An educational video on inserting an indwelling urinary catheter for an adult

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Laurea University of Applied Sciences **Abstract**

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Catheterization is one of the important and frequently occurring nursing interventions in professional career of a nurse. Urinary tract infection is one of the most common infections caused by using an indwelling urinary catheter. The most important interventions to prevent infection and trauma are to limit indwelling catheter use, to discontinue the catheter as soon as clinically feasible, to maintain sterile and aseptic techniques during catheterization. Skillful nurse with theoretical knowledge also plays important role to minimize risk of infection in urinary tract, bladder or less commonly the kidneys as well urethra trauma. Nurses require theoretical as well as practical knowledge to provide a holistic and effective nursing care. Evidence-based education video can be one of the sources to achieve nursing knowledge.

Previous studies on insertion of indwelling urinary catheter have been done but the authors have been unable to find any educational video in English language based on the Finnish prospective in those studies, resulting a need to produce an educational video of inserting an indwelling urinary catheter in adult in English language with Finnish perspective.

The purpose of this thesis is to produce an evidence-based educational video on inserting an indwelling urinary catheter in English language. The aim is to improve knowledge and hands on skills about the indwelling catheterization for nursing students and nurses.

The theoretical framework of the thesis is from the latest evidence-based practice from national and international institutions, academic journals as well as research articles. Based on the current recommendations and guidelines, an educational video was produced as the final product in collaboration together with Laurea UAS, to meet the Finnish nursing prospective.
Respondents participating in the feedback collection have agreed that the final product will be useful for the nursing students as well as nurses and will provide improved knowledge and hands on skills about the indwelling catheterization.

Separate study topics on the insertion of indwelling urinary catheter in male and female, as well as Finnish subtitle with English narration in educational videos could be used in future thesis development, which will help to make the final product shorter as well as beneficial for both English and Finnish speakers.

Keywords: Urinary catheterization, urinary catheter, educational video, nursing students, nurses

Contents

1 Introduction

The human body is made up of different systems; the urinary system is one of them, which is responsible for the production, storage, and elimination of fluid waste. Kidney is one of the organs of the urinary systems, which prepares this fluid waste (urine), and then this fluid waste travels from kidney via ureters and gets collected in the bladder and exits through urethra. (Keller 2018.)

Whenever there is difficulty in emptying urinary bladder naturally due to health problems such as urinary incontinence and urinary retention or surgical intervention, spinal cord injuries, or neurological issues, urinary catheterization is widely used. Catheterization of urinary bladder is an invasive process, which includes flexible tube (catheter), and drainage bag. Urine is drained through catheter and collected into a drainage bag. (Hill & Mitchell 2018.)

Intermittent urinary catheter and indwelling urinary catheter are the two main types of urinary catheters. Intermittent catheter is the single use catheter, which are used to empty the bladder many times in a day according to the need of the patient and is removed immediately, after the bladder is emptied, whereas the indwelling urinary catheter is placed in patients who are not able to urinate naturally due to health problems such as urine incontinence, urine retention, surgery, multiple sclerosis, spinal cord injury or neurological issues for many days or even weeks (up to 12 weeks) once it is inserted. (Hill & Mitchell 2018) Before inserting an indwelling urinary catheter a nurse should always measure the residual urine left in the urinary bladder of the patient.

Catheterization is an important skill performed by nurses as well as nursing students in clinical practice. Lack of theoretical information, hand skills as well as negligence in patient safety, sterile and aseptic techniques may increase risk of urinary tract infections, injury to the urethra, prostate, or bladder (Bianchi & Chesnut 2021).

Educational videos are innovative materials used in learning and teaching processes. These multimedia technologies provide students with more sensory learning environment. The information, knowledge, and skills gained through these educational videos can be retained for longer period. Well-designed, well-prepared, and evidence based educational videos can have a positive impact on skills as well as increase the motivation of students. In a long run, these learning techniques also make it easier to recall theoretical information. Research indicates that even for large student group, education videos have positive contribution to the skills training. (Bahar, Arslan, Gokgoz, Ak, & Kaya 2017.)

The purpose of this thesis is to produce an evidence-based educational video on inserting an indwelling urinary catheter in English language. The aim is to improve knowledge and hands on skills about the indwelling catheterization for nursing students and nurses.

As mentioned above, catheterization is one of the important nursing interventions in professional career of a nurse. Since equipment's and techniques are changing frequently in nursing field, the authors looked for recent educational videos produced by THL and other Finnish health institutions in different platforms like YouTube but didn't find any latest educational video of the topic in English language. The topic was chosen to provide knowledge and techniques of indwelling catheterization in English language based on Finnish nursing perspective for nurses and nursing students through an educational video. The objective of this research work is to provide knowledge and techniques to the nurses and nursing students to perform an aseptic process of indwelling catheterization for adult male and female. The final product will then remind and guide the target group about the whole process, need, proper handling, possibility of risk, patient safety as well as patient education.

This thesis is done in cooperation between Laurea University of Applied Sciences and authors, which after completion will fulfill the need of an English language educational video based on the current recommendation.

2 Theoretical background

2.1 Urinary catheter

When patients are unable to empty urinary bladder due to impaired bladder function or surgical intervention, catheterization is used to empty the urinary bladder. Catheterization is an invasive process which is completed always by nurses with proper theoretical knowledge and hand skills to minimize possible risk of infections and injuries. Sterile procedure, aseptic techniques, patient safety and patient education should always be considered while catheterization of urinary bladder. Intermittent and indwelling urinary catheters are the two main types of urinary catheters. (Bianchi & Chesnut 2021)

2.2 Indwelling catheter

A urinary catheter which is inserted by health care professionals with following aseptic techniques through urethra to empty the urinary bladder and remains in place for longer period is classified as indwelling catheter. Before inserting an indwelling catheter, appropriate size of the catheter should be chosen. For adult, correct catheter size is Ch 12-

14. Length of catheters for male is longer than catheter for female. Bigger sized catheters are used if the urine is stale or bloody. Male patient with enlarged prostate, coude catheter is used as it has slightly curved tip which makes it easier to insert into the bladder through urethra via prostate. If the catheter is going to be placed for longer period or patient have suspicious of latex allergies, silicone catheter or hydrogel catheters are recommended primarily (Terveyden ja hyvinvoinnin laitos 2021). Silicone catheter is non-allergenic and works well for patients with sensitive skin.

An indwelling catheter is a double or multi lumen flexible tube; in double lumen catheter, one lumen is for urine drainage whereas another lumen is used to put sterile water, which helps to inflate the balloon present at the other end of the catheter. In multi-lumen catheter, the third lumen is used for irrigation. This catheter is inserted through urethra to reach bladder and connected to a drainage bag. This indwelling catheter remains in place for many days, unto 3 months maximum. Indwelling catheters are mainly used to drain the bladder; before, during and after the surgery, to relieve urinary incontinence if no other methods are helpful and to relieve retention of urine. (Hill & Mitchell 2018.)

Need of the indwelling catheter should be assessed carefully before insertion and it should be removed immediately after necessity is over. This helps to minimize the risk of urinary tract infections caused by catheter. (Coventry et. Al 2021.)

2.3 Insertion of indwelling catheter

The process or action of putting or adding something into something else is called insertion (Cambridge Dictionary Insertion 2021). Insertion means inserting indwelling catheter into bladder via urethra. Insertion of indwelling urinary catheters is one of the important and frequently repeating nursing intervention. Indwelling urinary catheter can be used during surgical interventions and patients who have urination problem due to health problems such as neurological issues, spinal cord injury, and urine bladder problems.

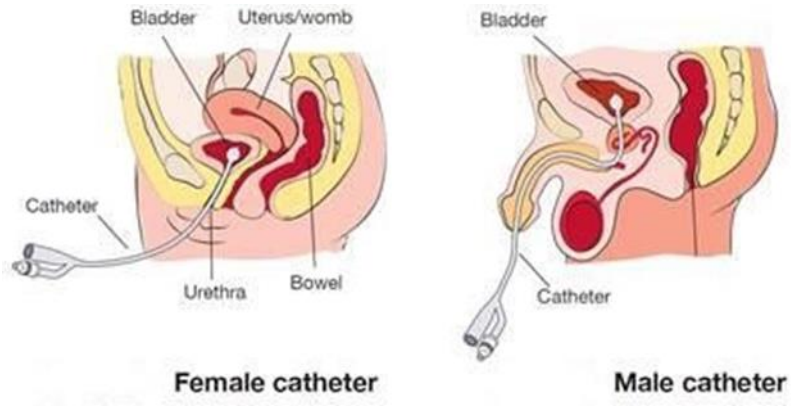
Insertion of indwelling urinary catheter is an invasive procedure. Latest evidence-based guidelines and aseptic techniques should be strictly followed during the whole process of urinary catheterization. Only the trained healthcare professionals with adequate theoretical knowledge and hand skills can insert an indwelling catheter. Benefits and risks of the catheterization should be evaluated well before making decision of inserting a urinary catheter as well as patient and relatives should be informed and explained about the process procedures, benefits, risks, and need of the catheterization. Patient consent should be gained

before starting the procedure, nurses should be aware about privacy of the patient and privacy should be respected all the time during the procedure by curtaining surrounding of the patient, if possible, using a single patient room, covering all other body part, and exposing only the necessary part. (Terveyden ja hyvinvoinnin laitos 2022.)

Catheterization is challenging with male patients especially with enlarged prostate, risk of trauma and possible infections is higher. Repeated and unsuccessful attempts while catheterization brings stress and pain for the patient as well as injury to the urethra, which will increase the healthcare cost due to the possible longer hospitalization, need of more interventions and possible need of follow ups. (Willette & Coffield 2012)

Before starting the catheterization, hands should be washed, and hand disinfection should be done according to the guidelines. Adequate light should be ensured and working area should be planned in a way that patient will be warm, feel comfortable, and feel safe being there. (Terveyden ja hyvinvoinnin laitos 2022.)

After making the environment ready for the procedure, equipment necessary for catheterization should be collected. Catheterization pack and drapes, sterile gloves, right size catheter, sterile lubricant or local anesthesia (xylocaine gel), sterile water (NaCl) to inflate balloon (according to the need and instructions in the catheter package), straps or skin tape to secure catheter to thigh (leg), drainage bag and waterproof sheet should be collected and placed in a disinfected dressing trolley. (Terveyden ja hyvinvoinnin laitos 2022.)



Picture 1: Insertion of indwelling catheter, Source: Department of Health, Government of Western Australia

After performing hand hygiene patient should be placed in a supine position and legs should be wide open. Waterproof sheet should be placed under the hip of the patient. Initial

cleaning can be done by having factory clean gloves. Genital area should be cleaned first with sterile normal saline and clean cotton swab. For male patient penis is lifted and foreskin is retracted then tip of the penis is cleaned using the sterile normal saline and clean cotton swab whereas for female patient, after separating labia with one hand, another hand will hold forceps with wet swabs and clean urethral opening downward to the rectum area. After each urethral cleaning the swabs should be changed and dirty one should be thrown to the dustbin. Once the sterile package and equipment are opened and placed on the working tray, nurse should be very careful not to contaminate them. Any movement over the sterile equipment should be avoided and in case happened, they are not considered sterile, and equipment should be changed immediately as they are one of the reasons for possible infections. (Terveyden ja hyvinvoinnin laitos 2022.)

Once the cleaning is done, nurse performs hand hygiene and hand disinfection. Sterile gloves will be used by the nurse who will be inserting the catheter. Nurse should follow strict hand hygiene procedure even while opening the catheter and equipment packages and be careful not to contaminate neither equipment's nor the surface. Local anesthesia (Xylocaine gel) will be applied in the meatus of penis for male and urethral meatus in vagina for female. This gel will ease in the flow of catheter and helps to make patient comfortable. Xylocaine gel will also be applied in the tip of the catheter. (Terveyden ja hyvinvoinnin laitos 2022.) Nurse with sterile gloves will insert the catheter slowly and carefully through meatus. Patient should be informed all the time about the procedures and asked if he/she is having any kind of pain. If so, procedure should be stopped and evaluated again. Catheter tube will be pushed slowly towards the urinary bladder. Once urine starts to flow from the catheter, it indicates that the catheter has reached in urinary bladder. Catheter will be further pushed into bladder to make sure that it is well inside the urinary bladder. The balloon which is attached into the tip of the catheter will be then inflated with sterile saline NaCl (volume to be decided according to the need and instructions given in the package), which will help to keep the catheter placed inside the urinary bladder. Patient will be asked if he/she feels pain while inflating balloon, if yes means that catheter is not well inside the urinary bladder and catheter should be pushed further into the bladder. After inflating the balloon, the catheter should be pulled back gently to see if it is inside the bladder and thus will help to anchor the catheter. Assistance nurse will then attach outer end of the catheter to the drainage bag. Catheter will be secured in thigh of the patient with a skin tape. All the stuffs should be collected, and patients' lower part will be cleaned and dried again if needed. The drainage bag will be placed below the waist for the natural flow of urine. (Terveyden ja hyvinvoinnin laitos 2022.) Hand hygiene should be performed after taking off gloves and instruments away and waste should be handled according to the instruction of the institution.

After completing the insertion of indwelling catheter and performing hand hygiene, nurse should observe patients' general condition and ask how he/she feels about it. Possible pain

should be asked and observed by different pain measuring methods like measuring blood pressure, observing physical expressions, breathing type/frequency, numeric rating scale (NRS) or visual analogue scale (VAS). Amount of urine output and color, smell of urine should be followed and documented properly. Patients and relatives should be educated properly about the handling of the catheter, patient movement, emptying process of the bag, proper hygiene and report keeping of the urine output. Proper patient education provided by nurse influence directly to minimize risk of infection, injuries as well as unnecessary ejection of catheter.

2.4 Removal of indwelling urinary catheter

Urinary catheters are removed immediately after according to the doctor’s decision when the need is over. Hand hygiene instructions are followed strictly before starting the procedure. Factory clean gloves are used after disinfecting hands (Terveyden ja hyvinvoinnin laitos 2022.) Waterproof sheet will be placed under the hip of patient. Process and procedures should be explained beforehand to the patient and their relatives if present. Patient privacy and sufficient lightning should be secured beforehand. Drainage bag is emptied always before removing the catheter. Tape which was used to attach catheter on patient skin should be removed also. After that the balloon of catheter will be emptied by using an empty syringe. The size of the empty syringe can be decided by looking at the previous documentation done while inserting the catheter (for example: if 10ml saline was used to inflate balloon while inserting catheter, then while removing also 10ml empty syringe should be used to empty the balloon). After the balloon is emptied catheter can be removed slowly on exhale if possible and with rotation movements if necessary. Documentation of all the procedure is necessary. Once the catheter is removed, patients' urine output should be observed carefully for 24 hours. Residual urine should be measured after the first natural urination. In case, the doctor sees need of the bladder trainings, the nurse should observe and educate patients and relatives about bladder training because the bladder and urethra will be weak after removing catheter. (Terveyden ja hyvinvoinnin laitos 2022.)

2.5 Asepsis

Hand hygiene and aseptic techniques are essential to provide safe nursing intervention (Wikstrom, Dellenborg, Wallin Gillespie, & Andersson 2018). Medical professionals should follow a strict aseptic technique to reduce the number of microorganisms and prevents growth. Asepsis includes hand washing, hand disinfection, cleaning of equipment, site washing and site disinfection. (Wright 2020). Personal protective equipment's are also part of the asepsis. Reason behind the importance of asepsis is to be free from pathogenic microorganisms and prevention of the transmission of organisms from one individual to another, preventing direct contamination of materials and supplies (Palmer 2019).

Genital area is usually the dirtiest part of the human body. Nurses should always be extra precautions while performing nursing intervention in those areas. Urinary catheter is a huge port for the possible infection risk, so while doing this nursing intervention, action should be performed in such a way that minimizes the risk of bringing bacteria to the urinary bladder (Kulbay & Tammelin 2018).

2.6 Nurses' responsibilities concerning indwelling catheterization

Catheterization increases the risk of urinary tract infection, bladder spasm and urethral trauma, that's why nurses should observe the need and benefits of catheter (Kulbay & Tammelin 2018). After the need for an indwelling catheter is decided, nurses are primarily responsible for inserting and maintaining urinary catheters. Nurses should always follow the guidelines and protocols while inserting as well as while taking care of the catheter. Properly followed guidelines and protocol in health care facility have positive impact on the knowledge and skills of nurses, which will play vital role in avoiding complications due to catheterization. (Teshager, Hussien et. Al. 2022)

Since patient safety is the center of care, each nurse is responsible for their actions. Procedures, equipment's, and research are changing often in care field, so it is the nurse's responsibility to update own knowledge and skills according to the current recommendations. Service provider is also responsible to check if each employee's knowledge and skills are up to date and provide trainings to ensure that each employee are familiarize with latest recommendations. This will help to improve the quality of care as well as minimize the risk of complications of catheterization. (Sosiaali- ja Terveysministeriö. 2017)

Size of the catheter before inserting should be decided carefully keeping in mind the comfort of the patient, ease of insertion and ease of removal. In addition to these, it is a nurse's responsibility to educate the patient and relatives about the care of the catheter. Personal

hygiene, fluid intake and urine output should be observed closely and patients as well as their relatives should be educated about it (Leaver 2017).

The functionality and need of indwelling catheter should be evaluated daily. The drainage bag should always be placed below the waist height, even while moving or movement of the patient. Drainage bag should be emptied often, and amount of urine output should be documented properly.

Nurses are responsible and accountable for the nursing documentation. Proper documentation helps in the continuation of care, reference for multi professional team, future reference, and accurate reflection of nursing assessment as well as works as a means of effective communication. Documentation should be clear, accurate, valid, complete, and accessible for the whole care team, as well as available for future reference. (American Nursing Association 2010.) Reason for having a catheter, date of insertion and date of removal, amount of sterile water for balloon inflation and information about catheters model, material and size should be documented. It is also nurse's responsibility to check the catheter's situation and change if necessary. (Terveyden ja Hyvinvoinnin laitos 2022). Enough education and trainings for hand skills, documentation, and patient education is needed for the nurses before handling indwelling catheter issues.

Since urinary catheter is a foreign object placed inside human body, it increases the risk of infection. If there are any sign of infection, such as: swelling, redness, other signs of infection in genital area, fever over 38.c without any other noticeable reason, pain on the rib bone, painful urination and frequent need of urination, nurse should inform to the doctor and act according to the instruction given. (HUS 2021.)

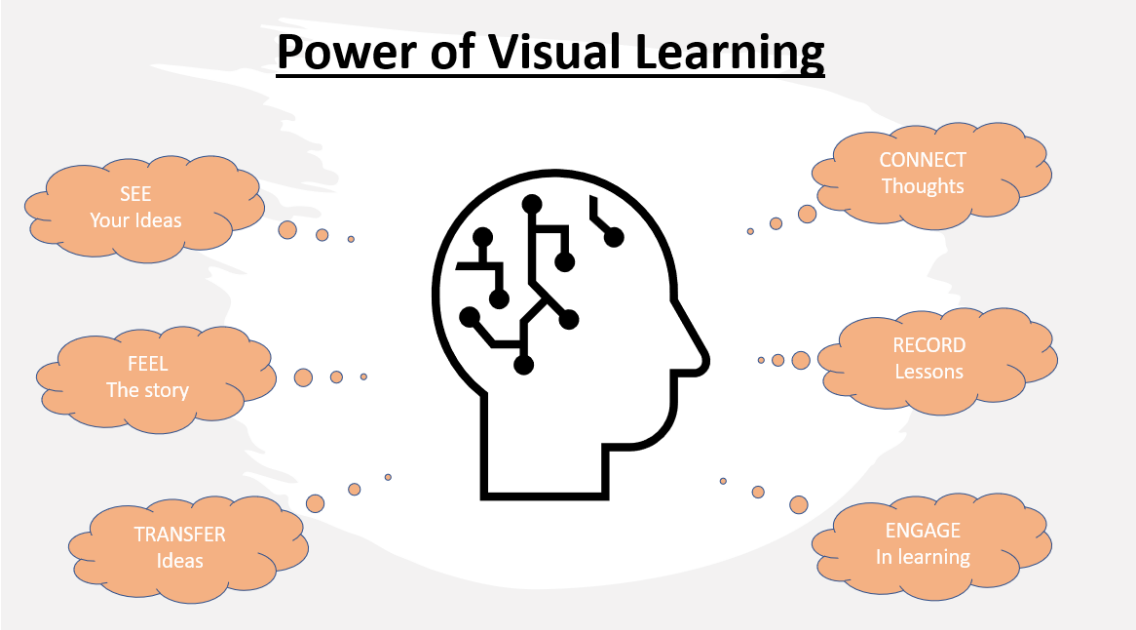
Patient education is the biggest part of nursing responsibility in urinary catheterization, handling, and its care. Nurses should avoid unnecessary touching of catheter, touching with dirty hands, lifting it over waist height as well as make sure that patient follows same guidelines. Once patient goes home with indwelling catheter, patient as well as relatives should get adequate education about handling and care of the urinary catheter. According to 30th national conference on incontinence 11-14 May 2022, many patients and relatives are not often educated enough about the care and handling of the urinary catheter and are forced to rely on the internet as well as other possible sources, which have increased in the cost of care and frequent hospital visit due to the possible complications caused by catheterization. To minimize catheter associated complications and improve patients' quality of life, nurses should educate patients and their relatives properly with the latest care and handling procedure of the indwelling catheter, keeping record of fluid intake and urine output, Proper nutrition, enough liquid intake, regular medicines, proper hygiene, movement, and exercises. Swimming and visit to saunas are recommended to avoid with indwelling

catheter in use. (Sairaala Nova 2020.) Patient education can be given orally as well as in printed or written form.

It is also nurse's duty to educate patient about infection signs and when to contact health care provider in case any of the infection sign mentioned above are noticed. It is nurses' responsibility to document everything about the whole process in a systematic manner in patient record platform for future references, patient safety and continuity of care. (TYKS 2016.)

2.7 Importance of educational video

According to Raiyn (2016), " visual information is mapped better in students' minds''. Visual learning has become important part of educational institution. Visual learning helps students to understand better and retain that information by associating ideas, words and concepts with images. (Raiyn 2016). Visual information can be presented in various formats, such as images, videos, flowcharts, diagrams, graphs, cartoons, color books, slide shows/PowerPoint, posters, movies, games (Cherrez & Moya 2018).



Picture 2: Power of visual learning, Source: Doodle institute 2020, Modified by Amar Rayamajhi & Deepak Adhikari 23.01.2023.

Visual learning style is the most popular learning method among visual, auditory, and kinaesthetic. Research also shows that it is easy to learn and remember through visual materials. Usually, students have difficulty remembering words by repetition of words, while visual information can be recalled more easily in the situation of need. Learning experience through visual formats can be more accurate, more real, and more active. Achievement of effective learning outcomes can be influenced by visual learning. (Cherrez & Moya 2018).

2.8 Benefits of educational video for nursing students

An individual who is studying and/ or training to be a future nurse in a school and/or hospital is defined as a student nurse (Collins dictionary 2022). These students after graduation will become health care professionals.

A health care professional, who is registered and have license to practice in health care profession independently or under the supervision of physician, dentist or surgeon and who is skilled enough to promote and maintain the health of individual as well as society is defined as a nurse (Merriam Webster 2022).

Study shows that the use of videos is helpful in developing skills of nursing students in any given procedures. Educational videos also simulate the real-life situation and bring the situation to nursing student's hand (Cardoso et. Al., 2012). In this age of smartphone and technologies, nursing students can visualize the situation on the go. Nursing interventions can be taught with lecture demonstration and video demonstration teaching methods and the results have been very effective. Research has also showed that most of the students are satisfied with combination of lecture and educational videos while learning nursing skills and practices. Learning method through visual education is an effective tool in learning (Sugathapal & Chandrika 2021).

There is a challenge faced by traditional model of learning by the introduction of educational videos such as YouTube materials in nursing studies. However, educational videos have given benefits to promote active participation and self-directed learning for nursing students. (Duncan, Yarwood-Ross, & Haigh 2013.)

Visual materials are a powerful tool which contributes to learning education and for the acquisition of clinical competences. Various observational studies also have found that educational videos are helpful in reducing the gap between theory and practice. (Salina et. al., 2012.) Use of educational videos and visual materials in perusing nursing education and developing clinical skills are being increased more in recent times than ever. A well-prepared

video with use of evidence-based information will enhance quality of nursing and clinical skills education. (Fobes et.al., 2016.) Once visual and auditory methods of teaching are combined in a teaching method, it is easy for nursing students to understand and retain the knowledge.

3 Purpose and aim

The purpose of this thesis is to produce an evidence-based educational video on inserting an indwelling urinary catheter in English language.

The aim is to improve knowledge and hands on skills about the indwelling catheterization for nursing students and nurses.

4 Working life partner

Laurea University of applied science (Laurea UAS) is situated in Uusimaa region in Finland. Laurea UAS have 6 campuses situated in Hyvinkää, Leppävaara, Lohja, Otaniemi, Porvoo and Tikkurila. The organisation was founded in 1992. Laurea UAS offers study in 18-degree programmes, 6 of them are taught in English. Laurea UAS have approximately 7800 students, 600 staff members and more than 30000 Laurea alumni. According to the data of 2019, Laurea UAS graduated students have employment rate 96.4%. (Laurea 2022.)

The service promise of Laurea UAS is ‘’we are here for you at Laurea’’, assures students a good learning environment and partnership as well as conduct joint development projects with its partners. Our working life partner promises student's good guidance and feedback as well as provides a high quality service that supports studies. Laurea UAS is committed to apply Learning by Developing (LBD) action model with students and employers. LBD method encourages students to take challenges and act in a self-directed manner. It also helps students to combine theory and practice, and develops competence needed in the work life. (Laurea 2022.)

5 Methodology

5.1 Functional thesis

Thesis is a document which demonstrates writers' evidence-based knowledge, verified with reliable sources and research. After a thesis is ready, the writer presents own work and action to others to read and see. (Airaksinen 2009.)

Functional thesis is one of the methods used during the thesis writing in University of Applied Sciences level study. Educational video in thesis work shows the theoretical knowledge in simulation of real-life situation in the final product. Final product of functional thesis can be a book, file, map, guidebook, poster, website, educational video or a portfolio. A report and a final product are always included in it. (Airaksinen 2009.)

The authors' final product is an educational video on inserting an indwelling urinary catheter on adult.

5.2 Planning of the educational video and implementation

The theoretical information and script related to our product were searched and retrieved from different electrical databases and search engines such as, Terveyden Ja Hyvinvoinnin laitos (THL), Helsingin Ja Uudenmaan Sairaanhoitopiiri (HUS), Turun Yliopistollinen Keskussairaala (TYKS) and Terveysportti, CINAHL (EBSCO) database. The reason behind using these sources for the script was because the authors wanted to make an educational video from Finnish nursing perspective. Keywords for the search were Urinary catheterization, Educational Video, Insertion of catheter, removal of urinary catheter, asepsis, nurses, responsibility of nurses, nursing students. Sources in English and Finnish language were chosen for our theoretical information for script writing.

After the authors were satisfied with the theoretical information retrieval, script writing for the video production based on information gathered was done.

Appendix 1 shows the list of necessary equipment

Appendix 2 shows the procedure of inserting indwelling urinary catheter for adult male

Appendix 3 shows the procedure of inserting indwelling urinary catheter for adult female

Appendix 4 shows the procedure of removal of indwelling urinary catheter for adult

Process of production of a video includes identifying goals and target audience, creating team, distributing roles, writing a script, creating a storyboard, selecting a location, making a schedule, and gathering necessary instruments. Permission for using the location of the shooting was applied and received before starting to shoot the video. Once the thesis planning was accepted, the authors then planned to produce the educational video. Authors applied for the permission to use the premises of Laurea UAS for filming, using manikin (clinical doll) and necessary equipment and instruments. After the above-mentioned permissions were granted by Laurea UAS, authors collected quality camera; stable camera stand and adequate light and peaceful environment so that the final product would be a quality product.

The filming of the educational video took place in Laurea University of Applied Sciences and was started on 5th of September 2022 and took 2 days to film it. Editing of the video took 3 days and the video was sent to thesis supervisors for the evaluation. Based on the comments and feedbacks from the supervisors, the authors decided to film totally new video again. Re-filming of the educational video took 2 days (28th and 29th of September 2022) and editing took again 3 days. After the editing was completed, the educational video was again sent to supervisors for the evaluation and quality check. Once the thesis supervisors gave feedback, video was edited according to the instructions and feedback. In this way the final product was produced and was ready for the feedback collection.

5.3 Feedback of the educational video

After the final product was ready, the feedback of the final product was collected by using qualitative research method and questionnaires were sent by using Google survey form. The questionnaire included five open ended questions to get detailed answer and independent view of the participants about the educational video. The questionnaire was built as related to the thesis topic and final product and were finalized after getting feedback and approval from the thesis supervisors. Feedback where all five questions listed below were answered were only included in the analysis process.

1. What kind of knowledge did you have before watching the video of insertion of indwelling urinary catheter?

2. Did we succeed in bringing theoretical knowledge into the video of insertion of indwelling urinary catheterization?

3. How helpful is the video of insertion of indwelling urinary catheter in your nursing study and future nursing career?

4. What are the things you wish to be improved in the video of insertion of indwelling urinary catheterization?

5. How likely are you to recommend this video of indwelling catheterization to others?

Once the research permit was granted by Laurea UAS, the research permit, feedback questionnaire in Google survey form and link of the educational video saved in Laurea one drive were attached in the Microsoft outlook email of 10 Degree nursing students from 2019 and 2020 groups and was sent in December 2022. The participants were informed that the feedback is anonymous, answering is volunteer work and respondents have the right to withdraw from the study any time. Authors used the feedbacks only in the purpose of their thesis and after the completion; the data were destroyed according to Finnish National Board on Research Integrity (TENK).

The participants were given 3 weeks to return the questionnaire form. 6 recipients out of 10 have answered all the questions and they were used to evaluate and analyze feedback of the educational video.

The first question on the feedback form asked about the participants' knowledge before watching the educational video of insertion of indwelling urinary catheter. All the participants have had theoretical and practical knowledge gained from school, workshop as well as work placement. One of the participants mentioned that even he/she have had enough knowledge but still many times have been confused about the necessary equipment for both male and female patient. One participant replied as follow: "I knew we need to perform hand hygiene immediately before and after the insertion of indwelling urinary catheter and I also knew the process of it, but after watching this video I got more knowledge about aseptic techniques, the process of insertion of indwelling catheter from the beginning to end. This video was so informative."

The second question asked was- did we succeed in bringing theoretical knowledge into the educational video of insertion of indwelling urinary catheter. The participants agreed about the transformation of theoretical knowledge into the educational video. One participant wrote that, in real life due to the rush, different staff and different ward practices, the process is done in sometime little different way. One another participant replied "yes, you succeed in bringing theoretical knowledge. Everything has been written clearly, how, when and to whom this process needs to be done".

The third question in the questionnaire asked, how helpful is the video of insertion of indwelling urinary catheter in your nursing study and future nursing career. 4 out of 6 Participants agreed that this educational video is and will be useful for nursing students as well as nursing career, as it have helped them to understand more clearly about the process, aseptic techniques, necessary equipment and so on. One of the participants also agreed that tool of reference was good but wished that, if the video was shorter, it will be more goal oriented.

The fourth question asked, about the things participants wish to be improved in the educational video of insertion of indwelling urinary catheter. 4 out of 6 participants suggested that the educational video could be shorter, as 36 minute is too long as a result it was difficult to pay attention on the video all the time. Suggestion of putting calm background music were also given as well as they wished for the narration of the video in place of text, as at times time to read the text was not enough. One of participant wrote "I think both students have clearly shown what need to be done, well showed every step. Clearly shown how to maintain sterile. I don't see any improvement needed in this video." One another participant suggested that the demonstration of aseptic techniques, gloves and equipment repeating often can be skipped or shortened, which might help in shortening the video length.

The last question asked was- how likely the participants are to recommend our educational video of indwelling urinary catheterization to others. Two of the participants gave numerical scale of 8/10 and 6/10, giving reason as well as behind them, as video was too long and there are things to be improved respectively. Two of the participants answered that they will recommend this educational video to other nursing students and forward to their friends and recommend watching it, once the video is publicly available. The fifth respondent wrote "I would recommend this video to watch. We study and forget many things, but this is visualization study material, which can be more understandable and easier to remember."

After collecting the feedback, spelling and grammatical mistakes were corrected and most importantly authors were able to make the video 10 minute shorter. The authors were satisfied with the final product after editing one more time according to the recommendations and suggestions from the participants as well as supervising teachers. Looking at the feedbacks, it indicates that the educational video will be useful for nursing students as well as nurses.

The educational video was published in Laurea UAS's YouTube channel (Link of the video: https://www.youtube.com/watch?v=jdZvmeHBzeY), where it is public and will be used for educational purpose for Nursing students.

6 Ethical considerations

Ethics in any research shows what is good and what is bad as well as what right and what is wrong. Before writing or publishing any research or articles ethical issues must be considered to make sure that the product is reliable, scientific, honest and accurate. (Astedt-Kurki & Kaunonen 2018.) Strictly followed ethical consideration in any research work also helps to prevent any kind of harm that the research or its result might cause on the subject as well as human beings involved (TENK 2021). University of applied sciences in Finland have compiled the national guidelines on the ethical principles of research in the humanities and social and behavioral sciences published by The Finnish National Board on Research Integrity TENK (TENK 2019).

Ethical reviews regarding any research work must be done before starting the actual research. It helps to evaluate the ethical risk that the research might cause. Researchers are always responsible for the ethical issues that might arise while conducting the research. (TENK 2021.) By following strict ethical guidelines and instructions, researchers always put themself in safe zone regarding ethical problems which might arises in future. Reliable and scientific sources were utilized while collecting the theoretical background of the research. Laurea UAS guidelines for referencing have been strictly followed for the referencing of the sources used. Evidence based nursing knowledge and instructions given by Social and Health Ministry as well as Terveyden Ja hyvinvoinnin Laitos (THL) have been given priorities for the materials and process, so that our product can be used in Finland.

Laurea UAS have provided the location for filming the final product after approval of permission applied. Property of Laurea UAS has been handled with care. Manikin (clinical doll) available in workshop room of Laurea AMK, have been used instead of a real human to avoid complications that might arise from inserting of indwelling catheter. Even the final product was filmed with manikin (dummy), all the procedures and ethical principles were followed as if the indwelling catheter was being inserted in a human being.

The authors have collected permit from Laurea UAS for conducting research and filming the educational video, according to the guidelines of co-partner, Laurea UAS. Once the final product, in this case educational video was produced, feedback was collected from nursing students. Feedback collection was done anonymously and confidentially. While collecting feedback of the product, questionnaires were prepared so that they don't have double meaning, religion, culture, and ethnical background were not harmed. Participants were informed that there will be no compensation for participating and one can withdraw from the process anytime. Participants' answers were used only for the product and were not handed to third party. Feedback collection was anonymous, volunteer and participants had the right

to withdraw anytime from the feedback collection process. Authors have been emphasized on data protection all the time during the process.

7 Reliability

According to Gerish and Lacey (2006) reliability is defined as '' the consistency of measurement within a study'' (Ellis 2015). Reliability shows how accurate a product is manufactured and if the quality of the product can be trusted or believed (Cambridge Dictionary 2022, reliability). The authors have used and researched latest reliable sources, so that the authors have the most reliable and current information are presented for the readers and viewers. The references for this thesis plan are marked according to Laurea guidelines of referencing. Final product was manufactured by using reliable sources and critically evaluating them. Current Finnish as well as international evidence-based practice were considered in every step of the research and development of final product. Reliable databases were searched and used in this thesis, keeping accuracy and quality of final product in mind.

Theoretical knowledge gained from theory lessons was also helpful in the research work, but they have been always verified with reliable source.

The credibility of the sources searched and used in this thesis respects and meets the guidelines given by the Finnish National Board on Research Integrity TENK, Laurea UAS guidelines, THL and Ministry of Social Affairs and Health Finland. Researched work has been properly referenced and cited to make it easier for tracing.

8 Conclusion and recommendations

The purpose of this thesis was to produce an evidence-based educational video on inserting an indwelling urinary catheter in English language. The aim was to improve knowledge and hands on skill about the indwelling catheterization for nursing students.

After analyzing and going through the feedback received, the authors felt that the students participating in feedback process were mostly satisfied with the final product. The authors concluded after reading all the answers from survey form, that the educational video will be useful in nursing students study career as well as future nursing career.

Most of the participants in feedback collection process have felt that the length of the educational video was long. The reason behind this was because the insertion and removal of indwelling urinary catheter of both male and female needed to be done in one video. In future, if possible, the authors recommend if the insertion of indwelling urinary catheter in male and female are done as separate thesis topic, then the length of the video can be shortened. Authors believe that this will help for the viewers to focus on the topic and will not be boring if the length of the video will be shorter.

In the Context of Finland, authors also believe if the narration will be done in English and subtitles will be in Finnish, then this will help both the students studying in English degree program as well as in Finnish.

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Pictures

Appendices

Appendix 1: Necessary Equipment

Before inserting an indwelling urinary catheter, all the necessary equipment should be placed in clean medical trolley within a reachable distance. The equipment needed includes:

1. Urinary catheter 12–16 CH for adult

2. Sodium chloride saline NaCl 0.9% 100 ml

3. NaCl syringe (size 10 ml)

4. Waterproof sheet

5. Factory clean gloves

6. Local anesthesia (xylocaine gel)

7. Skin tape

8. Drainage bag

9. Catheter set package (includes sterile gloves, cotton swab, forceps, and kidney dish)

10. Hand disinfectant

11. Trash bin

Appendix 2: Procedure of inserting indwelling urinary catheter for adult male

1. Wash hand and apply hand disinfection, rub them till hands will be dry.

2. Go to the patient, introduce yourself, check the identity of the patient by asking and looking at wrist band, explain patient what you are doing and reasons behind it.

3. Request the patient to clean the genital area if he/she is able to do it, if not assist them.

4. Inform the patient that you are going to make instruments ready for the procedure and will be back in a while.

5. Disinfect hand, take a clean medical trolley

6. Start collecting equipment needed and at the same time check expiry date and are not opened, not broken, are intact.

7. Take right size urinary catheter and place it in the lower shelf of the trolley

8. Take 10ml sodium chloride saline 9mg/ml in an empty syringe and place it under the lower shelf of the trolley

9. Place waterproof sheet, suitable sized factory clean gloves packet, sodium chloride available in the unit, local anesthetic gel, skin tape and drainage bag under the lower shelf of the trolley.

10. In this way nurse make sure that all the non-sterile equipment is in lower shelf.

11. Place the catheter set package on the upper shelf of the trolley

12. Take the trolley close to the patient, put enough light and prepare the working area so that patient's privacy will be respected.

13. Disinfect hand and open the catheter set package (includes sterile gloves, cotton swab, forceps, kidney dish) carefully as it is sterile

14. Take out sterile gloves from the catheter set package and make cotton swab wet by pouring sodium chloride saline in the container which is inside kidney dish

15. Disinfect hand and put sterile gloves

16. Make sure that patient is in his/her back, in possible comfortable position and lift the bed up so that nurses can work ergonomically

17. Nurse with sterile gloves makes sure that hands are sterile all the time

18. Assistance nurse disinfect hands, put factory clean gloves and helps to pull patients trouser down, places waterproof sheet which will protect patients legs and bed for being wet.

19. Assistance nurse open the drainage bag and places it on the side bar of the bed.

20. Nurse with sterile gloves places sterile drape around the penis of the patient, so that everything will be covered except from penis and place the kidney dish on the lower part of drape.

21. Assistance nurse helps to open package of anesthesia gel, 10ml syringe with sodium chloride saline, catheter and main nurse places them on the lower part of drape.

22. Sterile nurse holds the penis firmly, lifts it up by 90 degree and start washing tip of penis by round wash technique 3 times with different swab and washes meatus once. Nurse will throw each dirty swab immediately to the trash bin.

23. Nurse explains patient what they are doing, this will help to calm the patient.

24. Sterile nurse will then take local anesthesia gel and place it on the upper part of catheter and inside meatus.

25. Inform the patient that it might feel cold inside due to the local anesthesia.

26. Hold penis firmly with the other hand continuously and with other hand take catheter tube with forceps and start inserting through meatus. Remember to tell patient that it might feel uncomfortable at times.

27. Insert the catheter while penis is in upward position till it will reach in prostate, then put penis horizontally to legs and continue inserting catheter.

28. If patient is in pain doing this, the procedure should be stopped immediately.

29. Once Urine starts to flow back, it indicates that catheter have reached in urinary bladder, but nurse will still push catheter inside to make sure that another end of catheter is firmly in bladder. This will help to make sure that catheter is inside bladder but not in urethra.

30. With the help of forceps sterile nurse will press catheter and stop urine flow, at the same time assistance nurse will attach the drainage bag at the end of the catheter.

31. Assistance nurse will then inflate the balloon with 10ml sodium chloride syringe through another lumen of the catheter. At the same time patient’s reaction should be followed and asked if he/she is in pain. If so, the procedure should be stopped immediately. It indicates that the catheter is not well inside bladder but still in urethra.

32. After the balloon is inflated nurse will pull the catheter little bit outside to make sure that it is be placed firmly in the bladder and will be stable, anchor.

33. Penis will be wiped again and all the equipment together with drapes will be taken away.

34. Assistance nurse will then take a skin tape, place the tube in lower abdomen region and will pull trouser of the patient.

35. Both nurses will throw gloves to the trash bin and apply hand disinfection.

36. Nurses will go to patient ask how he is feeling and put the patient in comfortable position as well as will lower the bed in safety height.

37. Nurses will then document all the procedure including type of catheter, catheter size, material used to inflate balloon and its quantity, date of Catheterization, reason for catheterization, patients' reaction while inserting catheter and name of the nurse performing catheterization, amount of urine output, color, smell.

Appendix 3: Procedure on inserting indwelling catheter for adult female

1. Wash hand and apply hand disinfection, rub them till hands will be dry.

2. Go to the patient, introduce yourself, check the identity of the patient by asking and looking at wrist band, explain patient what you are doing and reasons behind it.

3. Request the patient to clean the genital area if he/she can do it, if not assist them.

4. Inform the patient that you are going to make instruments ready for the procedure and will be back in a while.

5. Disinfect hand, take a clean medical trolley

6. Start collecting equipment needed and at the same time check expiry date and are not opened, not broken.

7. Take right size urinary catheter and place it in the lower shelf of the trolley

8. Take 10ml sodium chloride saline 9mg/ml in an empty syringe and place it under the lower shelf of the trolley

9. Place waterproof sheet, suitable sized factory clean gloves packet, NaCl sodium chloride available in the unit, anesthetic gel, skin tape and drainage bag under the lower shelf of the trolley.

10. In this way nurse make sure that all the non-sterile equipment is in lower shelf.

11. Place the catheter set package on the upper shelf of the trolley

12. Take the trolley close to the patient, put enough light and prepare the working area so that patient's privacy will be respected.

13. Disinfect hand and open the catheter set package (includes sterile gloves, cotton swab, forceps, kidney dish) carefully as it is sterile

14. Take out sterile gloves from the catheter set package and make cotton swab wet by pouring sodium chloride saline in the container which is inside kidney dish

15. Disinfect hand and put sterile gloves

16. Make sure that patient is in his/her back, in possible comfortable position and lift the bed up so that nurses can work ergonomically

17. Nurse with sterile gloves makes sure that hands are sterile all the time

18. Assistance nurse disinfect hands, put factory clean gloves and helps to pull patients trouser down, places waterproof sheet between the legs and under the hips.

19. Assistance nurse open the drainage bag and places it on the side bar of the bed.

20. Sterile nurse opens the sterile drapes and place it over the waterproof sheet. Assistance nurse can help by lifting patients lower body parts if needed.

21. Assistance nurse helps to open package of local anesthesia gel, 10ml syringe with sodium chloride saline, indwelling catheter, and main nurse places them on the lower part of drape.

22. Sterile nurse then starts the cleaning by holding labia by thumb and index fingers firmly. At the same time thumb and index finger helps to open up the labia. The sterile nurse then takes the wet cotton swab and cleans labia going from top to bottom. This will be done three times and each time dirty swab will be thrown on garbage bin and used a new one. Urethra opening will be cleaned by sterile nurse at last.

23. Nurses explains patient all the time what they are doing, this will help to calm the patient.

24. Sterile nurse will then take local anesthesia gel and place it on the upper part of catheter and urethra opening.

25. Inform the patient that it might feel cold inside due to the local anesthesia.

26. Sterile nurse will then hold labia firmly with the one hand continuously and with other hand nurse takes catheter tube with forceps and start inserting through urethra opening. Nurse tells the patient that it might feel uncomfortable at times.

27. If patient is in pain doing this, the procedure should be stopped immediately.

28. Once Urine starts to flow back, it indicates that catheter have reached in urinary bladder, but nurse will still push catheter inside to make sure that another end of catheter is firmly in bladder. This will help to make sure that catheter is inside bladder but not in urethra.

29. With the help of forceps sterile nurse will press catheter and stop urine flow, at the same time assistance nurse will attach the drainage bag at the end of the catheter.

30. Assistance nurse will then inflate the balloon with 10ml sodium chloride syringe through another lumen of the catheter. At the same time patient's reaction should be followed and asked if she is in pain. If so, the procedure should be stopped immediately. It indicates that the catheter is not well inside bladder but still in urethra.

31. After the balloon is inflated nurse will pull the catheter little bit outside to make sure that it is be placed firmly in the bladder and will be stable, anchor.

32. Opening of urethra will be wiped again and all the equipment together with drapes will be taken away.

33. Assistance nurse will then take a skin tape, place the tube in thigh and will pull trouser of the patient or cover the patient.

34. Both nurses will throw gloves to the trash bin and apply hand disinfection.

35. Nurses will go to patient ask how she is feeling and put the patient in comfortable position as well as will lower the bed in safety height.

36. Nurses will then document all the procedure including type of catheter, catheter size, material used to inflate balloon and its quantity, date of catheterization, reason for catheterization, patients' reaction while inserting catheter and name of the nurse performing catheterization, amount of urine output, urine color, smell

Appendix 4: Necessary equipment for the removal of indwelling urinary catheter from adult

1. Hand disinfectant

2. Factory clean gloves

3. Waterproof sheets

4. Empty 10 ml syringe

5. Cotton swab

6. Trash bin

Appendix 5: Procedure of removal of indwelling urinary catheter from adult

1. Once the need of indwelling catheter is over, nurse then will go to patient and explain it to him/her.

2. Nurse will collect all necessary equipment and bring them close to the patient.

3. Nurse will prepare the working environment so that it will respect the privacy of the patient and patient safety will be in focus. Adequate lighting will be secured.

4. Disinfect hand and put factory clean gloves.

5. Empty the drainage bag.

6. Patient will lie on the back and position will be made as comfortable as possible.

7. Bed of the patient will be lifted so it will be easy for the nurse to work ergonomically.

8. Disinfect hand and put factory clean gloves.

9. Place the waterproof sheet under the hip and between legs.

10. Both legs should be bended half.

11. Remove skin tape, take a 10ml empty syringe and deflate the balloon by pulling sodium chloride saline from another lumen. Collect the same amount of saline used to inflate balloon from previous documentation.

12. Explain all the time what is being done and then nurse pull the catheter slowly outwards once the balloon is emptied.

13. Throw the catheter together with drainage bag in trash bin.

14. Disinfect hand and put factory clean gloves.

15. Dry the genital area, remove the waterproof sheet and throw on trash bin, put patient trouser on.

16. Disinfect hand, cover the patient, lower the bed, and put patient in comfortable position.

17. Documentation of the procedure will include explanation of the procedure, reaction of patient, possible problems occurred, name of the nurse who removed catheter, date and reason of the removal of the catheter and time of the first natural urination, urine amount, color, smell.