Satakunnan ammattikorkeakoulu
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Indwelling Urinary Catheterization Video Guide

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Abstract

The purpose of this thesis was to produce an educational material about Indwelling urinary catheterization for International nursing students of Satakunta University of Applied Sciences. The learning material was produced in video form, and captions were written in the English language to thoroughly explain the procedure. The objective is to teach and guide the nursing students of the evidence-based method in performing the indwelling urinary catheterization.

This thesis report has three major parts: the theoretical background, the implementation, and the evaluation. The concepts discussed in the theory part are urinary system, indwelling urinary catheterization, complications, safety and video as a learning material. These core concepts were specifically chosen for students to understand the topic. The information for this part of the thesis were retrieved from academic and scientific databases.

The approach for this thesis was functional and the method used in project management was the waterfall method. The waterfall method is linear and sequential, wherein there is a distinct goal for its stage of the project. The tasks were well defined at the start, delegated to members according to their skills, and had a time frame to complete.

A copy of the video material and a survey link was sent to some students to measure the quality and usability of the learning material. The survey was composed of four closed-ended questions and one suggestion space for anyone to write their comments.

In conclusion, the overall result of the survey suggested that the video has clearly demonstrated the procedure and suitable to use as a classroom learning material.

Key words: Urinary system, Indwelling urinary catheterization, Complication, Safety, Video as learning material

CONTENT

1 INTRODUCTION

According to study, around 4 million people yearly in Europe will develop healthcare-related infections. One of the most common infection is associated with the use of urinary catheters. For people who has long term urinary catheter in place, the possibility of getting a catheter-associated urinary tract infection also known as (CAUTI) is between 43% to 53%. The urinary tract infection is a threat to the safety of the patients. (Davis 2019, 96.)

A normal healthy body can eliminate urine by itself however, this primary function can be compromised by illness and other health conditions. For patients with acute illness, urinary catheterization may be necessary. (Perry, Potter, & Ostendorf 2016, 470.) Urinary catheterization is an invasive procedure that requires sterile and aseptic techniques. Nurses carry out most of this procedure; for this reason, they are required to have the knowledge to perform catheterization in an aseptic way. (Davis 2019,100.)

The topic was chosen to provide an English language material for the nursing students of Satakunta University of Applied Sciences (SAMK). This project provides the students with a visual understanding of the indwelling urinary catheterization procedure. The Objective of the thesis is to teach and guide nursing students of SAMK to perform an aseptic indwelling urine catheterization for male and female. Through this project, we revisit the process, proper handling, procedure, and long-term maintenance, as well as the outcomes of improper handling of the procedure. On the authors' side, this project would deepen their clinical skills and improve the ability to handle projects.

2 THEORETICAL BACKGROUND

The key concepts for this thesis are indwelling urine catheterization, urinary system, complications, safety, and video as a learning tool. Under each main concept has additional sub-concepts about the topic shown in (Figure 1).

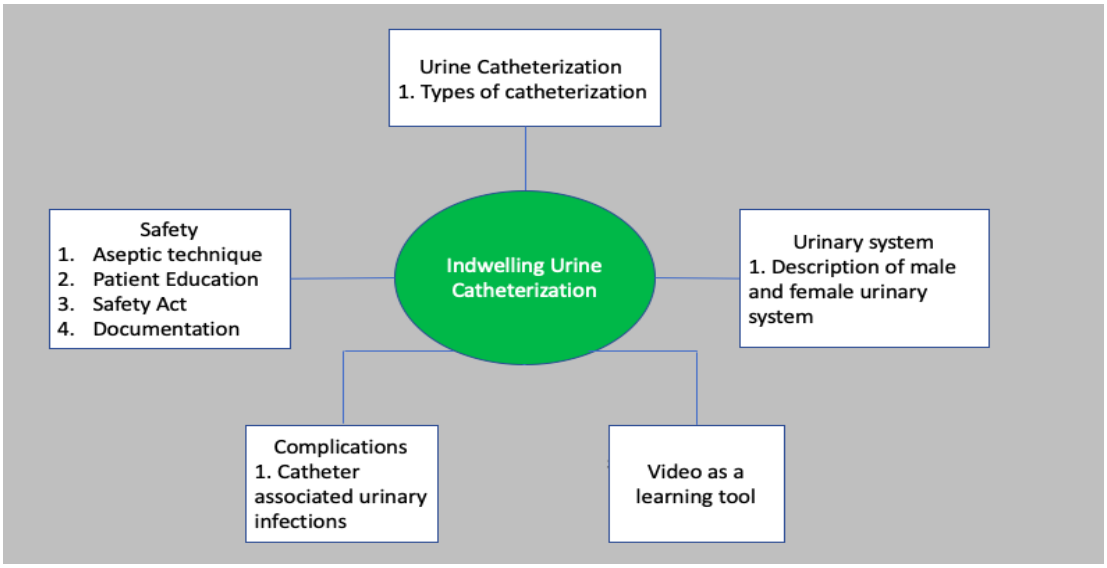

Figure 1. The key concepts of our project thesis.

2.1 Urinary System

The urinary system is composed of two kidneys, two ureters, the urinary bladder, and urethra (Figure 2). The kidneys are significant part of the urinary system. They are reddish, kidney-bean shaped organs situated above the waist in between the peritoneum and behind the abdominal wall. The 11th and 12th ribs partly protect the kidneys that when these ribs are fractured, it can puncture the kidneys and cause severe damage to the organ. The right kidney is moderately lower than the left because the liver occupies the space above it. A regular adult kidney is 10-12 cm long, 5-7 cm wide, and 3 cm thick and has a mass of 135-150g. (Tortora & Derrickson 2014, 981.) The urinary system diagram is shown below in Figure number 2.

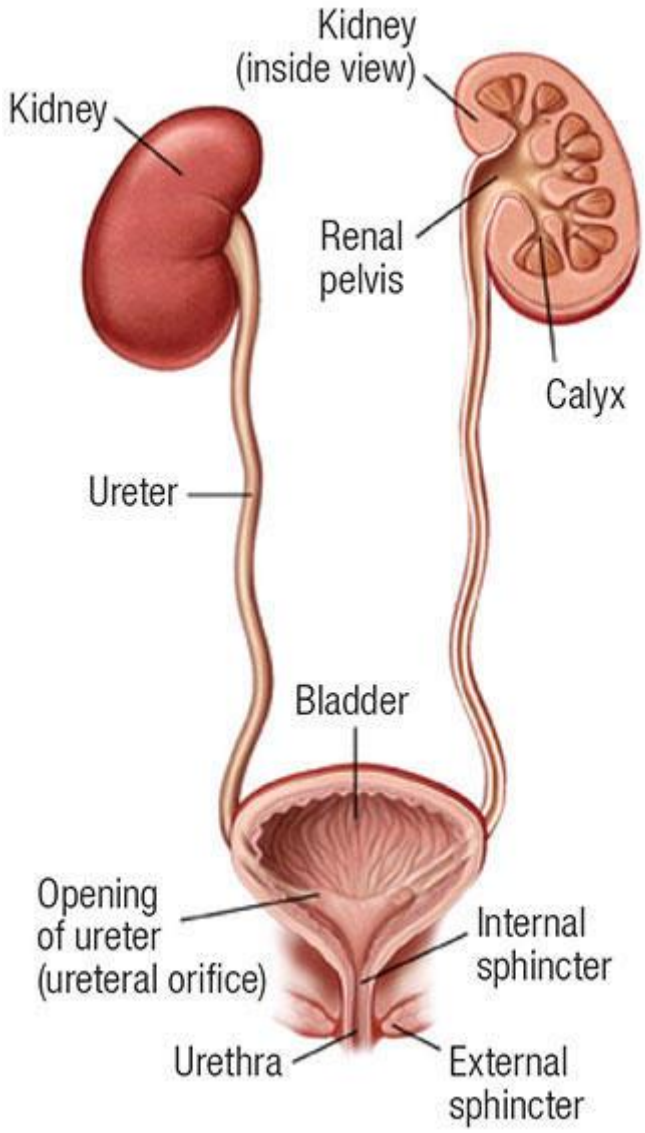

Figure 2. The structure of the urine system (Source: Website of Oncology Pro 2020.)

The kidneys' primary functions are to help regulate the volume and composition of blood and to regulate the blood pressure, acidity, glucose level, osmolarity, production of hormones, and excretion of wastes that have no practical use to the body in the form of urine. The urine formation starts when the blood plasma enters the renal artery, and then it goes through smaller arteries and capillaries and into the tiny structure filtering unit called nephrons. Nephrons are the functioning unit of the kidney. It consists of two parts, renal corpuscle, and renal tubule. In the renal corpuscle, there is glomerulus (a network of capillaries) and bowman's capsule, where the blood is filtered. The filtered fluid then passes into the renal tubule. In renal tubule, the filtered fluid moves into the collecting ducts. The reabsorption of water and needed solutes about 99%

occurs in the collecting ducts. The remaining water and solutes which are not reabsorbed by the body, is called urine. (Tortora & Derrickson 2014, 981-991.)

The other parts of the urinary system mainly act as transporters and storage. These parts are the ureters, which is 25-30 cm long that connects the kidney to the urinary bladder. The urinary bladder acts as a storage of the urine. It is a hollow, stretchable muscular organ located in the pelvic cavity behind the pubic symphysis. In males, the bladder is anterior to the rectum, and for females, it is anterior to the vagina and inferior to the uterus. The urine moves through to the ureters and is pushed to the bladder by means of peristaltic contraction of its wall. The bladder expands when the volume of urine increases, and it can hold an average of 700-800 ml of urine. However, for females, the urine capacity is less because the uterus occupies the space above the urinary bladder. When the bladder reaches its capacity limit, it expels the urine to the urethra. (Tortora & Derrickson 2014,1010-1012.)

The urethra is a small tube leading from the urinary bladder to the exterior of the body. It is the final part of the urinary system and the passageway for emptying urine from the body. For males, the urethra is about 20 cm, and it passes first through the prostate then through the deep muscles of the perineum, then to the penis. In females, the urethra is 4 cm long, and it lies directly to the pubic symphysis. The urine exits the body through the external urethral orifice located between the clitoris and the vaginal opening. (Tortora & Derrickson 2014,1013.)

2.2 Indwelling Urinary Catheterization

A urinary catheterization is a clinical procedure that involves the placement of a flexible tube (catheter) in the bladder to empty the urine. (Geng, Cobussen-Boekhorst, Farrell, Gea-Sánchez, Pearce, Schwennesen, Vahr, & Vandewinkel 2012, 13). There are several forms of urinary catheterization; indwelling catheterization (kestokatetrointi), single catheterization (kertakatetrointi), repeat catheterization (toistokatetrointi), and self-catheterization (itsekatetrointi). In the indwelling catheterization, the urine catheter remains in the bladder for a long time and is connected to a urine collecting bag. (Rautava-Nurmi, Westergård, Henttonen, Ojala & Vuorinen 2019, 280, 284.)

Indwelling urinary catheterization is indicated on specific clinical conditions such as acute and chronic urinary retention, neurological impairments causing difficulties in urination i.e. paralysis disturbing urination. It is also indicated to patients needing immobilization for a long-time due to unstable thoracic and lumbar spine, multiple traumatic injuries such as pelvic fracture, urine incontinence, and to enhance comfort to patients who are at the end-of-life care. Urological surgery or surgeries near the genitourinary structure may also require urinary catheterization. Indwelling catheters can result in irritation to the urethral wall, which increases the risk of infection. Hence, it is important to think about other possible options before placing a catheter. It should be the last solution when other options have not been enough or failed. (Geng et al., 2012,13-15; Rautava-Nurmi et al., 2019, 282.)

Indwelling urinary catheterization is either urethral or suprapubic. In urethral catheterization, the catheter passes through the urethra to the bladder whereas, in suprapubic, the insertion of the catheter is through the anterior abdominal wall and into the bladder. (Geng et al., 2012, 12.) The suprapubic cystostomy catheter is placed if there is a need for long-term catheterization. For instance, when the bladder is not functioning, and the patient, family members, or homecare are unable to commit the patient's repetitive catheterization. The suprapubic catheter eases mobile patients' movement because the catheter does not rub against the urethra. (Salomaa, 2017.)

The size of the urinary catheter is measured using the French (Fr) scale system. The Fr scale indicates the diameter of the catheter. In some countries, the unit of measurement is Charriere (Ch) in honor of its inventor. The French scale and Charriere are the same; one Fr/Ch is equal to 0.33 mm. Catheters which are smaller size 12-14 Fr are suitable for older women and men with an enlarged prostate. The catheter 14-16 Fr is recommended for indwelling catheterization for adults because it decreases the risk of infection and trauma. Catheters that are bigger in size have a higher risk of injury to the bladder neck and urethra. However, in some cases, bigger-sized catheter 20-22 Fr is necessary for specific conditions that can be after urological surgery or due to the presence of blood in the urine. (Perry et al., 2016, 477, 478; Kaisary, Ballaro, & Pigott 2016, 304.)

In Finland, the normal size for female catheters is between 10-14 Ch, for men 12-16 Ch and children is 6-10 Ch catheter (Rautava-Nurmi et al., 2019, 280). The balloon size of indwelling catheters ranges from sizes 3 mL to 30mL. The 3ml balloon size is appropriate for children while for continuous emptying of bladder 30ml is required. The balloon size is generally written in the catheter port. Generally, for adults, 10 ml of liquid is enough to inflate the balloon. The use of bigger balloon size (30mL) for a more extended period is related to patients' high discomfort, tenderness and damage, injury, and a high risk of ejection of the catheter. (Perry, et al., 2016, 478.)

The shape of the catheter varies according to its use. Typically, silicon-coated catheters having straight-up tip (Nelaton), is appropriate for men and women. However, if the insertion of Nelaton catheter is painful for men due to the large prostate gland or sphincter muscle resistance, Thiemann catheter is suitable to use. The long-term catheters are either Thiemann or Nelaton type of Foley catheter. The silicone catheters balloon can be filled with a saltwater solution or with a 10% glycerol liquid. Sterile water cannot be used to fill the silicone catheters, because water can pass through the wall, causing the balloon to deflate. (Rautava-Nurmi et al., 2019, 282.) The pictures of Thiemann, Nelaton and Foley catheters tips are shown below figure 3.

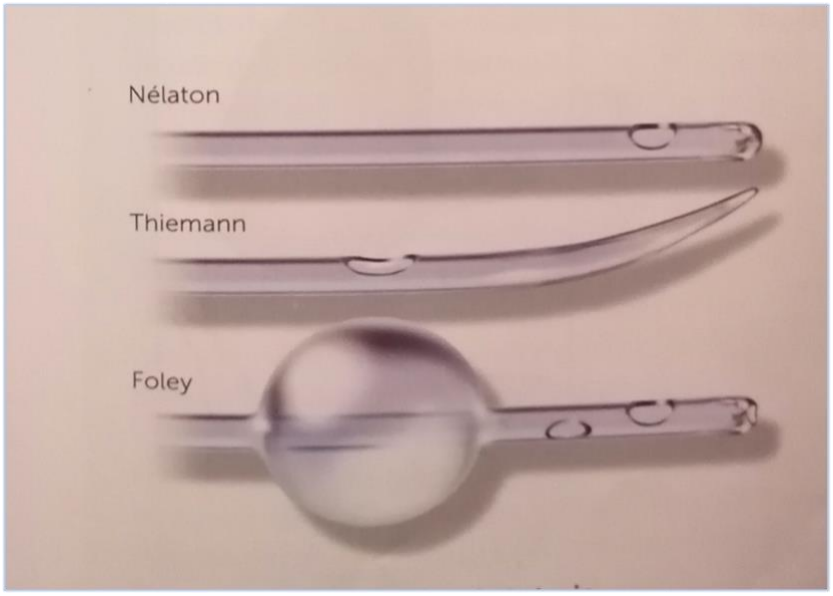

Figure 3. The different types of urine catheter (Rautava-Nurmi et al. 2019, p 283)

Nurses are responsible for choosing the correct type and size of the catheter, so during the catheter insertion it does not cause mucosal damage to the patient's urethra (Rautava-Nurmi et al., 2019, 280). There are three types of catheters based on their number of lumens. The single lumen catheters are meant for intermittent catheterization. In the indwelling catheterization, double-lumen catheters are used, one lumen for urine drainage and the other lumen to inflate the balloon to hold the catheter in place. The triple-lumen catheter is meant for continuous bladder irrigation (CBI) or to administer medications in the urinary bladder. Each lumen of the catheter has a specific function, such as one moves out liquid from the bladder, the other lumen is to blow the balloon, while the third lumen is to bring the fluid from the irrigation bag into the bladder. (Perry, et al., 2016, 477.) Below, figure 4 is an example of a double lumen Foley catheter.

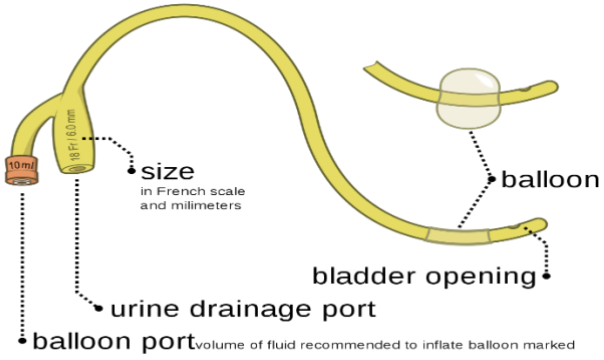

Figure 4. Foley catheters, (by unknown, Wikipedia 2020)

The procedure of inserting an indwelling and single-use catheter are similar. The difference between the two is the close drainage system of the indwelling catheter, and the balloon to hold the catheter inside the bladder. (Perry, et al., 2016, 477.) The closed drainage system is the connection of the catheter to a sterile bag after catheterization, necessary to lessen (CAUTI) infection chances. The drainage bags are selected based on the duration of the use, whether catheterization is needed for small/long interval of hospital stay, and by evaluating mobility, daily life and the intellective ability of patient. (Geng at al., 2012, 26.)

The drainage bags come in different forms; a pre-connected system where the bag is pre-attached to the sterile pack, the anti-reflux bag with a chamber that inhibits the backflow of the urine and leg bag, or body-worn bag for mobile patients. The leg bags allow the patient to move freely and hide the bag under their clothing. The capacity for this bag ranges from 120 to 800ml. The bags have many chambers that flatten the bag that it is not so obvious for other people to see. The leg bag can be secured to the legs with the help of nets and straps. The large capacity bag can hold from 2-4 liters, usually used for post-operative care. Most of these drainage bags have a sampling port to collect urine sample. (Geng at al., 2012, 26-30.) The drainage bags are replaced once in five to seven days (Rautava-Nurmi et al., 2019, 284).
In the Figure 5 and 6 are images of urine collecting bag and leg bags.

Figure 5. A urine collecting bag (By website of POLYMED medical devices)

Figure 6. Urinary leg bags (By website of Shop catheters, 2019)

Daily routine hygiene is required to keep the external opening of urethra clean. Soap and water are enough to gain effective urethral opening cleansing. The other important aspect is educating non-circumcised patients about daily cleansing of their underneath foreskin to remove smegma. (Geng, et al., 2012, 39.) Smegma is the whitish substance that may be present in the genitalia, caused by shredded skin cells (Website of News Medical Life Sciences 2020). It can increase patients' risk of causing Urinary tract infection (UTI) and may cause trauma and ulceration to the meatus and glans penis (Geng, et al., 2012, 38).

To care for the catheters, the European Association of Urology Nurses 2012, recommends performing hand hygiene properly before and after straightaway handling of catheter and the system. Ensure that the urine flows freely. Maintain the position of the catheter bag always under the bladder's level. (Geng, et al., 2012, 39.) The patient with long-term catheters should carry out 1-2 times genital wash, or nurses assist in washing if the patient is unable to perform. Patients with a long-term catheter can go to the sauna, but bathtub and swimming are prohibited because of the risk of infection. The urine collecting bag must be emptied daily, and urine output, color, the smell should be observed and documented. (Rautava-Nurmi et al., 2019, 284.)

When a urine catheter is not needed, it must be removed due to infection risk (Rautava-Nurmi et al., 2019, 284). The removal of the urinary catheter begins with aspirating slowly and evenly the fluid-filled balloon with a syringe. Rapid and vigorous movements can cause the filling channel to flatten and make emptying more difficult. Then the catheter is gradually withdrawn from the bladder. In case the fluid-filled balloon is not emptied, do it again with a gentle movement. Replace the syringe and flush the catheter with sterile water. The catheter can be rolled with your fingers, which breaks down any salt deposits that may block the balloon filling channel. In case the catheter removal fails, the last resort is to blow up the balloon with either medical benzene (lääkebensiiniä) or 80-100ml of sterile water. The catheter serial number, date of catheterization, and cause of catheter removal are recorded so that information is available if needed. (Kokko 2017.)

2.3 Complications

The use of indwelling catheters is associated with many complications, such as catheter-associated urinary tract infection (CAUTI), epididymitis, discomfort, bladder pain and spasms, catheter blockage, blood in the urine (haematuria) and squamous cell carcinoma of the bladder. The improper insertion of a catheter may also result in traumatic cleaving and sphincter disruption. (Geng, et al., 2012, 44.)

Catheter-Associated Urinary Tract Infection is known to be one cause of increased morbidity, mortality, cost, and length of stay in the hospital. The bacteria that cause CAUTI may develop in several ways during catheterization, commonly through meatal, rectal, and vaginal colonization. The infection occurs when microorganisms from these areas migrate to the urinary tract through the external or internal part of the catheter. When microorganism colonizes the catheter, it creates biofilm. They are structures that include host cells, bacteria, and cellular by-products. As bacteria multiplies, biofilm developed into a thick, complex structure "slimy coating" that is often visible during the removal of indwelling catheters that have been in situ for a long time. The formation of these biofilms has been the primary cause of certain diseases, as well as CAUTI. The bacteria can create infection within three days of the insertion of the catheter. The other cause of CAUTI is through contamination of equipment and lapses in aseptic procedures during the insertion of the catheter by medical personnel. (Felix, Bellush & Bor 2014, 8.)

Catheter-associated urinary tract infection (CAUTI) varies between genders. Females are more prone to catheter-related urinary tract infection because female's urethra is shorter than males. The bacteria from the perineum area are more likely to migrate to the bladder by moving through the urethra. In a male, bacteria tend to gain entrance to the bladder from the catheter itself. (Ignatavicius, Workman & Rebar 2018, 1356.)

The other bacterial infection related to catheterization is Epididymitis. The epididymis is a coiled structure at the back of the testicle, which serves as a passage of sperm from one testis to the vas deference. The Epididymitis is a swelling of the epididymis when there is a presence of bacteria called Pseudomonas Aeruginosa, it infects the vas, and

spread the infection to the testis. The symptoms include swollen, tender, red and warm testicle, fever and chills, pain in the scrotum, and pain during the passing of the urine. (Watkins 2011, 24.)

Patients who have long term indwelling catheter may experience bladder pain, spasm, and discomfort. These pains can be attributed to constipation and the use of a particular type of catheter. Chronic constipation can cause bladder emptying problems and exacerbate bladder spasm and pain when a catheter is present. The patient should receive treatment, and a high intake of fiber and liquid will help maintain regular bowel movement. The size and length of the catheter can also cause tissue damage and pain. Catheters that have a smaller lumen and made from latex are sometimes well tolerated than the silicon ones. (Nazarko 2014, 7.)

Catheter blockage occurs when urine fails to flow out from the catheter. It is a common problem by people living with Foley catheters. “The urine retention in the bladder may cause distress to the patient and, in some cases, could lead to sepsis, bladder and kidney stones, bacteremia, and pyelonephritis. About 50% of people with long term Foley catheters experience blockage mainly cause by encrustation. Other reasons for catheter blockage could be constipation, kinked tubing, tight clothing restricting the flow of urine, incorrect position of the drainage bag, drainage bag straps occluding of the non-return valve, full drainage bag or occlusion of the catheter eyelets by the bladder mucosa.” (Gibney 2016, 828-833.)

The encrustation of the catheter occurs when bacteria start to grow in it. These bacteria create an enzyme called urease, which produces ammonia and carbon dioxide, that turns the urine alkaline. In a normal condition, the urine acidity level is between pH 5 to 6. However, when there is a presence of bacteria, the urine can turn alkaline, which means the acidity level of pH 7-9.5. This condition provides an ideal state for crystal formation. These crystalline biofilms accumulate overtime and encrust the catheter. Eventually, they block the urine from flowing out from the bladder. (Stickler & Feneley 2010, 784-790.) An encrustation can happen either inside or outside the lumen. Encrustation outside the lumen can impair the balloon's deflation, making it

difficult to remove the catheter. (Ho, Khandasamy, Singam, Goh, & Zainuddin 2010, 5.)

The other complication associated with urine catheter is Haematuria or blood in the urine. The blood can be dark red or darkish brown. The presence of blood in the urine after catheterization indicates that there was a urethral trauma during insertion. The blood in the urine settles typically by itself; however, in some cases, if it fails to settle, irrigation or a formal bladder washout may be needed. The long-term use of urinary catheters causes chronic urothelial irritation, increasing the risk of developing a squamous cell carcinoma or cancer of the bladder. The only way to reduce the risk is to avoid using a catheter as possible. (Geng et al., 2012, 52.)

2.4 Safety

Patient safety is one of the priorities in the clinical procedure. It is the prevention of physical and psychological harm to the patient. (Perry et al. 2016, 45.) Patient safety is an essential part of delivering quality care to the patient. The general agreement about giving quality health services in the world is to give adequate, safe, and patient-centered care. According to an estimation, in well-earning countries, out of every ten patients, one patient gets harm during their care in the hospitals. The occurrence of these unwanted events results from unsafe care, in which 50% of them can be avoided. (World Health Organization 2019.)

Patient's safety includes technical knowledge of medical professionals to give the treatment. It means that nurses know the treatment methods and can explain to the patient the treatment he/she is about to receive and infection risks. Nurses should also have a good understanding of the safe administration of medicines. Additionally, nurses should know how to operate medical equipment and provide and safe environment to the patient. A patient trusts the care providers when he feels safe under their care. (Rautava-Nurmi et al., 2019, 28-29.)

2.4.1 Aseptic Technique

Aseptic technique is a practice to create and maintain an environment that reduces or does not have disease-producing organisms and prevents the transfer of these organisms. Medical asepsis is the use of barrier techniques; gloves, mask, gown, performing hand hygiene, and daily environmental cleaning. The sterile technique is a way to control and remove all the microorganisms from a space. Nurses observe sterile technique in the operation theatre, delivery room and labor, and in areas of performing procedures. Nurses perform the aseptic technique at the patient's bedside upon doing the specific procedures such as; during the introduction of an intravenous catheter in the patient's skin, putting a dressing on the surgical opening or burn and during the insertion of the surgical devices in the sterile body cavities like the insertion of a urinary catheter. (Perry et al., 2016, 74.)

The use of barrier protection, such as gloves, protects healthcare workers from patients' blood, body fluids. It helps prevent the transfer of microorganisms to other patients and the surrounding environment. The aseptic technique is crucial, especially for the protection of immunodeficient patients. Nurses always have an essential role in ensuring that other healthcare workers, who are participating in patient care and other supporting team members and the family members of the patients perform preventive infection practices. Cautious and evidence-based use of infection-prevention practices can make a change as to either a patient recovers from an illness or develops adverse or hazardous complications. Hand hygiene should be practiced by all the caregivers, as it is not optional. The use of sterile gloves, sterile packaged, table drapes, and proper hand hygiene is an aseptic way and crucial in indwelling catheterization. (Perry, et al., 2016,75-77.)

2.4.2 Patient Education

Patient education refers to any activities that teach and counsel, aimed to improve the patients' health knowledge and attitude (Friedman, Cosby, Boyko, Hatton-Bauer, & Turnbull, 2011). It has been part of healthcare since ancient times, although the term was not then explicitly used. Patient education is one of the main components of standard care given by nurses. The focus of teaching or counselling is to care for the sick and promote good health. (Bastable 2017, 6.)

In Finland, every patient should be made aware of his health conditions, reasons, the treatment and its benefits, different available options of care, their outcomes, and other care-related decisions made for the patients. It is the healthcare personnel's responsibility to provide clear and easy-to-understand information to the patient. If there is a communication barrier between the healthcare provider and the patient, interpretation services should be arranged. Additionally, patient belonging to other culture should receive care in the possible language that they can understand. (Act on the status and rights of patients 758/1992, section 3 & 5.)

In giving patient education, nurses should assess what patients already know and provide the information that the patient needs to know. Effective communication (demonstration) is essential due to the reason that nurses usually have minimal time. Efficient patient education increases the patient's health-related information, skills, and capabilities. An evidence-based knowledge, common sense education techniques are useful for patients and can be beneficial to nurses too. (Flanders 2018, 58.)

2.4.3 Safety Act

The constitution regulates the healthcare profession in Finland. The Acts were created so that patients can receive effective and safe medical care. The law requires a healthcare professional to have the right training and education to ensure that the person has the professional competency necessary to work on that position (Health care professional Act no.559/1994 section 1). Additionally, all healthcare professionals are also required to have the Finnish language skills needed to perform the job safely (Health care professional Act no.559/1994 section 18). According to Valvira, the agency that provides the license to healthcare and social care providers, the minimum language skill is intermediate, or level 3-4 based on the National Language exam or YKI test. The requirement additionally means that all the skill component of the language exam shall be a grade of 3 or higher. (Website of Valvira 2020.)

2.4.4 Documentation

Documentation is one important task that every nurse should manage. It is part of the core competencies in nursing and it requires nurses to be skilled and knowledgeable. Nursing documentation refers to the information recorded to show the medical care that the patient received. The recordings are patient-centered, individualized, continuous and the patient's information are safe and protected. (Rautava-Nurmi et al., 2019, 49.)

Documentation is an essential part of healthcare delivery because it ensures better continuity of care to patients, better communication among medical professionals, and increases patient safety. A medical record of a patient is a legal document that contains every information of a patient's care while under the care of a medical professional. Any information entered into the patient's medical record must be clear and accurate because the next health care provider will rely on this information to give and coordinate the patient's care. Documentation that is inaccurate, not complete, or false information can result in unnecessary and inappropriate medical treatment that can lead to adverse outcomes. (Perry et al., 2016, 35-36.)

In Finland, nurses have been using the electronic systems in documentation for many years. Previously, there were different documentation systems, however the structures were not unified. In 2003-2007 the Ministry of Social Affairs launched a project to unify the information systems, national data archives, and data security solutions to improve health care services. Part of this project was to standardize the national nursing documentation process, connect it with interdisciplinary core documentation of the patient's medical history, and connect it with the national code server and national archive. From this project, the nursing documentation model and the Finnish Care Classification system came into existence. (Tanttu 2011, 185.)

The Finnish National Documentation Model consists of structured core nursing data (the need for care, nursing interventions, nursing outcomes, nursing care intensity, and nursing summary), the nursing process, and the Finnish Care classification system. Finnish nursing documentation model structure is based on the decision-making

process and a standardized nursing terminology: the Finnish care classification system (FINCC). (Kinnunen, Junttila, Liljamo, Sonninen, Härkönen and Ension 2014, 196-202.)

2.4.5 Laws and regulations on documentation

The Finnish Laws regulate the documentation and safekeeping of the patient's medical information. Its creation and maintenance have guidelines that apply to all healthcare professionals. The law states that all health care professionals are required to document all the necessary information related to the medical care that the patient received. It means that a nurse should write into the patient's record the reason the patient came for care, the treatment he/she received, the patient's condition during and after the treatment, and possible follow up home care. The Act additionally stated that every medical professional should exercise extra caution on keeping the records confidential. It means that they are not allowed to give any information about the patient's medical record to any outsider without prior consent from the patient. The term outsider refers to a person that does not perform any healthcare-related work for the patient. The nursing records are handled according to the internal organization/unit specific guidelines and recommendations. (Act on the Right of the patient act 785/1992 section 12 ; Rautava-Nurmi et al., 2019, 49.)

All healthcare units that provide care to the patient can access the patient's medical information recorded by another unit only if necessary for treating the patient. The patient may also prohibit or allow the use of data entered by another unit anytime. The patient needs to be informed about this data sharing between health care units. (Health care Act No. 1326/2010, section 9.)

Every time the patient's medical record is accessed by other healthcare units through the information system, the use of this information will be monitored. The person requesting the patient's medical information should be able to establish or confirm that there is an existing doctor-patient relationship through information technology. The local municipal authority is responsible for maintaining a shared patient information register and ensure that data are safe through an information system. (Act in the Electronic processing of Client Data in Social and Health Care Services (159/2007) section 9.) The medical records of the patient are stored permanently in the national archives (Archives Act 831/1994 section 8).

2.5 Video as a learning material

For many years, educators have been using video in teaching. Some studies have shown that using multimedia supplements enhances learning outcomes, especially for students who have difficulty with the course. (Chapman 2012, 189-200.) For an educational video to be useful, it must include three elements: cognitive load, active learning, and engagement (Brame, 2015). Cognitive load refers to the amount of information the brain can hold at a given time; if there is an excessive information, it can interfere with the learning retention (de Jong 2010,105-134). Active learning is when students have the freedom to control how they want to learn. As in the case of a video, students can control the movement of a video by pressing stop, forward, or moving back. This interactive way of learning can achieve better learning outcomes. (Zhang, Zhou, Briggs & Nunamaker 2006, 15-27.)

Engagement is the length of time students watch the video. The average engagement time for videos, according to some studies, is less than six minutes long. When the length of the video increases the engagement rate of students gradually drops. (Zhang et al., 2006, 15-27.) The Youtube platform, however, has a different insight into audience engagement. According to their research, the runtime should match the content of the video. A viewer will watch a twenty-minute-long video if the content is satisfying. (Goodrow 2020.)

There are several elements in making a video: a camera, subject, lighting, audio, editing, and distribution. A camera is needed to capture a video, and it can be a smartphone or a digital single-lens reflex (DSLR) camera. The second essential element in the video is the subject. The subject is someone or something like the center of the story. Another element is the lighting. It is an essential part of the video because it helps tell the story by creating the mood. Lighting comes in two forms, natural light, which comes from the sun, and the artificial light, which is human-made. The fourth element is the audio. A video does not necessarily need an audio or a sound. However, audio is important because it tells us more about the subject and determines what we see. Editing is where the camera takes are put together and where the story is built. It is also in this part that music, graphics, and color grading is added to the video to create

emotion and increase audience engagement. The last element is distribution, and it is a platform where the video can be seen or accessed. The platform can be public or private that only members of the organization can access it. (Ebiner, Carnahan & Shimizu-Jones 2020.)

In creating a video, one needs to consider the purpose or the end goal. There are reasons why videos are created, entertainment such as music video or sketch, educational, documentary, and commercial or promotional video. The second thing to consider is the target audience of the video. These are the people who will watch the video and consider them when writing the script, shots, and style during editing. To keep the audience more engage in the video, it must be informative and short. (Ebiner et al., 2020.)

The process of making a video starts with pre-production planning. In this stage, the writing of the story/concept of the video, timeline, equipment list, personnel list and budgeting takes place. In writing the timeline, it is essential to know when the video is needed to estimate the preparation, shooting and editing time. The planner plans the personnel/crew involved in the video making and delegates the tasks. The equipment also needs to be planned, such as a camera, audio, lights, and other props. The pre-production planning also includes the location where the video will be recorded. Lastly, there has to be some cost planning beforehand, for example, food, transportation, and some postproduction cost. (Ebiner et al., 2020.)

The second stage is the production, where raw footage is taken as materials for the video. This phase includes setting up the video equipment, lighting, sound, capturing extra footage to support the story. After production, one can start to organize and edit the materials. At this post-production phase, the editor will select the parts needed to produce the final story, making it more engaging by adding music and text to the video. This part of the process takes longer to finish as it needs time to review the work before the final delivery. (Heil, 2018.)

3 PURPOSE AND OBJECTIVES OF THE PROJECT

The purpose of the thesis is to produce an evidence-based video learning material about indwelling urinary catheterization for nursing students of Satakunta University of Applied Sciences (SAMK). The Objective of the thesis is to show and guide nursing students of SAMK to perform indwelling urinary catheterization in male and female. This project provides the students with a visual understanding of the catheterization process and the risks that come with it. The video material has captions in the English language.

4 PROJECT PLANNING

A project is an activity with a particular goal. A project requires a plan, resources such as materials and people, that are gathered together for a time to complete a task. Additionally, a project has a breakdown of the tasks, a timetable where the start and end date of the project are stated. The purpose of this is to give the group members a specific time to start the project and reach the defined goal at the agreed time. The benefits of doing a project thesis are that students developed their project management skills, creative thinking, cooperation, and communication skills and negotiation with other team members. It is a way to meet unexpected challenges, finding solutions, and put those solutions to work. All of these soft skills are essentials for students to carry to the working life. (Hakala 2000, 17-18.)

4.1 Project method

The project method used in this thesis is the Waterfall method. This Project management method is linear and sequential; wherein there is a distinct goal for each stage. This means that once a phase of the project is completed, the development continues to the next level and no turning back. Similar to the flow of a waterfall, when it flows over the cliff, it will continue its journey down. (Cobb 2015, 4.) In this method, the project requirements are specific; there is a clear work structure breakdown at the start, a limited amount of time required to finish the project, and it is a traditionally known approach to project management. This method, however, has its pitfalls, the planning is overly optimistic that there is no room for uncertainties. It lacks flexibility, which means that once the plan is in place, it must be followed, and changes are hard to implement. (Pries & Quigley 2010, 122; Goodman & Henry 2010.)

4.2 Project Phases

This project thesis has three main phases: the design, implementation, and evaluation. The design phase started with the topic selection in Autumn of 2019. Satakunta University of Applied Sciences provided the project topic. Then, we started researching about other project works done related to Indwelling Urinary catheterization. We then reviewed these project works and decided that we would do an English video learning material as the existing ones are in the Finnish language. Our main target group are the non- Finnish speaker in the nursing program. We then planned the structure of the theoretical background, the timetable, and the resources that we need to use during the video production. In our timetable (Appendix 1), we have broken down the task and assigned them according to our skills.

The risks for this project were also identified, such as unavailability of simulation rooms, not meeting the completion dates because of unexpected events. These risks were taken into consideration, and the authors have created a plan to manage these risks. The term risk is defined as a combination of the probability of an event to happen and its consequence. The consequence can be negative or positive. The risk management process involves risk assessment to identify and analyze any exposure to uncertainties, reporting, and communication. Risk treatment involves selecting and implementing measures to modify the risk. Lastly, it includes monitoring and reviewing the structure, that risks are effectively identified, and measures and control are in place. Risk management aims to identify and treat those risks. (Website of the Institute of Risk Management, 2020.) After the plan was accepted, the authors signed the thesis agreement with SAMK.

The second phase is the implementation of the plan. We started researching for the theoretical background. This part needs to be completed before we proceed, as this will be the foundation of the video's content. After the theoretical part was approved, we then moved on to video production and editing. There were several consultations with our supervisor at this stage through virtual meetings before the video was finally accepted.

The last phase is the evaluation, where we evaluate the project result based on the plan. This evaluation is written in our final report. Below in the Table 1 is the actual timetable of the project thesis.

Table 1. Actual project timetable

Design phase August 2019- January 2020	▪ Selection of the topic ▪ Creation of project plan ▪ Presentation of the project plan ▪ Acceptance of the project plan ▪ Signing of the thesis agreement with SAMK
Implementation phase January- April 2020	▪ Writing of the theoretical background ▪ Recording and editing of the video ▪ Video submission for feedback to the supervisor ▪ Video revisions ▪ Survey to students
Evaluation and reporting May-August 2020	▪ Thesis report writing ▪ Evaluation and Conclusion

5 PROJECT IMPLEMENTATION AND RESULT

5.1 Theoretical background

The theoretical background was searched from the recent evidence-based literature. The databases that we used were Cinhal, Terveysportti, Google scholar, and scientific books from Finna and SAMK's library. These articles or information were published between 2010-2020. The initial plan was to complete the theoretical background writing within two weeks. Before the research, we created a mind map as a guide in writing the theory part. In this way, we only search for the most relevant articles.

However, the retrieval of the information proved to be demanding. There was a vast amount of information that ample time is needed to analyze and eliminate the less important ones. Consequently, the theory writing has reached several weeks to finished. The project supervisor had read the draft and made valuable suggestions before it was accepted.

After the theoretical part was completed, the authors then started to write the manuscript for the video based on the information collected during theoretical writing. The manuscript writing was challenging at some point as the catheterization procedure varies from workplace guidelines and school instructional materials. Ultimately, we decided only to follow the instructions that were available in SAMK (Appendix 2). The theoretical background corrections continued up to report writing stage of the project.

5.2 Video Recording and Editing

We booked the SAMK's simulation room for two days for the video recording. The first day was to work on the lightings, practice the scenes with life-sized dolls, and record it. We then watched the video and carefully observed our movements. The rehearsal's idea was to list things that we could improve and get acquainted with role-playing. The following week we did the final recording at the other simulation room. It has the needed equipment, such as catheterization kits, tables, and other essential materials. We used two life-sized dolls as a patient, one for each gender catheterization. Other material, such as anesthetic gel (Xylocaine 2%), was provided by our supervisor because it was not available in the simulation room. The authors arranged a Digital Single Lens Reflex (DSLR) camera, laptop, and additional lighting, and a cameraman came to assist. The two authors acted as a nurse, taking turns to each catheterization.

The recording for male catheterization took longer because we had to do multiple takes. It took the whole day to finish all the recording of the video. During editing, we decided just to put a caption on the video explaining the procedure with calm background music. In this way, it is easier for the viewer to follow the procedure than to have a voice-over, caption, and music background at the same time, which makes retention of information more difficult. This part of the whole video production process took the longest. There were constant virtual meetings between authors, sharing ideas, and feedback. The editing part needs good pairs of critical eyes and the right amount of creativity and patience. After editing, we then sent the video to our supervisor for viewing and feedback. The video was moderately acceptable; some scenes need revision, and more information needs to be inserted. Our biggest challenge was that the school was closed down due to COV-19 pandemic. Thus, there was no way for us to record the scenes in the simulation room again. We were faced with crucial decision to make to either wait for the uncertain school openings or tweak the video and add additional text for full explanation to the students. We decided to re-edit the video and arrange the scenes that were more acceptable with more captions. After the second revision, our supervisor has accepted the video, and we were allowed to send it to the students for a feedback survey.

5.3 Target group

The target group for this project thesis is the nursing students of Satakunta University of Applied Sciences. The nursing students in SAMK come from multicultural backgrounds. The program is taught in English and Finnish, and students can either do flexible or full-time studies. The nursing program's essential part includes the basics of nursing care, professional studies, electives studies, clinical placements, and a thesis. The nursing students of SAMK typically learn urinary catheterization during the first year, along with other necessary nursing skills such as aseptic procedures. The students are usually required to familiarize a procedure before the actual simulation. This video hopefully provides them the crucial information and confidence before going to simulation and clinical placements.

5.4 Feedback Survey and Result

The authors conducted a short feedback survey to two groups of nursing students to evaluate the video. The survey was done in the form of a questionnaire. A questionnaire is a practical and simple method to organize to gather data from participants in research. A researcher must know about the significance and intended outcome of a skill fully designed questionnaire. (Song, Youngshin & Oh 2015.) The feedback form consisted of four easy questions. The questionnaire measures the clarity, comprehensibility, learning experience of the educational video. There were four close ended questions. Each question has grade options from 1-5. 1 stands for poor, 2 satisfactory, 3 good, 4 very good, and 5 for excellent. An extra empty box for additional comments was available for anyone to write their feedbacks.

To collect the feedback, the authors used an online tool known as E-form software provided by SAMK. The link of the e-form was sent to a group of students. Initially, the video was intended to 3rd year English nursing group, which has 19 students. However, the authors realized there were not enough respondents, and being in the same group could influence a favourable feedback. The authors then decided to send the survey to the 2nd year group. The link of feedback and video was sent through

email to forty-one students of SAMK. The time duration for responding to the feedback was one week (28.4 - 5.5.2020). After one week, 14 students responded to the questionnaire. The same E-form application analyzed the results. However, the result's chart is created in the software known as Tixel 11. based on MS Excel.

The result of the four questions is shown in percentage in the bar chart and tabulated per question below in figure 8. The first question was about students' previous knowledge of indwelling urine catheterization, in which 71% responded with very good and 29% with good. The second question was about the usefulness of the video in learning the catheterization procedure, 64% responded with very good, 29% with excellent and 7% with good. The third question was about the quality of the video e.g. text, music, length and editing of the video, 71% responded with very good, 14% with excellent and 14% with good. The fourth question was the easiness to follow the educational video, 57% responded with excellent, 36% with very good and 7% with good.

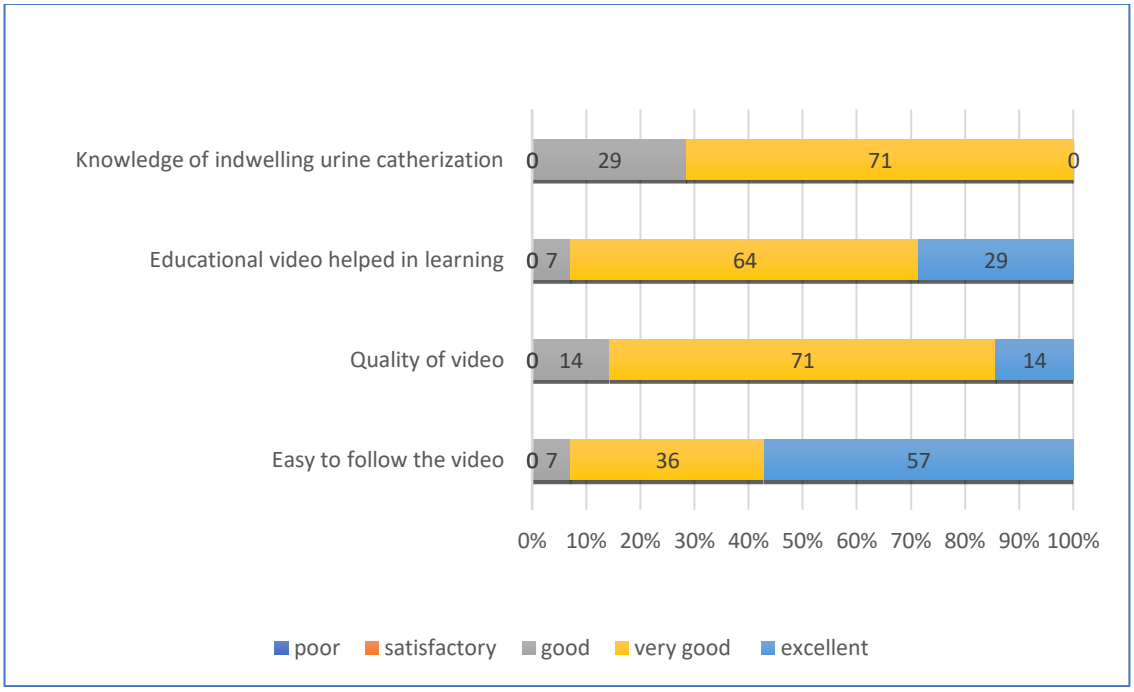

Figure 7. The sum feedback of the video

The additional comment box collected eight written feedbacks. According to six students, the video was good and helpful for the nursing students in learning the process of indwelling urine catheterization. Two students mentioned to focus more on aseptic during the procedure of insertion of urine catheter in the future. The suggestions are considered useful.

The subscriber's feedback about the video was affirmative. The video project has met its desired goal and is helpful in working life. Additionally, the authors were independent and self-directive and were able to create credible solutions during the project process.

6 EVALUATION

Our initial agreement in choosing a topic was based on three reasons: a topic that develops our clinical skills, not overly complicated to implement, and something beneficial to other students. Our initial research revealed that the existing available materials on urinary catheterization were in the Finnish language. The English nursing group, which consisted of mostly non-Finnish speakers, would barely understand it. Thus, the decision to produce video material in English language came quickly to us.

At the design phase, we have created a timetable that looked realistic and doable. However, as the project progressed, we realized that the timetable was too tight. We have not considered our other personal commitments, such as work, family, and our supervisor's schedule. As a result, we could not keep up with our initial timetable. We had to modify and stretch the timetable that would allow us to work according to our individual time.

During the project process, SAMK has issued an internal guideline that it might close the school due to the COVID- 19 pandemic. This decision could mean that we could no longer access the simulation room to record the video. Hence, it could delay the project, or we do the thesis differently. Based on this information, we decided quickly to record the video two weeks ahead of schedule. To have the foresight on what could happen and be decisive has saved us from a major dilemma. The school decided to close its door just a few days after we recorded the video. While the school was close, we were already editing the video.

We have organized quite efficiently the resources needed for this project. We had a cameraman to record the scenes. It was the right decision as the footage came out clear. Moreover, even though there was a social distancing required, the communications between authors and our supervisor continued using the HILL platform. The editing of the video took us longer than we planned. We edited the video by ourselves, which was the right decision because we could quickly edit, arrange the scenes and put on a

better caption. This task would have been challenging if we hired an editor who is not familiar with the nursing procedure and terminologies.

The risks for this project such as unavailability of the simulation room, not meeting the completion date, were identified early. These risks were purely based on the facts and knowledge we had at the design phase. We created more leeway in our timetable so that should we face uncertain events, there is still more time to make up for those days. However, just like in any project, some events were beyond our control. The time that we initially allotted for these events was not enough, and thus, we could not meet the deadline that we initially set.

The waterfall method that we used for this project was useful. We choose this method because our project is not complicated, and few people were involved. The method is quite straight forward. Once we knew our topic, we designed the plan, listed the tasks with specific due dates, implemented those tasks, and evaluated them. The method had been beneficial as it showed us the logical way to handle this project.

7 CONCLUSION

The survey results showed that we had achieved the end purpose of this project. The theoretical background was carefully compiled to provide nursing students with the essential concepts to know. The video material has the necessary information on how to perform the procedure correctly. The students can watch the video before going to the simulation room. In this way, they will get familiar with the materials and the procedure before the simulation.

The response of the survey was quite inexplicable for us. We have designed questions that were easy to understand and quick to answer, but fewer people were willing to reply. We assumed that only those who know us personally were willing to raise their opinion, and the rest remained unresponsive. Even though the response rate was moderately low, we are still grateful that some people answered our request. The result of the survey also highlighted the aseptic procedure. It is one thing that could be further developed in the future. Perhaps a system that encourages the students right from the start to practice hand hygiene and right aseptic procedure. Additionally, topics that could be further studied related to this topic would be removing the urinary catheters.

The other goal for this project thesis is to develop our clinical skills. Before we started the project, we had a basic understanding of the procedure. The writing part about the theoretical background has revealed plenty of information that has deepened our knowledge about the topic. The recording and editing of the video were also an additional learning experience. In conclusion, the whole project experience may be challenging at some point, but it certainly taught us skills that we could use in our future endeavours.

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APPENDIX 1

The project thesis timetable

	Weeks 2019			Weeks 2020																			
	34	49	50	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
Tasks																							
Identification of Topic																							
Project Plan creation																							
Submission of Research Project Plan-latest																							
Presentation of Project plan																							
Final feedback and acceptance																							
Background/Theoretical review																							
Teacher evaluation and feedback																							
Manuscript writing and submission																							
Teacher evaluation and feedback																							
Book simulation room																							
Making of the video												Train/practice											
Editing of the video																							
Submission of the video to teacher for feedback																							
Survey to students																							
Reporting/writing the last part of the thesis and Proofreading																							
Final presentation of the thesis																							
Done																							
On going																			hrs	400			
Planned start date																							
Rework																							

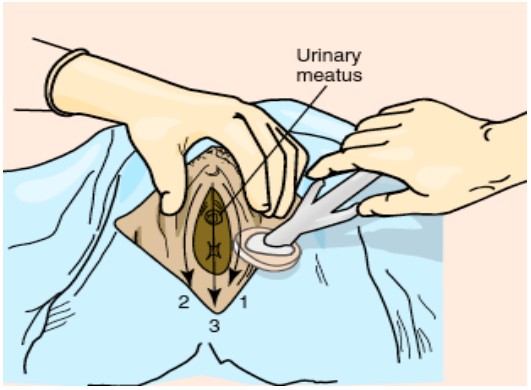
APPENDIX 2

The indwelling urine catherization procedure.

Female catheterization:

1. Identify the patient using the identifiers (e.g. Name and Social security no.) according to the facility policy or you can also ask the patient to say her/his name. Tell the patient about the procedure, how it is performed, and how it feels. There will be a slight discomfort. Ask the patient of any allergies (i.e. antiseptic, tape, latex and lubricant). If the patient is fully functional, ask the patient to wash the genital area, if physically unable to do so, then the nurse should do it for the patient. Disinfect your hand.
2. Gather all the required equipment on the table or tray. Bring the tray near the patient bed side. Provide privacy by closing room door or bedside curtain or through a partition screen.
3. Put the urine collecting bag into a hanger and hang it in the patient's bedside. Open the catheter set and pour the liquid (sterile water, or Sodium Chloride (NaCl) into the cup that the cotton balls get wet completely.
4. Assist patient to lie on back and lower the pants, diaper (if any) so that the genital area is visible. Ask the patient to flex the knees and relax the thighs. Place the wide absorbent pad between the legs of the patient to protect the bed from any liquid leakage.
5. Disinfect your hands and carefully wear the sterile gloves. Place the sterile drape with the shiny side down on bed on the patient's thigh so that the labia are expose.
6. Put the sterile tray with the wet cotton ball on the sterile area between patients' legs.
7. With the non-dominant hand separate the labia with the dry gauze (cotton) and spread them with your thumb and forefinger to fully expose the urinary meatus. Maintain the position of non- dominant hand continuously until catheter has been inserted.
8. Take the forceps to hold one cotton ball and clean the labia and urinary meatus from clitoris toward anus (up to down direction). Use a new cotton ball for each area cleanse. Put the used cotton ball outside the cup so it does not mix with

the clean ones. Wipe the far labial fold, the near labial fold, and directly over the centre of the urethral meatus as shown below.



Cleaning the Female genital (Perry et al.2017)

9. With the last cotton ball wipe the mouth of the urethra
10. don't loosen the grip of the labia during washing and catheterization procedure. Always make sure that the sterile hand remains sterile.
11. Take the catheter with forceps (if you wash the genital using forceps, insert the catheter the using the hands) lubricate it with the anaesthetic gel. Then, inject gently the anaesthetic gel into the patient's urethra. Wait for a while so that the gel effects. Explain to the patient that a feeling of burning, pinching or pressure may be experienced by the insertion of the catheter.
12. Insert the catheter to the urethra in an upward slight skewed position. Avoid tissue damage and contamination until the catheter reaches the bladder. Do not force the catheter if resistance is met. The catheter has reached the bladder when urine flows out. If urine is not draining from bladder, ask the patient to cough or to push the bladder or slightly press the bladder over the stomach so that the urine starts to flow.

    If no urine appears, the catheter maybe in vagina. If misplaced leave the catheter in vagina as a landmark indicating where to insert and insert a new sterile catheter.

13. After this, clip the catheter with forceps and push further forward, so that the catheter balloon is completely inside the bladder when it blows up. With free dominant hand or a partner attached pre-filled syringe in injection port at end

of the catheter. Slowly inject the total amount of fluid (10ml). The amount of fluid injected into the balloon is indicated in the catheter package.

14. Nurse ensures that the balloon should not be anywhere in the urethra. If patient feels pain during the blowing up of the balloon, empty the balloon by removing the fluid quickly. If urine does not drain, the gel may have blocked the catheter. Wait for a while, press the bladder carefully, ask the patient to cough.
15. After inflating the catheter balloon, connect the tube with the urine collecting bag. Gently pull catheter until resistance so that the balloon stays in the bottom of the bladder. Remove the forceps from the catheter. Clean the catheter tube mouth. Attach the catheter with skin tape to the thigh to avoid pressure damage on the urethral tube. The urine collecting bag is placed below the bladder level.
16. Remove the protective gloves and disinfectant your hands. Assist the patient to put the pants up and clean the patient's bed and environment. Discuss with the patient about the feeling regarding the previous procedure and guide the patient about the use of catheter. Document about the time, size of catheter, the amount of liquid for blow up of the balloon, feelings of the patient. (Rautava-Nurmi, Westergård, Henttonen, Ojala & Vuorinen 2019, 282; Perry, Potter & Ostendorf 2016, 485.)

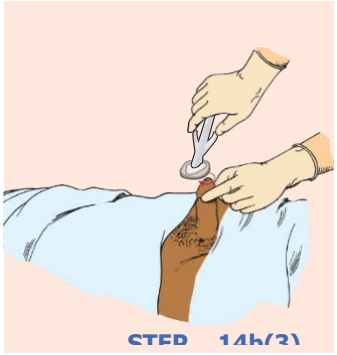
Male catheterization

1. Identify the patient using the identifiers (e.g. Name and Social security no.) according to the facility policy or you can also ask the patient to say her/his name. Tell the patient about the procedure, how it is performed, and how it feels for example will be a slight cold sensation when the catheter is inserted but it will not be painful. Ask the patient of any allergies (i.e. antiseptic, tape, latex and lubricant). If the patient is fully functional, ask the patient to wash the genital area, if physically unable to do so, then the nurse should do it for the patient. Disinfect your hand.
2. Gather all the required equipment on the table or tray and bring it to the patient's bedside. Provide privacy by closing room door or bedside curtain or through a partition screen.

3. Put the urine collecting bag into a hanger and hang it in the patient's bedside. Open the catheter set and pour the liquid (sterile water, or Sodium Chloride (NaCl) into the cup that the cotton balls get wet completely.
4. Assist patient to lie on back and lower the pants, diaper (if any) so that the genital area is visible. Ask the patient to flex the knees and relax the thighs. Place the wide absorbent pad between the legs of the patient to protect the bed from any liquid leakage.
5. Disinfect your hands and carefully wear the sterile gloves. Place the sterile drape with the shiny side down on bed on the patient's thigh just below the penis. Place the fenestrated drape with opening centred over the penis.
6. Put the sterile tray with the wet cotton ball on the sterile area between patients' legs.
7. With non-dominant hand grab the penis with dry gauze (cotton) and pull the foreskin backward (if uncircumcised). Hold shaft of the penis at right angle to body. This hand remains in this position until the end of the procedure.

   If the patient has an erection discontinue the procedure and wait until it subsides.

8. With forceps pick the wet cotton balls and wipe throughout the meatus in circular motion (starting at the meatus and moving outward in the spiral motion). Use a new cotton ball for each area cleanse. Put the used cotton ball outside the cup so it does not mix with the clean ones. With the last cotton ball wipe the opening of the urethra. Don't lose the grip of the penis during washing and catheterization procedure.



Cleaning the male genital (Perry et al.2017)

9. Take the catheter with your hands (if you wash the genital using forceps, insert the catheter with the sterile hands) and lubricate it with anaesthetic gel. Then

inject gently the anaesthetic gel into the patient's urethra. Lubrication reduces trauma to urethra and discomfort during catheter insertion. Wait for a while so that the gel effects. The amount of anaesthetic gel (in case of need) can be used up to 60ml to lubricate the catheter and to the urethra

The male catheter requires enough lubricant to cover the length of the catheter inserted.

10. Explain to the patient that a feeling of burning, pinching or pressure may be experienced by the insertion of the catheter. This sensation is normal and will go way. Gently apply upward grip to penis as it is held in 90-degree angle from body. Insert the catheter slowly through the meatus. Insert the catheter, when it reaches the bladder urine flows out. Stop inserting the catheter further, when urine appears. Lower the penis and hold catheter securely in the non-dominant hand.
11. Do not force the catheter if resistance is met. If urine is not draining from bladder, ask the patient to cough or to push the bladder or slightly press the bladder over the stomach so that the urine starts to flow. If required, the urine sample can be taken.
12. After this, clip the catheter with forceps and push further forward about 5-10cm, so that the catheter balloon is completely inside the bladder when it blows up. With free dominant hand or a partner attached pre-filled syringe in injection port at end of the catheter. Slowly inject the total amount of fluid (10ml). The amount of fluid injected into the balloon is indicated in the catheter package.
13. Nurse ensures that the balloon should not be anywhere in the urethra. If patient feels pain during the blowing up of the balloon, empty the balloon by removing the fluid quickly. If urine does not drain, the gel may have blocked the catheter. Wait for a while, press the bladder carefully, ask the patient to cough.
14. After inflating the catheter balloon, connect the tube with the urine collecting bag. Gently pull catheter until resistance so that the balloon stays in the bottom of the bladder. Remove the forceps from the catheter. Clean the urethral mouth. Check that the foreskin is in place to prevent the gluteal contraction. Attach the

catheter with skin tape to the thigh to avoid pressure damage on the urethral tube. The urine collecting bag is placed below the bladder level.

15. Remove the protective gloves and disinfectant your hands. Assist the patient to put the pants up and clean the patient's bed and environment. Discuss with the patient about the feeling regarding the previous procedure and guide the patient about the use of catheter. Document about the time, size of catheter, the amount of liquid for blow up of the balloon, feelings of the patient. (Rautava-Nurmi, Westergård, Henttonen, Ojala & Vuorinen 2019, 282; Perry, Potter & Ostendorf 2016, 485.)

Special Notes

- The catheterization can be performed alone or with the assistance nurse. In case, catherization is performed by one nurse, the patient should be cooperative, with careful aseptic measures and techniques it performed.
- The catheterization procedure can be distributed between the two nurses as the work becomes flexile.
- The other nurse can assist patient in catheterization position, opening of the catheter package and assist in lubricating the catheter, for insertion of catheter, filling of the balloon, for connecting the catheter with the catheter bag and taking care of the aseptic.
- Patient having catheter should be followed the urine output, colour of urine, smell and clogging, and it should be documented.