LAPIN AMK
Lapland University of Applied Sciences

PERFORMING A STERILE FEMALE URINARY INDWELLING CATHETERISATION AND REMOVAL

A Video Guide

Oyelere Lydia Solomon

Bachelor of Health Care

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Abstract of Thesis

LAPIN AMK
Lapland University of Applied Sciences

Degree Programme in Nursing
Bachelor of Health Care

Author	Lydia Solomon Oyelere	Year	2024
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Tittle of Thesis	Performing a sterile female urinary indwelling catheterisation and removal		
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This thesis, commissioned by Lapland University of Applied Sciences, focused on creating a video and a guide for performing sterile indwelling catheterisation and removal on female patients. The purpose of this thesis is to produce a video to teach and demonstrate how to successfully perform female indwelling catheterisation and removal in a sterile and aseptic manner. The aim is to expand the knowledge and skills of international nursing students on the female catheterization process and its aseptic technique. This thesis explains and demonstrates the process of sterile insertion and removal of female indwelling catheters.

The thesis report is divided into three sections: theory, implementation, and evaluation. The theory section covers the urinary system, types of urinary catheters, complications associated with catheterisation, the importance of sterile technique in female catheterisation, and patient safety guidance. Emphasizing safety is essential to help students prevent infections and ensure high-quality care. Various resources were utilized, including the school library, e-articles, and online publications. Additionally, guidelines for catheterization provided by THL were carefully followed.

The video was filmed at the Lapland University of Applied Science Kemi campus and edited with the iMovie application. Voice-over narration and supporting images were added to explain each step. The final video will be saved and uploaded to the commissioner YouTube channel, making it accessible as a teaching resource for other students.

Key words — Indwelling, video guide, sterile female catheterisation, nursing student, nurse

Other Information — The thesis includes a video submitted to the commissioner.

LAPIN AMK
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Opinnäytetyön tiivistelmä

Sairanhoitajakoulutus

Sairanhoitaja (AMK)

Tekijä	Lydia Solomon Oyelere	Vuosi	2024
Ohjaaja	Sirpa Orajärvi		
Toimeksiantaja	Lapin ammattikorkeakoulu		
Työn nimi	Steriilisti suoritettava naisen virtsarakon kestokatetrointi ja katetrin poistaminen		
Sivu- ja liitesivumäärä	49		

Tämä Lapin ammattikorkeakoulun tilaama opinnäytetyö keskittyi videon ja oppaan luomiseen naispotilaiden steriilin kestokatetroin ja poiston suorittamiseen. Tämän opinnäytetyön tarkoituksena on tuottaa video, joka opettaa ja demonstroi kuinka onnistuneesti suoritetaan naisten kotikatetrointi ja -poisto steriilisti ja aseptisesti. Tavoitteena on laajentaa kansainvälisten sairaanhoitajaopiskelijoiden tietoja ja taitoja naisten katetrointiprosessista ja sen aseptisesta tekniikasta. Tämä opinnäytetyö selittää ja esittelee naisten kestokatetrien steriilin asettamisen ja poistamisen

Opinnäytetyöraportti on jaettu kolmeen osaan: teoria, toteutus ja arviointi. Teoriaosuudessa käsitellään virtsatiejärjestelmää, virtsakatetrityyppejä, katetrointiin liittyviä komplikaatioita, steriilin tekniikan merkitystä naisten katetroinnissa sekä potilasturvallisuusohjeistusta. Turvallisuuden korostaminen on välttämätöntä, jotta opiskelijat voivat ehkäistä infektioita ja varmistaa laadukkaan hoidon. Käytettiin erilaisia resursseja, kuten koulun kirjastoa, sähköisiä artikkeleita ja verkkojulkaisuja. Lisäksi THL:n antamia katetrointiohjeita noudatettiin tarkasti.

Video on kuvattu Lapin ammattikorkeakoulu Kemin kampuksella ja editoitu iMovie-sovelluksella. Ääniselostus ja tukikuvat lisättiin selittämään jokaista vaihetta. Lopullinen video tallennetaan ja ladataan Lapin ammmattikorkeakoulu YouTube-kanavalle, jolloin se on kaikkien opiskelijoiden käytettävissä opetusresurssina.

Avainsanat	kestokatetri, video-opas, steriili naisten katetrointi, sairaanhoitajaopiskelija, sairaanhoitaja.
Muut tiedot	Opinnäytetyö sisältää komissaarille toimitetun videon.

CONTENTS

FORWARD

First and foremost, I dedicate this work to my beloved late father, whose memory remains a source of strength and inspiration to me each day. To my mother and siblings, nephew, and nieces thank you for your unwavering support and belief in me.

I extend my deep gratitude to my mother-in-law for her constant encouragement and prayers. My father-in-law, who recently passed on, your support and kindness have left a lasting impact on me and my family.

I would also like to appreciate my teachers at Lapland University of Applied Sciences. Your guidance, knowledge, and mentorship have been instrumental in shaping my understanding and skills throughout my studies in nursing. Thank you for fostering an environment of learning and compassion that will serve me well in my career. To Lapland University of Applied Sciences, thank you for providing access to the simulation room and necessary instruments for the video production.

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1 INTRODUCTION

Urinary catheters have been in use for over 5,000 years, with early examples dating back to around 3,000 B.C. in ancient civilizations. These early devices were fashioned from natural materials, such as hollow reeds, palm leaves, or metal tubes made from copper, silver, or gold. Their main function was to alleviate urinary retention, a potentially life-threatening condition if left untreated. (Feneley, Hopley & Wells 2018.)

Urinary catheterisation is a vital medical procedure used to manage various urological conditions and emergencies. It is a process of putting a thin tube (called a catheter) into the urethra and bladder to help drain urine, monitor urinary output, or administer medications. This procedure is commonly performed in hospitals, clinics, or care facilities, and it is essential for patients who are unable to void urine naturally due to medical conditions, surgery, or other factors. (Levin & Slobodov 2018.) Urinary catheterization means putting a single-tube catheter into the bladder to help drain urine, this an invasive medical technique. This medical procedure is often done by nurses in the healthcare setting (Newman, Quallich, Hull, Powley & Wall 2021.) The female urethra typically measures around 4 cm in length and lacks the natural curvature found in the male urethra. Unlike the male urethra, there are no identifiable anatomical segments within the female urethra (Biachi, Leslie & Chesnut 2023). The female bladder is susceptible to myogenic injury caused by over-distension; therefore, nurses must fully understand how the structure of the bladder and how it functions. (Richens 2016).

The process of catheterisation should be carried out in an aseptic manner to evade infection of the urinary tract. Techniques used for the catheterisation must be critically measure when performing catheterisation so that it should not be a factor by which infections of the urinary tract is contracted. (Gonzalez & Sole 2014.) The topic of performing a sterile female urinary indwelling

catheterisation and removal is of paramount importance in the realm of healthcare. This critical medical procedure is employed for various clinical purposes, such as monitoring urinary output, relieving urinary retention, and preventing complications in patients with specific medical conditions. Catheterisation is not without risks, and maintaining sterility is pivotal to minimizing complications. Nurses are tasked with safeguarding patient safety and minimizing harm while delivering care in various healthcare environments, whether short-term or long-term (Matlhaba & Nkoane 2022).

Catheterisation is a relevant topic for this study because it serves as a practical and visual guide, that will help the international nursing students at Lapland University of Applied Sciences better understand the procedure. The overall aim of this thesis is to equip the international students at the Lapland University of Applied Science with necessary clinical skills and to acquire a comprehensive understanding of the principles and practices involved in sterile female urinary indwelling catheterisation and removal through an instructional video. The purpose of this thesis is to produce a video to teach and demonstrate how to successfully perform female indwelling catheterisation and removal in a sterile and aseptic manner. The aim is to expand the knowledge and skills of international nursing students on the female catheterization process and its aseptic technique. This thesis explains and demonstrates the process of sterile insertion and removal of female indwelling catheters. In addition, the thesis will cover patient guidance, safety, procedure, and complications associated with catheterisation that may occur due to poor handling and placement of catheters.

2 PURPOSE AND AIM

The overarching aim of this thesis was to equip the international students at the Lapland University of Applied Science with the necessary clinical skills and to acquire a comprehensive understanding of the principles and practices involved in sterile female urinary indwelling catheterisation and removal through an instructional video. The purpose of this thesis is to produce a video to teach and demonstrate how to successfully perform female indwelling catheterisation and removal in a sterile and aseptic manner. The aim is to expand the knowledge and skills of international nursing students on the female catheterization process and its aseptic technique. As part of this thesis, an instructional video based on evidence-based practices was created in English to demonstrate the process of implanting and removing an indwelling urinary catheter. The video is tailored for international students at Lapland University of Applied Sciences to support their learning. It will help them to achieve key clinical skills and knowledge of the principles and procedures related to sterile catheterisation and removal of female urinary indwelling catheters.

3 THE PROCESS OF FEMALE URINARY CATHETERISATION

3.1 Theory of catheterisation

3.1.1 The urinary system

The human body consists of various systems, and among them is the urinary system, which plays a crucial role in producing, storing, and eliminating fluid waste. The kidney is an essential organ of the urinary system (Keller 2018). The kidney is a crucial part of the urinary system (Keller, 2018). It is responsible for removing waste and medications from the body, keeping fluid levels balanced, controlling blood pressure, and helping produce red blood cells. Urine flows from the kidneys to the bladder through a pair of ureters. The bladder, located in the lower abdomen, is a hollow organ that stores urine. Its walls expand to hold urine and contract to release it through the urethra. (O'Callaghan 2016.) Figure 1 presents the structure of the female urinary system.

The urethra is the pathway through which urine exits the body, serving as the final part of the urinary system. In men, it is about 20 centimetres long and passes through the prostate gland, the perineal muscles, and the penis. In women, it is much shorter, around 4 centimetres, and is located near the pubic symphysis. The urine exits through the external urethral opening, which in women is located between the clitoris and the vaginal opening. (Tortora & Derrickson 2014.)

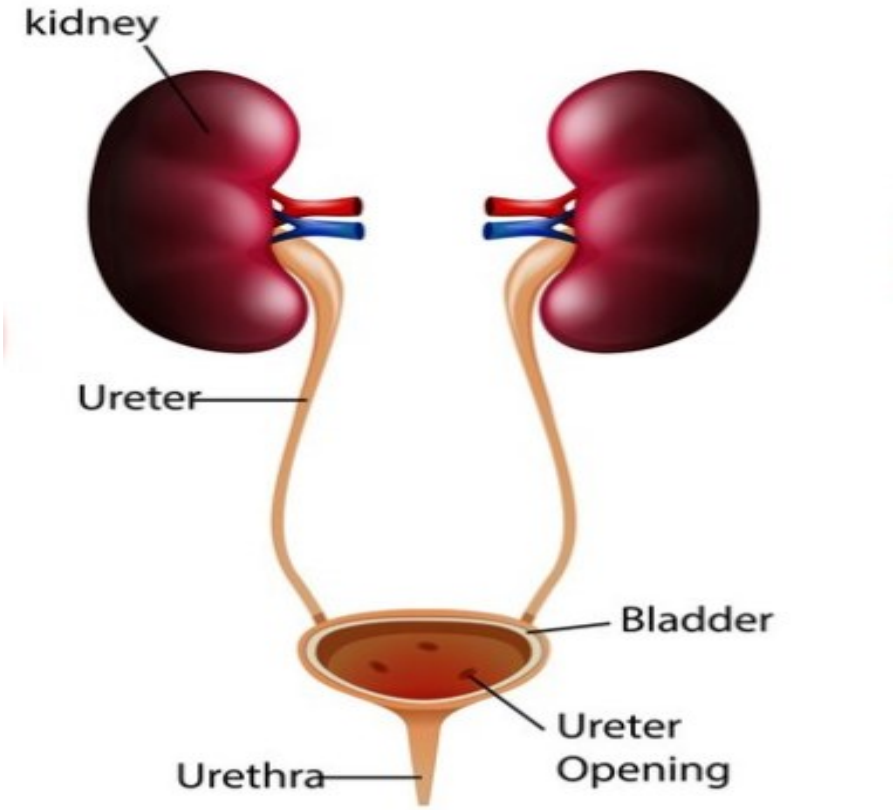

Figure 1. The structure of the female urinary system (Source: Designed by Freepik)

3.1.2 Urinary catheter

A urinary catheter is a flexible medical instrument featuring a hollow channel, designed for insertion through the urethra or a surgically created opening in the abdomen. Its primary function is to aid in removing urine from the bladder. (McIlvaine 2018.) A urinary catheter is a pliable tube intended for insertion into the bladder to assist with urine draining, commonly used in medical settings for individuals who cannot urinate on their own due to medical conditions, surgical procedures, or injuries. (Meddings, Saint, & Fowler 2019). This device enables urine to pass directly from the bladder into an external collection bag, making it particularly beneficial for individuals who are confined to bed or dealing with

urinary retention, a condition where the bladder cannot be completely emptied, or undergoing surgery where they are under anaesthesia or cannot control their bladder function. Catheters can serve a short-term purpose or be left in place for long-term care, depending on the specific medical needs of the patient (Meddings, Saint, & Fowler 2019). A urinary catheter is typically designed from silicone-coated soft latex, this type of catheter is particularly advantageous for prolonged use without removal. Its design helps prevent easy accumulation of dirt or bacteria from urine, reducing the risk of blockages. Consequently, it can be in use for some time, atleast for 5 to 8 weeks. (Hera & Dolejsova 2021.) Various kinds of urinary catheters are available, each designed to address various conditions and preferences (Stickler, 2014).

3.1.3 Reason for sterile female indwelling catheterisation

Urinary catheterisation is commonly used in cases of urinary difficulties, including conditions like incontinence, retention, surgical procedures, spinal cord injuries, or neurological disorders. Additionally, catheterisation serves the purpose of measuring urine output in patients, assessing residual volume, and providing comfort to terminally ill individuals. (Hill & Mitchell 2018.)

The urinary catheter is a crucial medical tool, used for various purposes in healthcare. These include alleviating urinary retention and precisely tracking urine output, administering medications, facilitating urinary system management during surgical procedures, implementing bladder irrigation for haematuria management, this involves assisting with fistula care and supporting healing, performing diagnostic procedures, maintaining skin health, and identifying disorders in the lower urinary tract. Post-urological surgeries, such as distal to mid-shaft hypospadias, urinary catheterisation is employed to measure urine output during and after surgery while preventing possible urinary retention. Intra- and postoperative urine output and prevent potential acute urinary retention resulting from post-surgical swelling and discomfort. (Rohan & Amarasekara 2019.) When clean intermittent self-catheterisation is impossible for patients,

the utilization of an indwelling catheter should be considered. The length of time the catheter is used varies based on clinical needs, ranging from short to long-term (Roger, Hopley, & Peter 2015).

Healthcare providers must base the decision to undertake catheterization on a comprehensive evaluation of the individual, ideally involving collaboration with the patient. This evaluation should taken into account the patient's medical history, with special consideration for those at increased risk. Such individuals may include, but are not limited to, those with weakened immune systems, organ transplants, or artificial heart valves. Catheterisation should only be pursued when its advantages for the patient surpass the potential risks involved. (Janet, Sarah, Lorraine & David 2023.)

3.2 Types of urinary catheter

Urinary catheters are generally classified into two main types: intermittent and indwelling catheters. Intermittent catheters are used temporarily, being inserted to drain the bladder and then removed. In contrast, indwelling catheters are designed to stay in place for longer durations, such as several days or weeks, and are held securely within the bladder by an inflated balloon. (NHS 2023.)

The primary options for addressing difficulties with bladder emptying are single-use and indwelling catheters. However, in the treatment of urine incontinence, indwelling catheter should not be considered the first choice. Alternatively, diapers or external urine collectors such as urinals should be used. (Terveyden ja hyvinvoinnin laitos 2022)

3.2.1 Indwelling catheter

An indwelling catheter, commonly referred to as a Foley catheter, is a type of catheter introduced either through the urethra or via a small incision in the abdomen. They are specifically designed to remain within the body for continuous bladder drainage for extended periods. These catheters are

professionally inserted and can remain for a specific time. (McIlvaine 2018.) These catheters have a balloon located at the end of the tube, usually filled with 10 ml of sterile water, to keep the catheter in place within the bladder. A drainage bag is then attached to the catheter, establishing a closed system. Most Foley catheters are constructed from latex, so nurses must ascertain any latex allergies beforehand. It's important to note that latex can irritate women who have received epidural anaesthesia, although this may not be immediately evident. (Yana 2016.) The balloon sits at the bottom of the bladder, blocking the urethra and guiding urine through the catheter. These balloons are usually filled with 10ml to 30ml of fluid. It's important not to use saline to inflate the balloon, as it can form crystals inside, leading to blockages. Saline can also make it harder to deflate the balloon and remove the catheter. (Newman 2021)

An indwelling catheter, a flexible tube placed in the bladder, is used to constantly collect and drain urine. The catheter is connected to a sterile urine collection bag designed to capture and store urine for convenient monitoring and disposal. This bag includes a bottom drainage valve, which allows for easy emptying without the need to disconnect the catheter from the bag, reducing the risk of contamination. It is essential to open this valve only when the bag is about half full to prevent excessive weight on the catheter and to avoid backflow, which can increase infection risk. Maintaining the valve securely closed at all times, except when actively draining, is critical for preventing the entry of bacteria that could cause urinary tract infections. Infection prevention is further supported by positioning the urine collection bag lower than the bladder. but above the ground. Keeping the bag below the level of the abdomen ensures that gravity facilitates a steady flow of urine without causing backflow into the bladder. Placing it above ground level prevents accidental contamination from surfaces. Proper positioning and handling techniques significantly reduce the risk of complications associated with catheter use, ensuring patient safety and comfort. (Medical News Today 2019)

Indwelling urinary catheters are either inserted transurethrally or suprapubically. Transurethral indwelling catheterisation is the process of placing a catheter into the bladder via the urethra. Figure 2 presents an indwelling catheter with an indication of an inflated balloon, while Figure 3 represents indwelling catheter illustration. Suprapubic catheterisation is the process of placing a catheter into the bladder through an opening made in the lower abdomen, above the pubic area. This procedure involves making a small incision just above the pubic bone. It is usually carried out by a urologist. Long-term catheterisation can lead to various serious issues, such as urinary tract infections, inflammation of the urethra, bladder spasms with pain and leakage, and other bladder-related issues. (Newman 2021.)

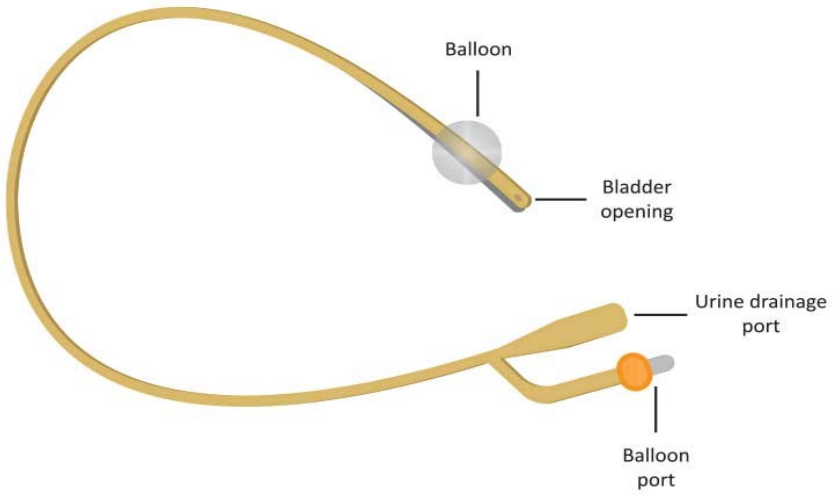

Image 2: Indwelling catheter with an indication of an inflated balloon (Source: Ausmed, 2022)

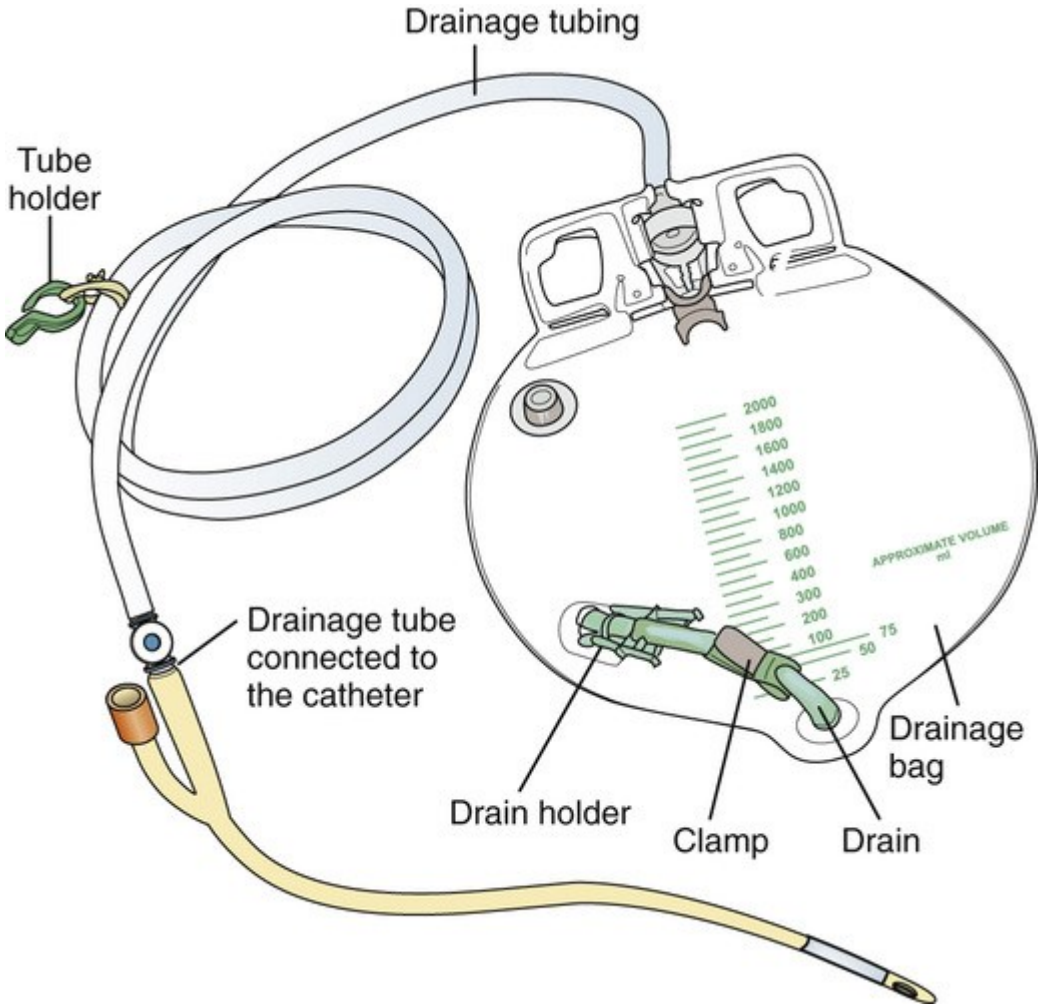

Image 3: Indwelling catheter illustration (Source: Nurse key 2017)

3.2.2 Intermittent catheter

Intermittent catheterisation is a frequently employed method for individuals encountering difficulties with bladder emptying. The process includes placing a hollow tube, called a catheter, either through the urethra into the bladder or through a surgically created opening in the skin. The catheter is drained several times a day, often by a healthcare professional, the patient themselves, or with the help of a caregiver. (Prieto, Murpy, Stewart & Fader 2021.) Patients using intermittent catheters should receive thorough instruction on the proper technique for catheter insertion. The catheter typically comes pre-lubricated to

minimize discomfort during insertion. Figure 4 illustrate intermittent catheter. One end of the catheter is left open to allow urine to drain into a toilet, or it may be connected to a collection bag for urine. The other end is carefully guided through the urethra until it reaches the bladder and urine starts flowing. After the urine stops flowing, the catheter can be taken out. The used catheter is discarded, and a fresh one should be used for each new insertion. (NHS 2023.)

Image 4: Intermittent catheter. (Source: Urology today 2021)

3.2.3 Tieman catheter

A Tiemann catheter is a kind of urinary catheter that features a tapered, curved tip, specifically designed to facilitate easier insertion through narrow or obstructed urethral passages. This catheter, sometimes called a "coude catheter" due to its bent shape, is often preferred for male patients with prostate enlargement, strictures, or other obstructions that can make the urethra difficult

to navigate with a standard straight catheter. The angled tip of the Tiemann catheter helps it bypass these obstacles by allowing it to more easily follow the natural curve of the urethra, reducing discomfort and risk of trauma during insertion (Anderson, Meyers & Clark 2018).

Tiemann catheters are usually crafted from flexible substances such as silicone or latex and are available in different sizes and lengths to accommodate the needs of patients. The catheter's tip is not only angled but also slightly firmer, giving healthcare providers better control and precision during catheterisation. They are frequently used in both short-term and intermittent catheterization procedures where patients have urethral narrowing, as in the case of benign prostatic hyperplasia (BPH) or other urological conditions (Stamm, 2019).

Compared to standard Foley catheters, which have a straight tip, Tiemann catheters are used less frequently but are considered especially useful in cases where urethral anatomy complicates catheterisation. Proper training in their insertion is essential, as they are typically recommended for use by healthcare professionals with experience in catheterisation to prevent injury and ensure proper placement (Smith, 2020).

3.2.4 Nelaton catheter

A Nelaton catheter is a type of straight urinary catheter that has a rounded end, primarily used for intermittent catheterization. Unlike other catheters designed for long-term use, the Nelaton catheter is designed for short-term use, without an inflatable balloon, to drain urine from the bladder before being removed once the bladder is emptied. It is typically made of PVC, silicone, or latex and comes in various sizes to suit different patient needs (Geng, Zhang & Wei 2020).

The rounded, straight tip of the Nelaton catheter makes it suitable for patients who do not have significant urethral obstructions or complications that would require a curved or specialized catheter. Nelaton catheters are commonly used in self-catheterization, especially for individuals who need to intermittently empty

their bladder due to conditions like spinal cord injuries, neurological disorders, or bladder retention. For male and female patients, the length and size of the Nelaton catheter can vary, as female catheters are often shorter for easier use (Carr, Shaw & Bennett 2018).

Proper hygiene and technique are critical when using a Nelaton catheter to reduce the risk of infection, as intermittent catheterization can lead to urinary tract infections (UTIs) if not done with care. The catheter is available as a single-use device in many settings to further lower the risk of bacterial contamination (Chen, Zhang & Li 2019).

3.3 Sizes of catheter

Catheters are sized according to their outer diameter using a system called the French (Fr) gauge, which ranges from 6 to 18 Fr, with each unit representing 0.33 mm. It is advised to choose the appropriate catheter size, usually between 14 to 16 Fr, to ensure proper drainage. Larger catheters, such as those 18 Fr or greater, should be avoided due to the risk of complications. These can include increased damage to the bladder neck and urethral lining, formation of strictures, and inadequate drainage of secretions from the periurethral glands, which may lead to irritation and infection. Additionally, larger catheters can cause discomfort and pain (Newman 2021). In Finland, standard catheter sizes differ by age and gender: females typically use catheters sized 10-14 Ch, males 12-16 Ch, and children 6-10 Ch. (Rautava-Nurmi et al. 2019)

Male catheters are usually longer compared to female catheters. The commonly used catheter model is the hydrophilic straight and round tip catheter, they are coated with sterile water or saline according to the instructions provided by the manufacturer. Separate training is required for the use of specialized catheters. (Terveyden ja hyvinvoinnin laitos 2022) Indwelling catheters are available in various balloon capacities, ranging from 3 ml to 30 ml, with the 3 ml size being appropriate for paediatric patients, while continuous bladder drainage typically requires a 30 ml balloon. The balloon size is typically indicated on the catheter

port. In adult patients, a 10 ml balloon is generally sufficient. However, using a larger balloon size, such as 30 ml, for an extended period can lead to increased discomfort, tenderness, potential injury, and a higher risk of catheter ejection. (Perry, Potter, & Ostendorf 2016.)

3.4 Catheterisation procedure

Before commencing the urinary catheterization procedure, it is essential that nurses prioritize and protect patient privacy, as maintaining dignity is a core principle in patient care. Privacy measures should begin with preparing the environment to create a sense of security and comfort for the patient. This includes drawing curtains or using portable privacy screens around the patient's bed to limit exposure, and whenever possible, using a private or single-patient room to enhance confidentiality and comfort. Additionally, all non-essential body parts should be covered with clean sheets or blankets, ensuring that only the necessary areas are exposed to minimize feelings of vulnerability (Terveyden ja hyvinvoinnin laitos 2022). In addition to physical privacy, nurses should offer clear, step-by-step guidance to help alleviate patient anxiety and promote understanding of the procedure. Before beginning, it is essential to explain the procedure in simple, respectful language, addressing any questions or concerns the patient may have. This helps foster a collaborative and supportive environment and empowers the patient to participate actively in their care, enhancing trust. (Wagner & Dolan 2022.)

During catheterization, nurses must also monitor the patient's physical comfort, health status, and orientation. Observation includes watching for signs of distress, pain, or confusion, as these can impact both the procedure's effectiveness and the patient's well-being. Continuous communication with the patient, including verbal reassurances, can help maintain orientation and comfort. Observing for indicators of discomfort or anxiety, and addressing them promptly, also helps prevent complications and supports a positive patient

experience (Smith, Owens & Conley 2022.) To foster respect for privacy and confidentiality, nurses should limit the number of staff present to only those necessary for assistance or supervision, minimizing exposure and fostering a more respectful environment (Wagner & Dolan 2022). Comprehensive attention to privacy, clear communication, health monitoring, and individualized care contributes to a compassionate and dignified approach to urinary catheterization, aligning with best practices in patient-centered care.

3.4.1 Aseptic technique

Proper hand hygiene and aseptic techniques are vital for ensuring the safety and effectiveness of nursing interventions (Wikstrom, Dellenborg, Wallin, Gillespie, & Andersson 2018). Medical personnels must adhere to rigorous aseptic techniques to minimize the presence and proliferation of microorganisms. Aseptic techniques include hand washing, sanitizing hands, sterilizing equipment, and cleaning and disinfecting the insertion site. (Wright 2020.) Aseptic techniques are commonly applied in patient treatment and care to minimize the introduction of microorganisms. The procedure of sterile indwelling urinary catheterisation is typically conducted aseptically to reduce the risk of post-catheterisation infections for patients and to minimize the potential transmission of infectious microorganisms to healthcare workers. (Nursing Bird 2023.) Infection introduction can be minimized by employing rigorous aseptic techniques along with the application of an antiseptic gel. In a situation whereby the catheter is placed wrongly into the vaginal canal, it must be discarded, and a new catheter should be utilized (Yana 2016).

Skilfulness in aseptic technique is vital for infection prevention; however, mastering this technique can be challenging. In cases of urinary catheter insertion, failure to properly follow strict aseptic procedures has been linked to infections and sepsis (Gonzalez & Sole 2014). Hand disinfectant must be applied before and after touching the catheter site or device. If any breaches in aseptic technique, disconnections, or leaks occur, the catheter and drainage

system should be replaced immediately. It is essential to use a sterile, closed, and unobstructed drainage system for indwelling catheters. (Assadi 2018.)
One crucial requirement across various healthcare settings is a sterile table

3.4.2 Preparation of sterile table

One crucial requirement across various healthcare settings is a sterile table. These settings encompass operating rooms, invasive procedures like treating wounds less than 24 hours old and placing catheters. Additionally, sterile tables are essential in outpatient clinics, wards, and emergency services (Valvira 2022). In Finland, maintaining sterility during urinary catheterisation is essential to prevent infections and ensure patient safety. Finnish healthcare guidelines outline specific procedures for setting up a sterile surface, focusing on maintaining sterility and minimizing the chance of contamination. (Valvira 2022). Before using any supplies, it is essential to check the sterile packaging for any damage, discoloration, signs of contamination, and the expiration date. Likewise, the container of the instrument should be inspected for proper sealing, sterility, and the secure fit of the lid and filter prior to use (Valvira 2022).

Pieces of equipment required during this procedure include an indwelling catheter, sterile protective gloves from factory clean environment, a factory-clean laundry basket with folds or a pre-packaged laundry set, a sterile instrument for bladder catheterisation, sterile water or saline for cleansing, individually packaged anaesthetic gel syringes, alternative lubricant according to manufacturer's instructions if anaesthesia is contraindicated, A 10% glycerol solution, hypertonic saline, or sterile water, depending on the catheter requirements, and a sterile syringe for inflating the balloon, urine collection bag and holder, bed cover and tape for securing the catheter (THL 2023). The person performing the Catheterisation or assistant disinfects their hands and gathers the catheterisation supplies on the sterilized cleaned surface (THL 2023). Before placing the package, disinfect the table. Setting up the table involves several steps: first, disinfect your hands. Then, place the catheter pack

on the table, opening the outermost flap away from you. Open the other flap outward, allowing it to lay flat. Once the pack is set up, add the necessary equipment, such as the catheter. Remove its cover and position it on the sterile surface. Place a 10ml syringe, lidocaine, and hand disinfectant within easy reach, ensuring the urine bag is also readily available. (Holroyd 2016.)

3.4.3 Patient preparation

Before catheter insertion, it is essential to perform a thorough risk evaluation. Whenever feasible, obtain and document the patient's informed consent after discussing the benefits, risks, and impact on lifestyle and sexual relationships associated with catheterisation. Provide appropriate care and assistance to the patient, ensuring their privacy, dignity, and the choice to having a chaperone present if needed. (Yates 2017.)

Having a urinary catheter should not limit regular activities. Patients should be guided on when it's safe to resume work and normal routines. Gentle exercise aids catheter drainage, and swimming is feasible with an indwelling catheter securely in place. Ensure proper support for both the catheter and leg bag to minimize bladder neck/urethral traction and promote comfort. A G-strap, which is a retention strap designed to hold the catheter securely and comfortably against the leg, can serve as a retaining strap, securely and comfortably holding the catheter tubing against the upper thigh, allowing for natural movement. Although indwelling catheters may pose more challenges, sexual activity is usually still possible. (NHS 2023)

3.4.4 Putting on sterile gloves

Sterile gloves are single-use gloves that have been sterilized to eliminate any micro-organisms, maintaining a sterile barrier between the healthcare provider's hands and the patient. These gloves are typically used in invasive or high-risk procedures to minimize the likelihood of contamination and avoid infection (WHO 2016) Manufactured under strict protocols, sterile gloves undergo

rigorous sterilization processes, such as gamma radiation or ethylene oxide exposure, which ensure that they meet high standards of cleanliness suitable for use in clinical and surgical settings (Centers for Disease Control and Prevention 2020).

When selecting sterile gloves, take gloves that fit appropriately and are of the correct size, typically made from latex. But, if the patient is allergic to latex, choose a latex-free alternative. Before donning the gloves, perform hand disinfection, ensuring your hands are dry. When putting on the first glove, handle only the inner surface of the folded side of glove with an unprotected hand. Figure 5 illustrates how to put on sterile gloves. Carefully slide the glove over the cuff, ensuring your bare hand doesn't contact any sterile areas of the glove or gown. Insert the fingers of the hand in the sterile glove into the folded portion of the second glove. Then, pull the second glove over the cuff and adjust the edges of both gloves to fit properly. (Oulun yliopistollinen sairaala 2023.)

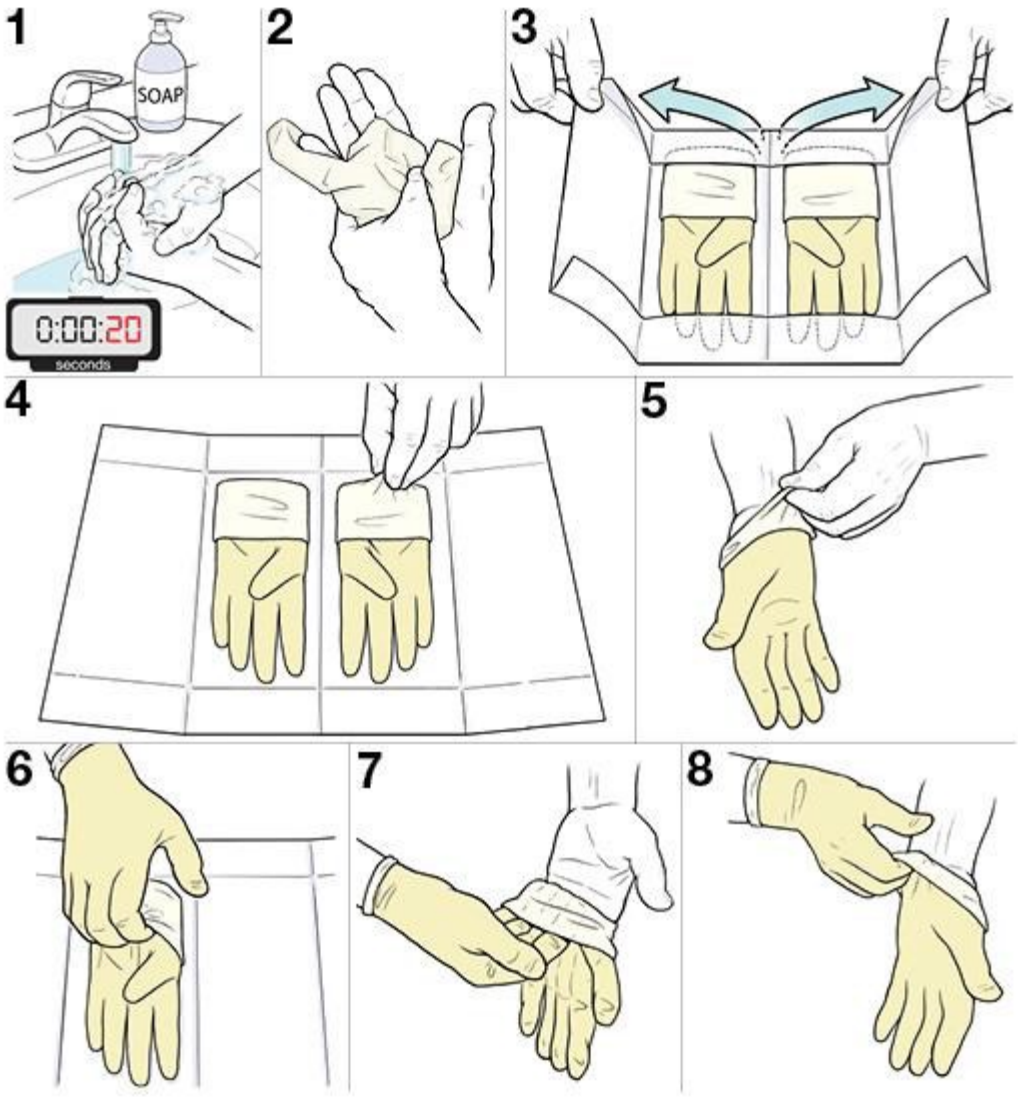

Image 5: Illustration showing how to put on sterile gloves (St Luke's 2020)

3.4.5 Inserting of sterilized indwelling female catheterisation

When performing a sterile indwelling catheterisation procedure, start by assisting the patient in removing any relevant clothing, such as underwear or pyjama bottoms, ensuring modesty by covering exposed areas with a towel. Prepare the bed with a protective covering to maintain cleanliness. Guide the patient to lie supine with knees bent and legs apart. Begin by washing and drying your hands thoroughly, disinfect the hand using hand disinfectant. Put on a plastic apron and apply the aseptic non-touch technique (ANTT) when opening

the catheterisation kit and any other necessary supplies. Keep the urinary catheter sealed in its sterile packaging until ready for insertion to maintain sterility. Gently remove the covering from the genital area of the patient to begin the procedure (Yates, 2017). Use one hand to gently open the labia, while the other hand to clasp the forceps using damp swabs to clean the area around the urethra, moving from front to back. After each swipe, throw away the used swab and use a fresh one. When opening sterile items, the healthcare personal carrying out the catheterisation must be careful not to touch them and should avoid moving over the sterile area. If anything becomes contaminated, it should be replaced right away to prevent infection. (Terveyden ja hyvinvoinnin laitos 2022.)

Once the cleaning is finished, the health care personnel will clean their hands and use disinfectant. The nurse who is inserting the catheter will put on sterile gloves. It's important to follow proper hand hygiene when opening the catheter and other equipment to avoid contamination. A local anaesthetic gel (Xylocaine) is applied to the urethral opening. This gel makes it easier to insert the catheter and helps keep the patient comfortable. Xylocaine gel is also applied to the tip of the catheter. (Terveyden ja hyvinvoinnin laitos 2022.)

Wearing sterile gloves, the nurse carefully inserts the catheter into the urethra. The patient is kept informed throughout the process and asked if they are feeling any pain. If the patient reports pain, the process should be paused and reassessed. The catheter is gently shoved towards the bladder, and when urine starts flowing, it means the catheter is in place. The catheter is then inserted a little further to ensure it is correctly positioned. Sterile water is then used to inflate the balloon located at the tip of the catheter, the amount is determined according to the instructions, to hold the catheter in the bladder. Asked the patient if they feel any discomfort during this step, as it may mean the catheter needs adjusting. Once the balloon is inflated, the catheter is gently draw back to make sure it is securely in the bladder. An assisting nurse connects the catheter to the drainage bag, and the catheter is taped to the patient’s thigh. All

equipment is cleaned up, and if needed, the lower part of the patient wipe again to dry. The urine draining bag is placed below the bladder level to allow for proper urine flow. (Terveyden ja hyvinvoinnin laitos 2022.) Finally, ensure the comfort of the patient and help them dress if needed, maintaining their privacy and dignity. Ensure the bed is tidy and free of moisture and dispose the used items in a medical waste bag following proper procedures. Conclude by washing your hands to maintain hygiene standards. (Yates 2017)

3.4.6 Removal of indwelling urinary catheter

The catheter is promptly removed upon the doctor's instruction when the need is no longer required. Strict adherence to hand hygiene protocols is maintained before commencing the process. Gloves that have been cleaned in the factory are put on after washing and disinfecting the hands. (Terveyden ja hyvinvoinnin laitos 2022.) A moisture protective sheet is positioned beneath the patient's hip for protection. Procedures are explained to the patient and any present relatives beforehand to ensure understanding. Patient privacy and adequate lighting are ensured. The drainage bag is always emptied prior to catheter removal. The tape securing the catheter to the skin is carefully removed, followed by deflating the catheter balloon using an appropriate-sized syringe determined by previous documentation. The catheter is then slowly removed, preferably during exhalation and If needed, with gentle rotating motions. It is crucial to document the entire procedure in detail. After the catheter is removed, the patient's urine output is closely monitored for 24 hours. The remaining urine is measured after the first natural urination. If bladder training is deemed necessary by the doctor, The nurse should monitor the patient and provide guidance to both the patient and their family, as the bladder and urethra might be fragile following the removal of the catheter. (Terveyden ja hyvinvoinnin laitos 2022.)

3.5 Nursing care in catheterisation

3.5.1 Patient guidance after urinary catheterisation

Providing patient guidance about the care of the catheter after catheterisation is crucial to ensure the client's safety, especially outside the hospital setting. This involves imparting information to clients on how to properly care for the catheter. This will reduce the risk of infection and complications associated with catheterisation. Information regarding proper hygiene such as regular washing of hands with warm water and soap before and after touching the catheter and areas of the body connected to the catheter. Drinking enough fluid to stay hydrated and eating enough fruits and vegetables to prevent constipation. The patient should prevent kinks in the catheter and ensure that the urine collection bags are consistently positioned below the level of the bladder. (NHS inform 2023.)

For patients not staying in a healthcare facility, if any signs of infection, such as irritation, fever, cloudy or foul-smelling urine, and any unusual pain or discomfort. If any of these symptoms appear or changes in body temperature occur, the patient should promptly contact their healthcare centre for assistance. Additionally, the patient receives guidance on when to schedule the next catheter change and doctor visits. (AUA 2022.)

3.5.2 Complications associated with catheterisation

A common and serious complication linked to urinary catheters is a urinary tract infection (UTI), specifically referred to as catheter-associated urinary tract infection (CAUTI). CAUTIs can progress to conditions like urosepsis and septicaemia. These infections often develop because catheters allow organisms to enter the bladder, providing a surface for bacteria to attach and causing irritation to the bladder lining. The use of a urinary catheter is the main risk factor for bacteriuria. In most cases, bacteria causing CAUTIs access the urinary system through the inside or outside of the catheter. (Newman 2021.) The risk

of infection increases with the length of time a catheter remains in place. When an indwelling catheter is used, there is a 3-7% chance of developing bacteriuria, especially if the catheter stays in for several weeks. Women and older adults are more vulnerable to these infections. Around 24% of patients with bacteriuria may develop a catheter-associated urinary tract infection (CAUTI), and in 3-4% of cases, this can lead to more severe infections, such as bloodstream infections. Patients with long-term catheters may experience complications like kidney stones, infected urethra, abscesses, and prostatitis in men. Non-infectious issues include blocked catheters, inflammation or scarring of the urethra, mechanical injuries like hypospadias in men, and mobility problems. (NHS 2019).

Catheter-associated urinary tract infections (CAUTIs) are a significant cause of increased illness, death, healthcare costs, and prolonged hospitalizations. (Newman 2021). The bacteria that cause CAUTI often originate from the urethral opening, rectum, or vaginal area during the catheter insertion process. These germs enter the urinary tract by traveling along the inside or outside of the catheter. Once on the catheter, they create biofilms, which are complex layers made up of bacteria, host cells, and waste materials. Over time, these biofilms thicken into sticky, slimy layers, which are often visible when long-term catheters are removed. (Felix, Bellush & Bor 2014.) The formation of these biofilms stands as a primary factor in various diseases, including CAUTI. Infection can occur within three days of catheter insertion. Another contributor to CAUTI is equipment contamination and failure to maintain sterile techniques during catheter insertion by medical staff. (Felix, Bellush & Bor 2014.)

CAUTI affects men and women differently. Women are at higher risk of catheter-related urinary tract infections because their urethra is shorter than that of men (Flores-Mireles, Teri & Hunstad 2019). This shorter distance makes it easier for bacteria from the perineal area to reach the bladder. In men, however, bacteria typically enter the bladder directly through the catheter. (Ignatavicius, Workman & Rebar 2018.) As much as possible, women should be informed about

potential complications prior to catheterisation. To mitigate these risks, it is advisable to utilize suitable anaesthesia, antiseptic, and lubricating gel (Yana 2016).

4 THE FUNCTIONAL THESIS IMPLEMENTATION

4.1. Functional thesis process

A functional thesis includes two parts: the practical component and the written report, both designed to provide practical insights for educating individuals, particularly nursing students, on performing specific nursing tasks. The process of creating a functional thesis involves initiating a plan, followed by developing the functional segment, often in the form of a video. Both the video and the final report are substantiated by research to enhance their credibility and usefulness. (Saastamoinen, Vähä, Ypyä, Alahuhta, & Puutalo 2018.)

This thesis process included the written video scripts, camera, actor, project material, video editing software, phone, and shooting location which was the nursing simulation room at Lapland University of Applied Sciences, Kemi. There was a single actor that played the role of a nurse, also with assistance that assisted, and a mannequin was used to simulate a patient. The author applied knowledge acquired and research to carry out the process of sterile indwelling female catheterisation as well as explain the entire process. The use of equipment such as a mannequin, sterile table, glove, cloth, lubricant, water, aseptic gloves, syringe, catheter, and catheterisation pack was used during the video shooting of this functional thesis.

4.2 Cameras, acting, and voiceover

Unlike the perception, creating a professional or educational video may not be expensive based on the equipment used or time spent in training. All that is required is noting every little detail about making numerous efforts to the task at hand. The important considerations in video creation entail researching to gather additional information, purchase control gear, filming in a neat background, storytelling, enough light, testing and trying different positions, regular checkups and judgments, quality sounds, avoid the interruptions of shaking the gadget, and the use of the right positions. (Thapa 2022)

For this thesis, video and recording was conducted using two personal phones owned by the author, specifically a Samsung and an iPhone brand. This dual-phone setup allows for shooting from two different angles. A mannequin served as the patient in the video. Editing was performed using iMovie, which offers features such as voiceovers and soundtrack integration. The educational video guide was filmed in the simulation room at the Kemi campus of Lapland University of Applied Sciences.

4.3 Description of thesis commissioner

Lapland University of Applied Sciences (Lapin AMK), established in 2014 from the amalgamation of Rovaniemi and Kemi-Tornio UAS, offers a robust nursing degree program across its Rovaniemi and Kemi campuses. With a student body of about 5,500 and a focus on Northern Well-being and Services, Lapland UAS equips future nurses with specialized skills tailored to the unique healthcare needs of the Arctic region. Lapland UAS provides a diverse range of study programs, leveraging the natural learning environments available in the North for effective teaching and learning. Embracing the Northern context as an opportunity, “Our core mission is to foster the development of Lapland and ensure the well-being of its residents, taking into account the unique demands of the Lappish lifestyle and business activities in the North” (Lapinamk 2023).

4.4 Advantages of educational video for nursing students

Educational videos contribute to increased engagement and improved understanding compared to traditional text-based methods, thereby enhancing information retention (Guo, Kim, & Rubin 2014). Educational videos, particularly those simulating clinical scenarios, enhance clinical concept comprehension, better-preparing students for real-world situations (Foronda, Gattamorta, Snowden & Bauman 2014).

The main target beneficiaries of this functional thesis the nursing students from international backgrounds at Lapland University of Applied Sciences. The thesis produced an evidence-based education video on performing and removal of sterilized female indwelling catheterisation.

4.5 Data collection, analysis and evaluation

The information and script for the video on how to perform sterile female indwelling catheterization were gathered from different online sources, including Terveyden ja hyvinvoinnin laitos 2022 (THL), Helsingin ja Uudenmaan Sairaanhoitopiiri (HUS), and Oulun Yliopistollinen Sairaala. These sources were selected to ensure an educational video reflecting the Finnish nursing perspective. The second step involved the creation of an instructional video for performing sterile female indwelling catheterisation and removal. The guidelines were used to produce a multimedia video for international students to learn about the female indwelling catheterisation procedure. The third step involves the user experience evaluation of the instructional guidelines and video. Before the shooting of the video, five international nursing students at the Lapland University of Applied Science were randomly selected and invited to study the instructional procedure to get a basic understanding of the catheterisation procedure. Four students accepted the invitation and participated. After the video production, the students were given the video to view. There was an interactive discussion, and feedback from the selected students were collected and continue to develop the video after first feedback and presented in the report. The feedback received were focused on the length of the video and how text can be used in providing the list of items needed for the catheterisation procedure. The discussion of the feedback is presented in section 6.2 of this thesis.

5 THESIS ETHICS AND RELIABILITY

Ethics can be described as a systematic approach, process, or framework for determining appropriate courses of action and for analysing complicated problems and issues (Resnik 2020). Ethics relates to the proper guidelines of behaviour essential in conducting functional thesis (Mcleod 2023). The researcher must diligently consider any potential negative impacts the study might have on participants. Despite efforts to anticipate ethical issues, unforeseen adverse effects may arise. In such instances, it is imperative to either halt or modify the study accordingly. (Dooly & Moore 2017.) Research ethics sets the rules for responsible conduct among researchers. Following these principles is important to protect the rights, dignity, and welfare of those taking part in the study. (WHO 2024) Adhering to ethical norms and guidelines is crucial, as it promotes the overall objectives of the study, including error prevention, pursuit of knowledge, and truthfulness (Resnik 2020). Research, being a collaborative endeavor encompassing individuals from diverse backgrounds, necessitates the incorporation of ethical principles like fairness, respect and accountability (Resnik 2020).

In functional thesis the description about the process and theory content in the final product are key factors in reliability. To maintain the impartiality and objectivity of a research thesis, it is essential to avoid conflicts of interest. For research to uphold its ethical standards and credibility, it should adhere to the Responsible Conduct of Research (RCR) methodology. (Finnish National Board on Research Integrity TENK 2020.)

When writing a thesis, authors must carefully consider various ethical concerns, among which bias or competing interests is paramount. Bias or competing interests arises when a writer's impartiality is compromised, potentially leading to biased outcomes. (Arene 2015.) A conflict of interest happens when a person's decisions about important matters, like patient care or the accuracy of research, are influenced by other factors, such as the potential for financial benefit. (Fontanarosa & Bauchner 2017).

Conflicts of interest present a challenge to maintaining confidence in research and the researcher community among professionals, patients, and the public. It is crucial to employ effective methods for identifying and managing these conflicts to ensure the integrity of research goals and achieve their objectives. (Romain 2015.) The ethical standards and trustworthiness of a thesis are strengthened by following the guidelines for responsible research conduct (RCR) provided by the Finnish National Board on Research Integrity. (TENK 2023).

The author of this thesis was committed to conducting thorough and up-to-date research, utilizing the latest reliable sources, and adhering to Lapland UAS reference guidelines in the thesis plan. The final product will be meticulously crafted by critically evaluating reputable sources, including current Finnish and international evidence-based practices throughout the research and development process. To ensure accuracy and quality, the author has utilized and will continue to explore reliable databases. The theoretical knowledge acquired from lessons has contributed to the research plan, and it has been verified with credible sources. (TENK 2023).

The credibility of all sources aligns with the standards set by the Finnish National Board on Research Integrity TENK, Lapland UAS, THL, and the Ministry of Social Affairs and Health in Finland (TENK 2023). Proper referencing and citation procedures have been diligently followed for all researched work. (TENK 2023).

The trustworthiness of this functional thesis is established by the researcher's commitment to transparency, rigor in process, adhering to guidelines provided Lapland University of Applied Sciences and clinical procedure outlined by Terveyden ja hyvinvoinnin laitos 2022 (THL).

6. DISCUSSION

6.1 Meaning and importance in general

The term "catheter" finds its roots in the ancient Greek word "kathie´nai," which translates to "To push in" or "to insert." This was before the Foley catheter became commonly used in the 1930s, catheterisation primarily served the purpose of addressing urinary retention in males. (Roger, Hopley, & Peter 2015.) Early catheters were typically rigid and mainly intended for intermittent catheterisation. Instances of urinary retention in females were uncommon. Urinary incontinence, while a personal embarrassment for both men and women, was not often considered a medical urgency and individuals devised their own methods to manage it. (Roger, Hopley, & Peter 2015.) The introduction of the indwelling Foley catheter made it possible for both men and women to use catheters for short- and long-term treatment, bringing a significant change in how urinary retention and incontinence were managed. Nonetheless, this advancement additionally brought forth a host of medical complications and adverse events. For individuals with compromised bladder function, Whether it's for urine retention or incontinence, a reliable and safe system is essential for collecting and storing urine, whether used for a short or long period. (Roger, Hopley, & Peter 2015.)

Nurses hold the primary responsibility for urinary catheterisation and its management. They are the ones who typically detect urinary tract infections (UTIs) related to catheter use in patients with catheters. (Rohan & Amarasekara 2019.) Therefore, nurses' understanding and adherence to proper procedures for inserting and caring for indwelling urinary catheters are crucial in mitigating and preventing CAUTI and other complications. With adequate knowledge of indwelling urinary catheterisation procedures, nurses can significantly decrease the occurrence of catheter-related complications. (Rohan & Amarasekara 2019.) Nurses must possess comprehensive knowledge and skills in performing the sterile procedure of female indwelling urinary catheterisation. (Rohan & Amarasekara 2019.) The primary beneficiaries of the video that will be

produced in this thesis will be students at Lapland University of Applied Sciences (UAS), particularly international students. The video is shared on the university's website and YouTube channel, making the video accessible to all nursing students enrolled at Lapland University of Applied Sciences (UAS).

6.2 Discussion and feedback of the educational video

In the discussion, participants were first asked about their knowledge of sterile female catheterisation prior to viewing the educational video on how to insert an indwelling urinary catheter, all participants possessed basic theoretical knowledge and had some hands-on experience from their studies, workshops, and internships, as none of them are currently working in a healthcare setting yet. One participant mentioned that even though they felt knowledgeable, they still often felt unsure regarding the required equipment for both male and female patients. Another participant said, "*I knew that hand hygiene is important before and after inserting an indwelling urinary catheter, and I was familiar with the process. However, after I watched this video, I learned more about aseptic techniques and the complete catheter insertion procedure from beginning to end. The video provided a lot of helpful information." (Student participant, 2024).*

The next discussion and the question asked - if the researcher successfully incorporated theoretical knowledge into the educational video on sterile female catheterisation. The participants agreed that theoretical knowledge was well represented in the video. A participant mentioned that, in practical situations, catheterisation process may vary slightly due to the fast-paced environment, different staff, or ward practices. Performing sterile urinary indwelling catheterization in the emergency ward is often faster, depending on the urgency of the patient's case, compared to when it is done in a regular ward setting. Another participant agreed that theoretical knowledge was effectively presented in the video.

The next discussion was the benefit of the video of performing sterile female catheterisation and removal to international nursing students and future nursing career. The 4 participants agreed on the following discussion:

Clinical competency development: The thesis can be resourceful to both teachers and international nursing students at the Lapland University of Applied Science as teaching and learning material. The students are allowed to develop and refine their clinical competencies. This includes mastering the steps of the sterile indwelling catheterisation process, recognizing indications and contraindications, and handling complications effectively.

Evidence-based practice: The educational video will encourage the international students at Lapland University of Applied Science to integrate evidence-based practices into their clinical approach. This involves referencing scientific literature, guidelines, and best practices to inform decision-making during sterile indwelling catheterisation and removal.

Professional responsibility: The students will learn a sense of professional responsibility and ethical considerations. They will understand the importance of informed consent, patient dignity, and maintaining privacy and dignity throughout the procedure.

Finally, participants were asked if they had any suggestions for improving the video based on their observations. Three out of four participants commented on the length of the video, noting that the original 18 minutes video felt too long and could become boring to watch. Based on this feedback, the video was shortened to 8 minutes. Additionally, one participant suggested using white text to list the necessary items for the catheterisation procedure, which would make it easier for viewers to follow along.

6.3 Learning process

Through this research, the author of this study explored various resources including the school library, e-articles, and online publications, to gather a

wealth of valuable information on sterile female indwelling catheterisation. This comprehensive review enhanced the researcher's understanding of the procedure and allowed her to refine her practical skills. This thesis has significantly contributed to the development and refinement of clinical competencies in multiple areas. Through the rigorous research, planning, and practical application involved in this thesis, has strengthened the researcher's ability to apply evidence-based practices, enhancing her clinical decision-making skills. Engaging with current guidelines and best practices has deepened the researcher's understanding of patient care standards, particularly in areas requiring sterile techniques, like catheterisation.

Moreover, creating a practical resource has improved the skills of the author in patient education and communication, as such procedures in had to be conveyed in a clear and accessible manner. This process has also taught the author the importance of meticulous attention to detail, as each step in preparing and executing clinical tasks requires precision to ensure patient safety and comfort. Overall, the thesis project has honed the authors adaptability and responsiveness to new information, fostering a commitment to lifelong learning and continuous improvement in her clinical practice. The insights garnered from this thesis not only benefit the researcher but also have the potential to enrich the clinical knowledge of both current and future nursing students, thereby contributing to the advancement of healthcare practice.

In the future, researchers could conduct a comprehensive study to evaluate the effectiveness of this educational video in enhancing student learning. By collecting data on student engagement, knowledge retention, and overall comprehension, educators could gain insights into how beneficial and impactful the video was. Surveys, test scores, and feedback sessions could be utilized to assess the video's role in improving understanding and motivation. Such a study could also help identify specific features within the video that were most helpful to students, guiding further improvements and creating a framework for effective study materials.

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APPENDIX

Equipment needed for indwelling catheterisation

- Indwelling catheter
- Sterilized gloves
- Cleaned basket with factory-clean items or pre-folded laundry set
- Sterilized catheter kids
- Washing liquid: sterile water or common salt
- Individually packaged syringes for anaesthetic gel application; choose an alternative lubricant if anaesthesia is contraindicated, following the manufacturer's guidelines.
- 10% glycerol solution, saline solution with high salt concentration, or sterile water, depending on the catheter requirements.
- Syringe for ball inflation
- Urine collection bag and the holder
- Bed covering
- Tape for catheter attachment

Preparation and hand hygiene

- Begin by disinfecting your hands.
- Position the bed cover beneath the patient's buttocks and thighs and perform another round of hand disinfection.
- Put on protective gloves.
- Moisten the washcloths with the specified solution and position them between the patient's legs, resting on the bed cover.
- Thoroughly cleanse the labia, maintaining a sterile environment throughout the procedure.

Catheter insertion procedure

- The anaesthetic gel is injected slowly into the urethra, ensuring it takes effect before catheter insertion.
- The catheter is gently inserted with a sterile instrument preventing contamination of the bladder through the urethra. When urine begins to flow through the catheter, it signals that the catheter is correctly positioned in the bladder.
- The catheter is connected, and the urine bag is collected quickly.
- The catheter balloon is inflated.
- The catheter is attached with tape and the bag is hung on a rack lower than the bladder level.
- Takes off gloves and clean the hand with disinfectant.

Removal of indwelling catheter

The urinary catheter is taken out as soon as it is no longer necessary.

- The urine collection bag is emptied first before the catheter is removed.
- With a 10ml syringe, the balloon is emptied by drawing the saline solution.
- The catheter is pulled from the bladder carefully.
- The urine bag and the catheter are disposed of properly.