Pretest and Posttest Scores (N = 10)

Nurse	Pretest	Posttest	Change
1	8	10	2
2	9	10	1
3	7	9	2
4	7	10	3
5	7	10	3
6	8	10	2
7	6	9	3
8	7	9	2
9	6	8	2
10	7	10	3
Range	6 to 9	8 to 10	1 to 3
M	7.2	9.5	2.3

Figure 2

Pre and Posttest Scores

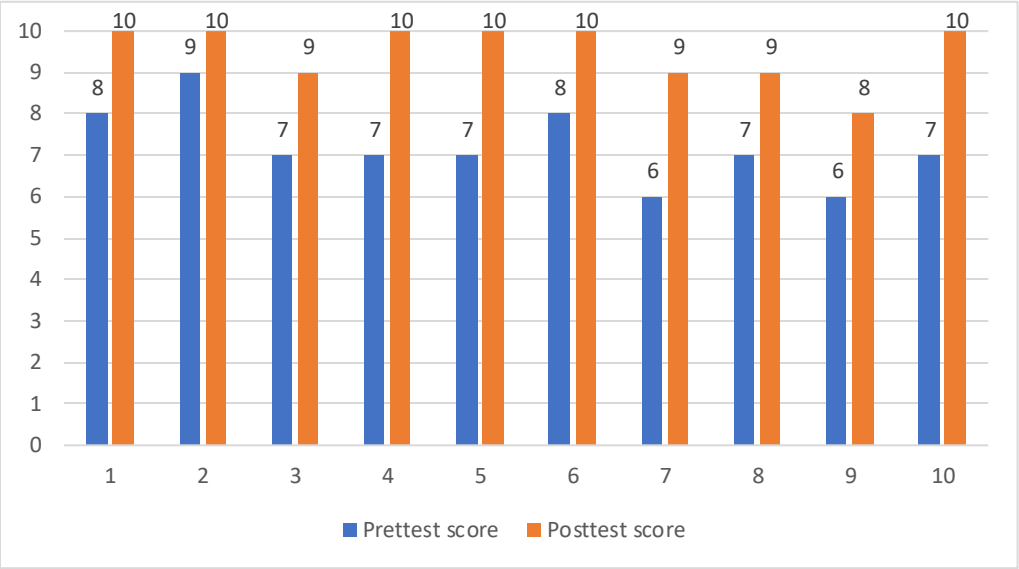
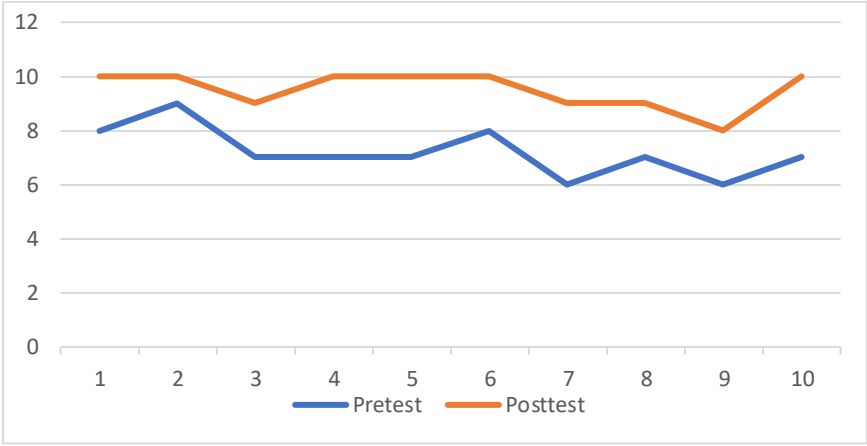


Figure 3

Pre and Posttest Scores



Recommendations

Project findings supported the effectiveness of this staff educational project based on the revised Bladder Algorithm. This project's overall recommendation is that instead of using the indwelling Foley catheter as bladder management for a neurogenic blader, the provider should recommend a frequent voiding schedule along with bladder scanning and intermittent straight catheterization as management of the disorder. Neurogenic blader is manageable and is reversible most of the time. Routine staff education is essential to inform staff of this evidence-based strategy.

Contribution of the Doctoral Project Team

The Bladder Algorithm was revised many times by the site's Bowel and Bladder Committee during the doctoral project. The committee at the site helped with the development and revision of the DNP educational project. The team was comprised of members of the site's Bowel and Bladder Committee. The education was presented to the bowel and bladder committee for review seeking their input and comments prior to presenting to staff. The team shared their knowledge and expertise during the development of the educational project and provided some recommendations to the project and suggested some changes that meet the facility bladder protocol. Project findings will be disseminated to the DNP project team leaders at the conclusion of this project.

Strengths and Limitations of the Project

This project had many strengths. The Bladder Algorithm that was the focus of the education was based on an evidenced-based approach to managing neurogenic bladder.

The project received an expert review from the bladder and bowel committee at the hospital where I conducted the project. Many of the patients at that hospital that use the frequent toileting and bladder scanning for residual and straight catheterization regained continence via this technique.

The limitations of the project lie in the fact that, first, the sample size needed to be bigger. I was able to have only ten nurses. The size being small, it is a limitation as we cannot use data from a larger sample that would allow a more generalized educational outcome. Also, another barrier or limitation I had during the project was presenting my paper at the facitilty. At the facilty expert panel which consisted of the director of nursing and the administration revise the PowerPoint presentation and made few recommendations.This limitation is a logistical limitation.This project went through the expert panel review and they took long to get back with me, which caused delay in presenting educational PowerPoint program to staff.

Section 5: Dissemination Plan

The plan is to disseminate this project findings to the clinical site that experience the problem. The ne blader protocol will be a guide for the nurses to manage NB. They will folllow the blader algorith,The project findings will be useful for the floor nurses that will use the algorithm to manage the patients with neurogenic bladder.The project will also be publish by a publishing company and will be available as a good resource for many hospitals an many clinicians to use . This project will be disseminated and published in nursing and medical journals and it will be accessible to clinicians and hospitals for use in managing neurogenic bladder

Analysis of Self

The completion of this project is an accomplishment for me.The DNP project process helped me learn and acquire many skills. I developed the staff education project with the interdisciplinary team. I learned and acquired skillful coordination, collaboration, communication skills, and teamwork while working with members of other disciplines on this interdisciplinary health care team.

This project enhanced my skills as a scholar, and my writing skills significantly improved. I learned how to critically analyze information and distinguish between relevant and irrelevant information. I learned how to find and analyze evidence-based articles and utilized them in my project.

According to Zaccagnini and White (2015) in the *Doctor of Nursing Practice Essentials,* health care delivery changes are providing nursing faculty with extraordinary

opportunities to create new models for clinical learning. These new models will afford academic nursing the opportunity to reconnect nursing education with clinical practice. According to the DNP Essentials we have to strived to lead and make changes to the evolving nursing field to improve patient care This project gave me the opportunity to develop these core competencies in an environment where the patient wellbeing is the goal. In this project the goal was to improve the care of patients with neurogenic bladder. It enhanced my skills as a DNP-prepared nurse and added relevance to my role as a leader. As a highly qualified practitioner, I got the opportunity to exert my skills with a team that developed a protocol that is now being used at that clinic for the management of NB and will impact the future health care system.

Summary

Neurogenic bladder is a chronic disease that affects many people. Management of this disorder was previously done with the use of an indwelling catheter. The clinical site developed a bladder algorithm that incorporates the use of a toileting program and bladder scanning in the management of neurogenic bladder. With the application of this bladder algorithm, many success stories were developed, and many patients regained continence. This project's aim to develop a staff education program filled the gap in educating staff nurses about an evidenced-based approach for managing neurogenic bladder and will be disseminated and published in nursing and medical journals and accessible to clinicians and hospitals.

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Appendix A: Pre- Posttest Questionnaire

Questionnaire

1. What is a neurogenic bladder?
   A. A disorder that indicates a patient is incontinent or unable to get to the bathroom
   B. Bladder malfunction that develops as we age is characterized by incontinence
   C. Bladder malfunction caused by an injury or disorder of the brain, spinal cord, or nerves

ANSWER: C

2. What is true about neurogenic bladder?
   A. It is curable with medication.
   B. It is not reversible.
   C. It can be managed with bladder therapy.

ANSWER: C

3. What element is included in a toileting schedule otherwise called "timed voiding"?
   A. Checking and changing a patient brief at regular intervals
   B. Having the patient physically sit on the toilet and try to void three times a day
   C. Attempt to void even if the sensation to void is not felt

ANSWER: C

4) A patient is sleeping. It is 0300 a.m., and the toileting schedule is due. What do you do?
   A. Let the patient sleep; it is 0300 a.m. Ask to use the toilet or commode when awake.
   B. Wake the patient and have the patient sit on the toilet or commode and try to void.
   C. Check and see if the patient is wet, change him in bed, and let him sleep.

ANSWER: B

5) A bladder scan is useful in assessing pre- and post-void residual before intermittent catheterization.
   A) True
   B) False

ANSWER: A

6) Why is the toileting schedule important to the patient?

A. Because it helps train the bladder
B. The toilet is the best place for the patient to void rather than in the brief.
C. A and B

ANSWER: C

7) What do you do first if your patient has not voided in more than 6 hours?

A. Perform a bladder scan.
B. Perform intermittent catheterization of the patient.
C. Call the doctor.

ANSWER: A

8) The patient bladder scan shows a value of 400 ml. What do you do?

A. Perform intermittent catheterization on the patient.
B. Wait 2 hours and reassess bladder volume
C. .Try double voiding, and if unsuccessful, perform intermittent catheterization.

ANSWER: C

9) Frequent toileting of the patient benefits are:

A. Helps prevent UTI
B. Preserves bladder health
C. Prevents complications
D. All of the above

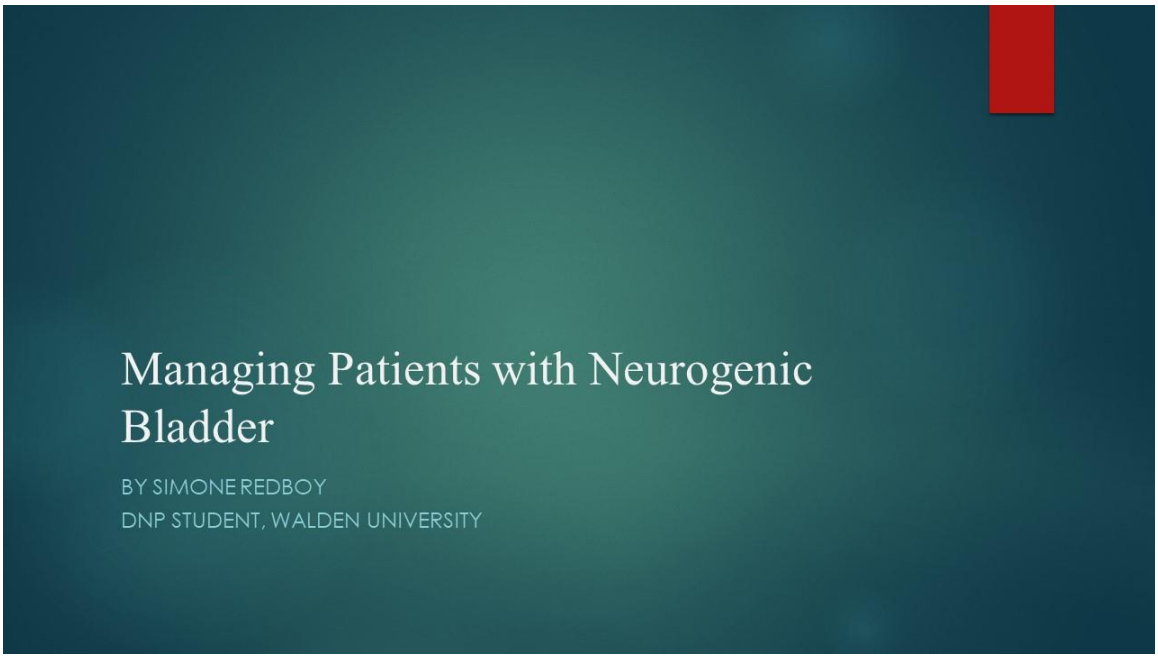
ANSWER: D

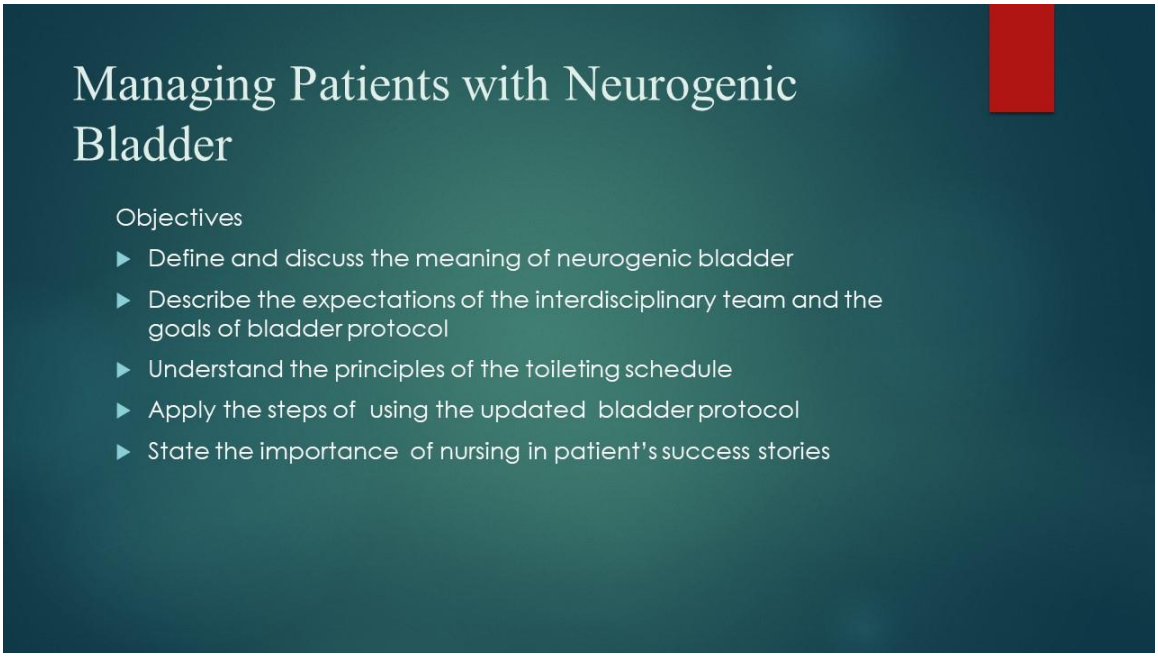
10) The nurse should perform intermittent catheterization for the patient if the Post void residual is greater than:

A. 200 ml
B. 300 ml
C. 250 ml
D. 400 ml1

ANSWER: A

Appendix B: PowerPoint





What is Neurogenic Bladder?

What is neurogenic bladder?

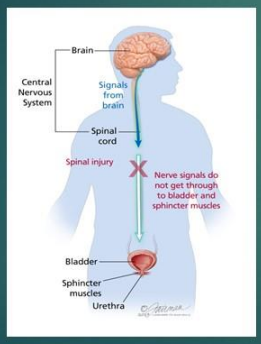
- Neurogenic bladder is a bladder malfunction caused by an injury or disorder of the brain, spinal cord, or nerves.
- Neurogenic bladder can be defined as the inability to completely empty the bladder and can lead to incontinence.
- This condition is experienced by many in the rehabilitation setting and is common among patients after a stroke, traumatic brain injury, or a spinal cord injury.
- It is important to understand management of the neurogenic bladder to help with the success of the patients served at Madonna Rehabilitation Hospital.

Understanding Neurogenic Bladder

- Neurogenic bladder sphincter dysfunction (NBSD) can develop because of a lesion at any level in the nervous system, including the cerebral cortex, spinal cord, or peripheral nervous system (Verpoorten & Buyse, 2008).
- Nerve messages go back and forth between the brain and the muscles that control the bladder when the bladder empties.
- Patients with neurogenic bladder have a disruption in communication between the nerves and muscles that control the bladder, therefore the filling and emptying of the bladder is affected.

Understanding Neurogenic Bladder

Neurogenic Bladder



Reference

- Jennifer Fairman (2019) Copyright: © Fairman Studios, 2019.Urology Care Foundation.

Neurogenic Bladder Prognosis

- Neurogenic bladder is different than stress incontinence, functional incontinence, and overactive bladder incontinence that can come from aging.
- Neurogenic bladder can be managed with a bladder management plan and therapy from a continence specialist.
- Nurses work in collaboration with the therapists to follow the orders of the toileting schedule and follow the bladder protocol for a successful regain of continence for the patients.

The Toileting Schedule

What is a toileting schedule?

- Toileting schedule is referred to as *timed voiding* and is characterized by a fixed interval time between toiletings (Ostaszkieick et al., n.d.).
- The nurses assess and document the voiding pattern of the patients, and the continence specialist will review and evaluate who needs a toileting program.
- The goal the toileting program is to retrain the bladder.

Toileting Schedule

- The patient is assisted to sit on the commode or the toilet at specific times.
- That positioning helps the brain send a signal to the bladder to empty.
- Performing the toileting schedule and having the patient physically sit on the toilet or commode will help the brain signal the bladder to empty several times throughout the day, and in the long term, the patient will regain continence.

Toileting Log

toileting log

Name:					Week of:					
	Date:		Date:		Date:		Date:		Date:	
	Toilet	Pants	Toilet	Pants	Toilet	Pants	Toilet	Pants	Toilet	Pants
9:00am										
9:30am										
10:00am										
10:30am										
11:00am										
11:30am										
12:00pm										
12:30pm										
1:00pm										
1:30pm										
2:00pm										
2:30pm										
3:00pm										
3:15pm										

D if dryclean, U if urinated, BM if bowel movement, U & BM if both

What Does Toileting Schedule Means?

- A- physically helping the patients to the commode or the toilet ?

- B-checking and changing a patient in bed?

Toileting Schedule Meaning

Yes

- It means physically helping the patients to the commode or the toilet.
- That helps retrain the brain and the bladder

No

It does not means checking and changing a patient in bed

Bladder Protocol

- There is a new bladder policy developed by the bowel and bladder committee. The goal is to assist the nurses on the floor to manage the patient bladder and to make the patients rehabilitation successful by helping them able to regain continence and go home as independent as possible.
- The bladder algorithm is what the Committee used to develop the Bladder Management Screen.
- The Bladder Algorithm is an important resource that is available for the floor nurses to put in practice.
- The protocol is a very good guide for the floor nurses to follow in managing the patient bladder.

Definitions

- **Bladder incontinence:** Lack of voluntary control over urination; may be due to lack of sensation, behavioral reasons or physical and/or cognitive impairments.
- **Bladder Volume Index (BVI):** A volume estimate of urine in the bladder determined by scan.
- **Post void residual BVI:** The volume of urine left in bladder after a void.
- **Pre void BVI:** The volume of urine in bladder before voiding (Anderson, 2022).
- **Clean intermittent catheterization (CIC):** A technique used to empty the bladder via a catheter at some intervals of time. The patient or caregiver may use clean technique with a catheter to drain urine from the bladder (Lee,2021).

Baillargeon L, Woodbury B. Bladder Post Void Residual Volume. [Updated 2022 May 8]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2022 Jan-. Available

Definitions

- **Double void:** A technique that may assist the bladder to empty more effectively when urine is left in the bladder by attempting to pass urine more than once each time you void. For example: Void, shift position, and attempt to void again (Anderson, 2022).
- **Intake and Output (I & O):** Measurement of any fluid taken in and put out (Anderson, 2022).
- **Intermittent catheterization (IC):** Caregiver insertion and removal of a clean or sterile catheter to empty the bladder based on individual patient needs; use of a sterile catheter at this site (Lee,2021).

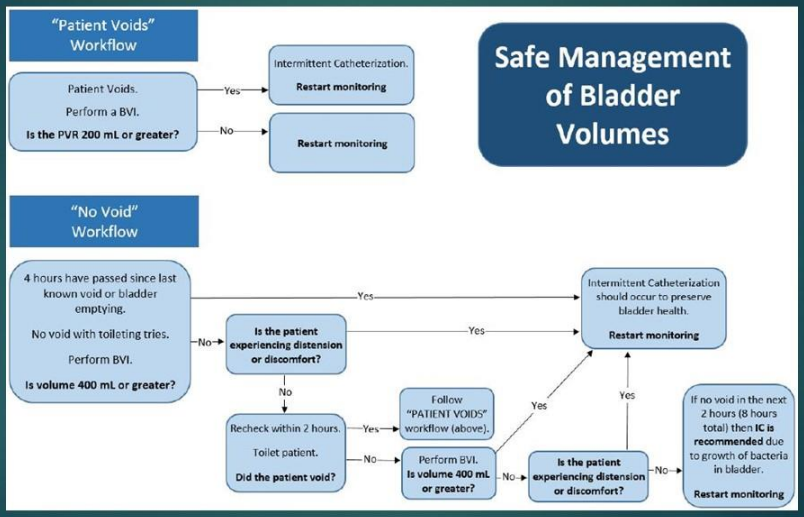
Bladder Protocol

- The protocol is a guide and reference for nurses to manage the patients with neurogenic bladder.

A. Inability to void after 4 hours perform a BVI:
   i. If BVI is 400 mL or greater, intermittent catheterization is indicated.
   ii. If BVI is less than 400 mL recheck the patient within 2 hours and
      1. Toilet the patient
         a. If able to void, follow post-void BVI guidance. See "A" Post-Void BVI.
         b. If unable to void, intermittent catheterization may be indicated if bladder distension or discomfort is assessed.
            i. If intermittent catheterization occurs then re-assess at next void ("A") or at 4 hours if no void ("B").

- If intermittent catheterization doesn't occur follow up must occur within 2 hours (eight hours total since last known void) (Anderson, 2022).
- For a post void BVI of more than 200 ml the protocol states to perform straight catheterization for the patient.

Safe Management of Bladder Volumes



Bladder Protocol

- **Notification of Licensed Practitioner:**

I. Notify the licensed practitioner for a new admission if inability to void, urinary retention or incontinence continues for 72 hours.

II. Notify the licensed practitioner for any established patient with new signs or symptoms of retention within 24 hours.

The 4 **WHYs** OF BLADDER MANAGEMENT

PREVENTION OF INFECTION

- ✓ Urine sitting in the bladder for greater than 4-6 hours increases risk for urinary tract infection. Excessive urine in the bladder can reflux back into the kidney and cause infection or kidney damage. Hygiene is an essential part of infection prevention!

PROTECT BLADDER HEALTH and PROTECT SKIN INTEGRITY

- ✓ Excessive urine volumes in the bladder can overstretch this muscle, which can cause long-term damage. The bladder is similar to a balloon - if it is overstretched it cannot return to its original size. Emptying the bladder too frequently causes the bladder to shrink and become less effective in storing urine when a restroom is unavailable.
- ✓ Poor bladder management can lead to skin break down, pressure injuries, and infections

PROMOTE CONTINENCE

- ✓ Bladder management can assist significantly in preventing incontinence episodes. Strategies of bladder management may allow for greater control in managing urgency, frequency, and leaking.

IMPROVE QUALITY OF LIFE

- ✓ A sound bladder management plan can increase independence, decrease risk for complications, and maximize time to engage and participate in life outside the restroom.

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