Aseptic Practices in Perioperative Nursing: an educational video

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Laurea University of Applied Sciences **Abstract**
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Perioperative nursing is centered on a holistic nursing care approach that aims to understand a patient by identifying and addressing issues that may affect the surgical experience. Surgical site infections solely accounted for every operative patient adverse incident, re-admittance and prolong hospital stay after surgery. Therefore, a perioperative nurse's mission is to advocate for patients' safety before, during, and after surgical procedures by adhering strictly to standard aseptic practice in the operating theatre.

Producing an educational video for nursing students at Laurea UAS is the purpose of this thesis. Laurea UAS students have conducted previous studies on some aspects of this thesis topic; however, there was a need to produce an educational video that shows the aseptic procedures implemented in this final thesis product. The thesis aims to promote nursing students' clinical competence in surgical hand scrub, donning of sterile surgical gown and gloves, surgical skin preparation, and draping of surgical patients. The thesis's theoretical framework is from the latest evidence-based practice. The thesis consists of written report and an educational video. The thesis has been conducted functionally by the authors in collaboration with Laurea UAS as part of the institutions' Guidance in Nursing-project.

Thirty-five respondents evaluated the video. Participation in the feedback was voluntary and anonymous. The consensus is that the video should serve as a learning material during the intraoperative nursing course. Students and nursing educators can find the educational video on Laurea UAS YouTube channel. The length of the educational video was 8 minutes and 13 seconds. The authors are delighted with the outcome of the educational video.

As a development idea, degree nursing students could appraise the educational video's use by the working life partner. More English educational videos on clinical nursing and surgical skills could be an area for further thesis development, e.g., cannula insertion and preparing the sterile table.

Keywords: Perioperative nursing, aseptic practice, hand hygiene, infection control, educational video

Contents

1 Introduction

Perioperative nursing is centered on a holistic nursing care approach that aims to understand a patient by identifying and addressing issues that may affect the surgical experience. Holistic patient care is an essential aspect of nursing intervention in perioperative nursing. Perioperative nursing is necessary because it helps surgical patients experience less operative adverse incidents (e.g., surgical site infections, trauma, pain, and anesthetic complication). Additionally, perioperative nursing care allows a patient to reach discharge or continuous care speedily, achieve satisfaction with surgical care, and resume regular activities more efficiently after surgery. (Selimen & Andsoy 2011.)

Aseptic practice consists of evidence-based and recommended guidelines performed precisely during the preoperative and intraoperative surgical course to reduce contamination caused by pathogens and decrease surgical site infections (SSIs) in the operating theatre (Aholaakko 2018, 24-27; AORN 2019). Implementing aseptic practice helps to preserve the sterile environment and equipment in the operating room and to protect the surgical staff from being exposed or contaminated from patient's secretions, blood, bodily wastes, and harmful substances, and lastly, to protect a surgical patient from surgical site infection during an invasive or non-invasive procedure. (Aholaakko, 2018; AORN, 2019; Hart, 2007, 43).

The accurate use and knowledge of aseptic practice are essential to prevent surgical site infections and sepsis, decrease patient morbidity and mortality rate, decrease prolonged and costly hospitalization, and avoid patient discomfort. Additionally, aseptic practice reduces cost of medical staff, investigation and treatment costs. (Health jade 2019; Badia et al. 2017; Bowers 2013.)

The evidence-based recommendation in aseptic practices includes personal hygiene, hand hygiene, wearing personal protective equipment, donning a sterile surgical gown and gloves, preparing a surgical site, and establishing and maintaining a field. (Eske, 2018).

Skills in aseptic practice are crucial competencies that nursing students should possess to effectively reduce infection spread in the perioperative nursing environment. However, the findings of Gonzalez & Sole (2014) suggests that nursing students are not well equipped with aseptic skills, which in turn exposes patient to post-surgical infection and sepsis. Breakdown in aseptic practices can cause urinary tract infections (UTIs), mainly among newly graduated nursing students. There is a need for nursing students to develop skills in aseptic practices across all nursing fields to prevent and control infection and transmission of microbes from nursing students to a patient (Gonzalez & Sole 2014).

In recent times, an educational video has been discovered to be a useful learning material. By watching an educational video, the viewers can receive and process information both in a visual and auditory manner (Brame 2015). Videos are helpful when teaching clinical skills, and it enhances students' knowledge when combined with traditional teaching methods in nursing education (Bahar et al. 2017, 1514-1525).

The purpose of the thesis is to produce an evidence-based educational video on aseptic practices in perioperative nursing. The thesis aims to promote nursing students' clinical competence in surgical hand preparation, donning of sterile gown and gloves, preparing patients' skin, and applying surgical drapes on a patient before surgery.

The thesis is a cooperative project between the authors and Laurea University of Applied Sciences. Laurea UAS students have conducted previous studies on some aspects of this thesis topic; however, there was a need to produce an educational video that shows the aseptic procedures implemented in this final thesis product. The educational video is part of Laurea UAS Guidance to promote perioperative nursing education.

2 Perioperative nursing

According to Goodman & Spry (2014), perioperative nursing, once denoted as "operating room nursing," is patient care delivered in the intraoperative stage of a patient's surgical experience through the nursing process framework. Nevertheless, as the operating theatre nurse's duties extended to patient care in the preoperative and postoperative stages, the term "perioperative" was acknowledged as more suitable by the Association of Operating Room Nurses (AORN) later changed its name to the Association of PeriOperative Registered Nurses. (Goodman & Spry 2014, 2-8.) The purpose of a perioperative nurse is to advocate for the wellbeing of surgical patients and their families and to assist them in attaining levels of mental and physical satisfaction before the surgical procedure (Lukkari et al. 2013). Perioperative nursing stages include preoperative, intraoperative, and postoperative. The nursing process begins with patient assessment, diagnosis, planning, implementation, and evaluating nursing interventions before a patient leaves for home or moves to a follow-up recovery unit (Goodman & Spry 2014, 2-8; AORN 2009, 9).

2.1 Perioperative nursing stages

In the perioperative stages, the patient passes through three different nursing care, the preoperative, intraoperative, and postoperative nursing intervention. During each phase, there are various nursing duties performed to guarantee the patient's safety. The treatment path for every surgical patient is individual, but for everyone, it starts with a diagnosed condition that requires surgical intervention. The medical condition might be a diagnosis from the past years or a sudden medical condition like an accident. A patient gets a place in a surgical list after the surgical unit decides to operate base on the surgery's urgency. (Karma et al. 2016.)

The preoperative stage commences when the decision for surgery is made and communicated to the patient or someone acting in the patient's interest, and the patient gives his or her consent to have the operative care. This stage involves the patient's mental and physical preparation for the operation and gathering of information through an interview with the patient or someone acting on their behalf. The data collected are used to create a nursing care plan for the patient. (Goodman & Spry 2016, 1-2.)

The intraoperative stage commences when the patient is transferred onto the operating theatre table and ends when the patient moves to the post-anaesthesia care unit (PACU) or an intensive care unit (ICU) where recovery from surgical intervention may begin. Intraoperative nursing interventions in this stage aim to promote patients' and surgical staff safety and infection control. (Goodman & Spry 2016, 2.)

The postoperative stage commences when the patient moves to the postoperative ward, and postoperative staff is satisfied with the patient's daily functional capacity. Nursing interventions at this stage involves evaluating the patient's physical and mental response after the operation, carrying out interventions to accelerate healing, educating the patient and their relatives and friends about patient wound care, and preparing for the patient's discharge. The aim is to support the patient to attain the highest optimal physical and mental condition after surgery. (Kozier et al. 2010, 776.)

2.2 Perioperative nurse in the operating theatre

The intraoperative nursing team consists of three nurses: anesthesia nurse, instrumental nurse, and circulating nurse. The nurse anesthetic collaborates alongside the anesthetist, providing help from induction to the patient's instant recuperation. The essential tasks of the anesthetic nurses comprise: the establishment of safe surroundings that involves equipment preparation, medications and infusion liquids, supervise surgical devices that measures patient's essential body functions (including blood pressure, heart rate, respiratory rate, and temperature), electrocardiogram and oxygen saturation. The anesthesia nurse is responsible for checking other health variables such as hemoglobin and hematocrit, blood sugar levels, and electrolytes. (Kozier et al. 2010, 784-786.)

Management is part of the duties of an anesthetic nurse, and it involves calling to the hospital ward for the patient to be transported to the operating theatre, ensure that the patient to be operated on is the right patient, document patient details into the ward archives and confirm relevant and essential information goes along with the patient. Additionally, duties of the anesthetic nurse include information sharing with the surgical and non-surgical staff, providing assistance during patient positioning, manage and promote patient's body heat, checking blood loss and fluid balance, continue medication administration, ensuring patient safety, and overseeing the overall condition of the patient before, during and after surgery. (Kozier et al. 2010, 784-786.)

The circulating nurse helps the scrub team by ensuring that the operating theatre has adequate surgical and nonsurgical supplies. He or she assists with patient positioning onto the operating table. (Kozier et al., 2010, 784.) The responsibilities of the circulating nurse are situated away from the sterile area. He or she is responsible for supervising the surgical procedure and the surgical team from a comprehensive standpoint. (Hamlin et al. 2009, 6.) The circulating nurse frequently informs the amount of blood loss and urine output during surgery to the nurse anesthetic and ensures that the anesthetic nurse performs supervisory duties (Karma et al. 2016, 138). The circulating nurse is responsible for establishing a safe, smooth-running, and relaxed environment for both the scrub staff and patient (Hamlin et al. 2009, 6).

Setting-up the diathermy device and attaching a neutral electrode to the patient's skin is an essential task of the circulating nurse (Lukkari et al. 2015, 289). Opening and maintaining sterile surgical gowns and gloves is a crucial duty of the circulating nurse. The circulating nurse hands out nonsterile products and instruments used during surgery. He or she ensures that all equipment and products given to the scrub staff are opened and delivered according to aseptic principles.

Surgical skin disinfection is an essential aseptic practice performed by the circulating nurse before surgery. Circulating nurse, along with the instrument nurse, counts needles and surgical sponges before the incision site is cut open, before surgical wound closure, and after the incision site has been closed. The transportation of tissue samples obtained in surgery is transferred to the lab by the circulating nurse. Additionally, documentation of the entire intraoperative procedure and surgical material inserted inside the patient's body is the duty of the circulating nurse, i.e., the temporary and permanent implants used during surgical procedure. (Brady et al. 2014, 113; karma et al. 2016, 138.)

The instrument nurse, also known as the "scrub nurse," performs his or her duty with the surgeon within the sterile zone (Hamlin et al. 2009, 6). Fluent instrumentation and equipment handling during surgery is the duty of the scrub nurse (Karma et al. 2016, 12). Before surgery, the instrument nurse checks and ensures that every supply needed for the planned surgery is available and accessible. It includes appropriate surgical gowns, gloves, protective gear, and the scrub staff essential surgical equipment. He or she must study the patient's chart to get acquainted with the surgery. Because the instrument nurse performs his or her duties as a scrub staff, donning personal protective equipment (PPE), performing surgical hand scrub, donning of surgical gown and gloves, draping a patient, and establishing and maintaining a sterile area are the essential duties of the scrub nurse. The instrument nurse performs counting of sponges and needles while the circulating nurse supervises the procedure. The positioning and continuous assistance with the surgical lamps and ensuring the surgical site is lighted-up often falls to the scrub nurse. (Brady et al. 2014, 113.) During the entire surgical procedure, instrumentation, supervising the scrub staff's activities, and maintaining the sterile area falls to the instrument nurse. (Hamlin et al. 2009, 6.)

2.3 The course of intraoperative stage

The circulating nurse helps transfer the patient from their bed to the surgical table and into the correct surgical position after induction and other nursing interventions, including inserting an indwelling urinary catheter. The process of transferring the patient onto the surgical

table is carried out with extreme care to avoid causing harm to the patient. Placing the patient in a wrong position may affect the procedure and increase surgical complications. (Karma et al., 2016, 104.) When the patient is in the right surgical position, the circulating nurse must inspect the integrity of the patient's skin, place a blanket over the patient to preserve the patient's body temperature before the diathermy device positioning, and attaching a diathermy pad in the right spot onto the patient's skin in preparation for surgical site disinfection. (Lukkari et al., 2015, 289; Karma et al., 2016, 109.)

While the circulating nurse performs surgical site disinfection, the instrument nurse performs surgical hand scrub and dons a sterile surgical gown, and two pairs of sterile gloves, and other personal protective equipment (Lukkari et al. 2015, 296). Another circulating nurse can help set up the sterile instrument table area while the instrument nurse supervises the procedure (Karma et al. 2016, 137).

After surgical skin site disinfection, the instrument nurse proceeds to cover the patient's skin with sterile surgical drapes and create and maintain a sterile field for the surgical procedure. (Lukkari et al. 2015, 299-301.) The circulating nurse assists with draping layout by only touching the edges of the drape (Karma et al. 2016). When the scrub nurse has draped the patient and created the sterile field, the circulating nurse informs the surgeon to perform surgical hand scrub. The surgeon is assisted first by the circulating nurse to don a sterile gown, and the instrument nurse helps the surgeon don two pairs of sterile gloves. (Lukkari et al., 2015, 301.)

The circulating nurse checks the sterile and non-sterile materials' validity and integrity, including the surgical instrument container, before and after unboxing them. The instrument nurse must supervise and ensure that the circulating nurse does not contaminate the sterile surgical instruments. The instrument nurse lifts the instrument basket from the container onto the sterile table and displays the essential instrument on the sterile table. A mayo table frequently holds other essential surgical supplies needed for the surgical procedure, and the mayo table is usually close to the surgical bed. (Lukkari et al. 2015, 299-301).

3 Asepsis in Perioperative nursing

3.1 Aseptic Practices

Asepsis refers to the nonexistence of pathogenic microorganisms on living tissues (Baines, 1996; Karma et al. 2016, 35). The aseptic practice is implemented by the operating theatre staff to stop, eliminate, and destroy harmful microbes from living tissue, the operating theatre environment, and surgical equipment (Karma et al. 2016, 35).

A study about the cause of healthcare-related infection was conducted in 2016 by the Finnish Department of Health and Welfare (THL). The research team ascertained that the prevalence of care infections was in the anesthesiology and intensive care unit (21%); likewise, in the cancer care unit, (18%) specialized and specific internal medicine and specialized surgery ward. Surgical infections (21%), acute generalized infection (20%), and pneumonia (19%) were the usual infections. Staphylococcus aureus (20%) and Escherichia coli (17%) were the most common infectious bacteria. (Sarvikivi et al. 2018.)

The evidence-based recommendation in aseptic practices includes personal hygiene, hand hygiene, wearing personal protective equipment, donning a sterile surgical gown and gloves, preparing a surgical site, and establishing and maintaining a sterile field with the aid of sterile surgical drapes. (Eske, 2018). The drapes are typically blue or green colored and should entirely cover the patient and table but expose only the surgical site. (Baines, 1996.)

Strict adherence to aseptic practice aims to stop the spread of disease to an exposed operative wound by separating the surgical site from the immediate nonsterile surrounding. The surgical staff achieves asepsis by establishing and preserving a sterile field and adhering to strict aseptic ethical guidelines and recommendations designed to stop microbes from infecting the operative wound, thereby leading to surgical site infections. The guidelines and recommended practices consist of patient hazard evaluation, cleaning the operating theatre and its surroundings, decontamination, sterilization of equipment, providing prophylactic antibiotic therapy before incision. (Osman 2000.) The intraoperative staff team must understand the importance of aseptic practice's ethical values and integrate them into daily surgical procedures. (Osman 2000.)

Aseptic practice's ethical values indicate that scrubbed persons must perform their tasks within the sterile field; the instruments and material utilized inside a sterile field must be sterile, and materials marked non-sterile when introduced into the sterile field must not contaminate the scrubbed person or the sterile area. (Baines, 1996; Osman 200.) Preserving and supervising an established sterile field must be continuous, surgical staff must limit movement in and out of the operating theatre during a surgical procedure. (Osman 2000.)

The sterile field is an area of asepsis created by placing a sizeable sterile drape sheet over an instrument trolley, set up near the surgical patient. The sterile field includes the sterile table that contains the instruments required during surgery, the draped patient, and the scrubbed surgical team members wearing sterile gowns and gloves. Standard aseptic practice requires the instrument nurse to set up the sterile field after donning a sterile gown and gloves. (Baines, 1996.)

4 Hand hygiene

Hand hygiene is a broad term that involves any practice of hand sanitizing, e.g., handwashing with soap and water, antiseptic handwashing, and hand rub, likewise surgical hand antisepsis (Boyce & Pittet 2002, 4). Hand hygiene is a primary infection prevention practice for preventing healthcare associate infections (HAIs) from spreading from patient to nurse and nurse to a patient. The aim of sanitizing the hands at the start of a nurse's shift with antimicrobial or non-antimicrobial soap and water reduces the transient and permanent microbial flora from the nails, hands, and forearms. (Kendall et al. 2012; Ochoa & Vega 2014, 177.) Performing hand wash with antimicrobial soap and water for at least 15 seconds reduces the amount of bacterial by 0.6-1.1 while washing for up to 30 seconds can reduce the bacterial amount by 1.8-2.8 (Ochoa & Vega 2014, 177).

Frequent hand washing dries up the hands; thus, healthcare staff should use an alcohol-based disinfectant rub if the hands are not visibly dirty (Ylitupa 2017). Hand washing is recommended when the hand is visibly dirty and to remove transient microbes from the skin. Transient microorganisms from the skin can be considered the result of infections caused by microbes (Syrjälä, et al. 2005, 614). A disinfectant rub is a useful alternative for hand disinfection if there is no visible dirt (Boyce & Pittet 2002, 1-44). Hand disinfection with an alcohol-based rub is the newest recommendation towards hand hygiene compliance (Syrjälä et al. 2005, 614).

Disinfectant hand rub plays a vital role in preventing microbes' from spreading from nurse to patient and patient to nurse (Munoz-Figueroa & Ojo 2018, 382). The alcohol-based disinfectant kills the bacteria and viruses in the hands while also preventing infections.

An effective hand hygiene practice includes caring for the skin, covering open sores, and keeping the hands moist. The disinfectant rub should be used by perioperative staff before entering and exiting the operating theatre, before and after using personal protective equipment during patient and non-patient care stages, before, during, and after contact with a patient's surroundings. (Karma et al., 2016, 46.)

The benefits of implementing good hand hygiene are diverse. For example, it minimizes the rate of nosocomial infections, e.g., MRSA. (Pittet et al. 2000; Macdonald et al., 2004). Infection risk reduction is associated with improved compliance with proper hand hygiene (Pessoa-Silva et al. 2007). Good hand hygiene improves better patient care outcomes, shorter hospital stays, reduced cost for readmission to hospital, and lower death rate (World Health Organization 2011).

4.1 Surgical hand scrub

The Centers for Disease Control and Prevention and the World Health Organization recommend perioperative scrub staff to implement surgical hand scrub to inhibit surgical site infections (SSIs) during all operative procedures (Gaspar et al. 2018). Boyce and Pittet (2002) described surgical hand scrub as antiseptic handwash, or antiseptic hand rub performed preoperatively by surgical staff to eliminate transient and decrease resident hand flora (Boyce &Pittet 2002, 4).

The purpose of surgical hand scrub is to remove microbes, inhibit the transmission, decrease the number of lasting floras on the hands, and prevent an open surgical wound from being infected from microbes present on surgical staff (Gök et al. 2016).

The scrub staff must perform surgical hand scrub before performing an operative procedure (Karma et al. 2016, 46). The evidence-based practice recommends that scrub staff hands be free from watches and jewelry, and trimmed nails must not exceed 0.25 inches before performing surgical hand scrub. Additionally, the nail must be free from gels, acrylic, and artificial nails. (Patrick & Van Wicklin 2012, 495.)

Surgical hand scrub involves washing the hands from the fingertips to the elbow using soap and warm water. The standard surgical hand scrub technique involves washing, rinsing, and drying the hands from clean to the dirty area, e.g., from the fingertip towards the elbow. (Gould & Brooker, 2008, 178-180.) The surgical hand scrub process, which includes handwashing and applying hand disinfectant rub, should last for at least 5 minutes (Widmer 2013, 37).

Two renowned practices for carrying-out surgical hand scrub include scrubbing hands and forearms with antibacterial soap, mostly 2% chlorhexidine gluconate or 10% povidone-iodine (PVPI). This procedure is considered a conventional surgical hand scrub technique. The second and commonly used practice in recent times involves alcohol-based surgical hand scrub recommended for surgical handwashing. Mild skin irritation, timesaving, minimal use of tap water, and the significant asepsis result are the advantages of utilizing alcohol-based practice. (Gaspar et al. 2018.) In the year 2008, alcohol-based hand scrub became notable. Due to the deficiency of moisturizers, alcohol-based liquids tend to cause a lack of moisture to the skin. Consequently, controversies about the benefits and shortcomings of alcohol-based antiseptics are still in debate. (Gök et al. 2016.)

5 Personal Protective Equipment

Personal protective equipment (PPE) consists of clothing and equipment put on by staff in the healthcare environment for protection against exposure to infectious particles and substances, thus safeguarding both the patient and the staff (Kozier et al. 2010, 328). PPE includes sterile and nonsterile gloves, surgical gowns, aprons, facial protective gear i.e., surgical face masks, and protective eyewear goggles or face shields. Personal protective equipment renders a physical barrier between the user and microbes by preventing microorganisms and blood-borne virus (BBV) from infecting the health care worker's mucous membranes, airways, skin, attire, hair, and the shoes, putting a stop to the possible transmission of microbes. (Neo et al. 2012, 22). Most standard practice guidelines promote risk assessment by all healthcare workers of the potential for exposure and utilizing proper equipment to manage this risk (Neo et al. 2012, 25).

5.1 Gloves

Gloves are indicated to prevent nurses' hands from being contaminated with the patient's secretion and excretion, blood, and bodily fluid. They also prevent the transmission of the nurse's microbes to the patient. Gloves are both sterile and nonsterile, and one-time use. (Kozier et al. 2010, 328.) Nonsterile gloves are used for essential clinical examinations and procedures, including skin disinfection, and opening an intravenous line. Sterile gloves can be used by the circulating nurse to insert a urinary catheter and are commonly used by the surgical team when performing surgery. (Karma et al. 2016, 46.) Sterile gloves are donned either by an open or closed method. Sterile gloves help maintain equipment's sterility and protect the patient's wound or incision site (Kozier et al. 2010, 332). The essential materials found in gloves are latex, nitrile, and vinyl (Ylitupa 2017). Hands must be disinfected before and after gloves are used (Karma et al. 2016, 46).

A study conducted by Laine et al. (2004) stated that surgical staff who perform a surgical procedure using a single set of gloves are 13 times more likely to experience perforations and contamination than staff who wear double gloves (Laine et al. 2004). The gloving system indicator "Puncture Indication System" (PIS) by Grant (2001) revealed that by using a green colored inner glove and a cream-colored outer glove, perforation to gloves could easily be spotted by the user because the color of the inner glove surfaces when the integrity of the outer glove is compromised. When performing a long surgery, it is recommended for gloves to be changed at least every two hours, so the barrier integrity is maintained throughout the procedure (Phillips 2010, 14). There are three different gloves donning techniques, open, closed, and scrub staff assisted (Newman et al. 2008).

The open gloving technique allows the scrubbed staff hands to glide through the sleeves and cuffs when the gown is put on before donning gloves, while the closed gloving technique prevents the scrubbed staff hands from extending out from the sleeves and cuffs when putting on the surgical gown. Instead, the hands are protected using the cuff before donning the gloves. (Alberta Health Services 2020.) The scrub staff assisted gowning allows a scrubbed surgical staff to assist another scrub member, e.g., a surgeon, to don surgical gloves (UIC Medical Center 2007.)

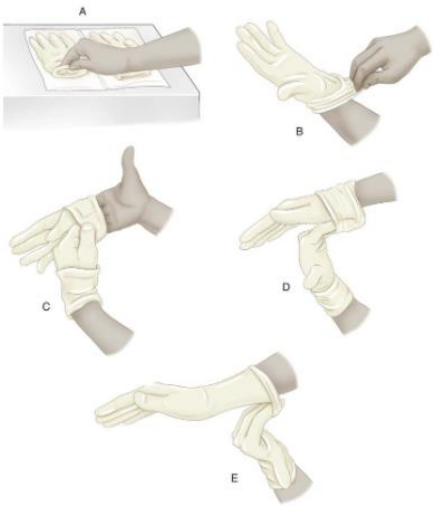

Fig 1: Open gloving method

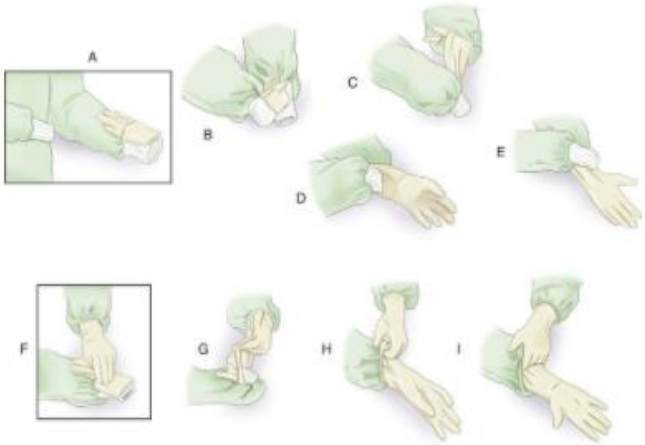

Fig 2: Close gloving method

5.2 Surgical gown

The sterile surgical gown is a barrier to fluid and infection transmission through surgery. It has long sleeves with flexible cuffs; it is worn to preserve the sterile barrier between the surgical field and the scrubbed staff clothes. They are made from either water-resistant fabric, firmly knitted fabric, and are proven to reduce bacterial amounts in the operating theatre. (Ammirati 2005.) The sterile surgical gown is indicated for one-time use after each procedure and patient contact (Kozier et al. 2010, 331).

Several surgical gowns come with the go-around belt system, making it easy to give the unsterile marked area of the paper attached to the belt to a circulating nurse to achieve the go-around procedure of securing the belt on the left side. Before tying the gown's belt, the scrubbed staff must don sterile gloves. The evidence-based recommendation suggests that the

type of gown used in the operating theatre be the go-around style. The go-around gown guarantee that the back of the scrubbed staff remains covered. The surgical gown areas considered to be sterile are the area between the chest and the level of the sterile field. The gown's sleeves, two inches above the gown's cuff, or from the cuff areas to the elbow are also considered sterile. The back of the gown is considered nonsterile. (Pirie 2010, 207-209.) Although other gown parts may not be contaminated, they are considered unsterile, and care must be taken not to allow these parts to encounter other sterile fields and equipment. The surgical gown is changed when its sterility is doubtful. (Pirie 2010, 207-209.)

5.3 Facial protective gear

Masks are worn to decrease the risk of spreading microbes via droplets and air from a patient to a nurse, nurse to a patient, and between surgical staff within the operating theatre (Kozier et al. 2010, 331). Masks are worn so that it completely covers the nose and mouth (Kivisalmi 2017). Wearing of mask before entering the operating theatre is required from both surgical and non-surgical staff. Standard practice requires hand disinfection before and after using a mask. (Karma et al. 2016, 44-45.) Protective eye gears such as goggles and eye shields are intended for use where patient’s bodily fluid may splash to the face of scrubbed staff (Kozier et al. 2010, 331). Goggles are proposed as essential eye protection because they have significantly decreased infectious disease transmission (Veltri et al. 2020).

5.4 Surgical hair covering

Although there is no definite evidence that wearing a headcover can help stop surgical site infections, the inherent benefits to patients when linked with the risks propose that perioperative staff should cover their heads, hair, and ears in the semi-controlled and controlled zones to afford the best possible protection for surgical patients. (Spruce, 2017).

The recommendation to use surgical headcover to minimize operating theatre staff skin and hair exposure, cover the ears, scalp, and burnsides was published in 2015 by the Association for Perioperative Registered Nurses (Pyrek 2019). Due to a lack of scientific evidence to support how effective surgical caps serves as a barrier in preventing surgical site infections (SSIs), criticism about using it in the perioperative setting has voiced out by different experts who argue against its usage. (Pyrek 2019; American college of surgeons 2017).

There are various types of surgical headcovers recommended for use in the operating theatre, i.e., surgical caps and hoods. These headcovers are disposable and commonly single-use items

(Kivisalmi 2017). Hand disinfection using alcohol-based rub should be performed when using surgical headcovers (Karma et al. 2016, 44).

6 Patient position and surgical site disinfection

6.1 Prone position in lumbar laminectomy

The prone position is indicated for surgeries of the back and cervical spine. After patient induction, prone positioning is carried-out by turning the patient first from supine to lateral position and onto the prone position with hands flexed towards the head. (Rotko 2011, 29; Särkijärvi 2014, 16.) A disposable prone-view protective helmet system is utilized by the anesthesiologist to carry out the prone positioning procedure with help from other intraoperative nursing and non-nursing staff. The system consists of a standard or adaptable mirrored platform and a helmet that holds a foam molded head/face cushion. (Lukkari et al. 2014, 288.)

Because patient safety is the paramount goal during positioning, adequate skilled intraoperative staff help during the procedure. Frequently, 5-7 people are involved in guaranteeing patient safety and reducing the likelihood of a patient falling from the surgical bed. (Lukkari et al. 2014, 288; Rotko 2011, 29).

The anesthesiologist will clarify the division of labor and responsibilities and is often responsible for coordinating the entire procedure. To successfully place a patient in a prone position, multi-professional cooperation and professionalism are required. Conventional prone position procedure requires a patient to be turned onto their flank close to the surgical table and simultaneously onto the stomach. (Karma et al. 2016, 107; Lukkari et al. 2014, 288.)

Damage to the patient's skin should be avoided during the positioning procedure. Intraoperative nursing staff assisting with the procedure should be positioned around the patient, i.e., two nurses on either side of the patient, and one nurse positioned at the lower limb. The anesthesiologist is responsible for the head and neck. (Karma et al. 2016, 107; Lukkari et al. 2014, 288.) Two disposable arm cradles and surgical gel pads support the patient's chest and knees areas (Karma et al. 2016, 107). A pillow is placed under the ankles, high enough to prevent the toes from pressing against the surgical table. The prone position is complete when the patient is secured to the operating table with a safety belt. (Lukkari et al. 2014, 288.)

The authors decided to perform surgical skin disinfection on an imaginary patient scheduled to undergo a procedure called lumbar laminectomy (Fig 1).

6.2 Lumbar Laminectomy

Lumbar laminectomy is an operative procedure used to relieve the stenosis's narrowing on the spinal cord or the nerve roots that may arise from injury, herniated disk, or tumors (Ammerman 2019).

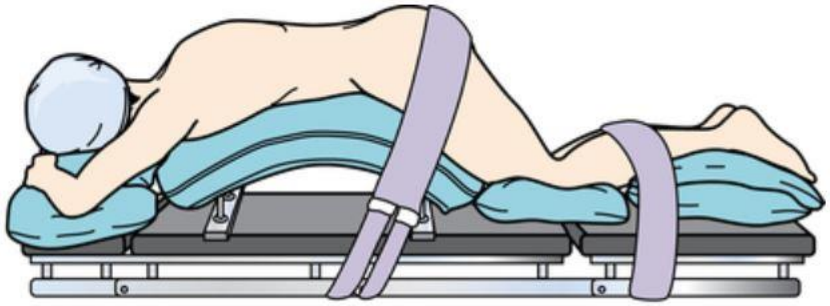

Fig 3: Wilson. Prone position for laminectomy

6.3 Surgical site disinfection

The purpose of pre-operative surgical site disinfection with a suitable skin solution is to reduce the number of resident and transient microbial flora found on the patient's skin to a point where they are less harmful (Kozier et al. 2010, 335-336; Gould & Brooker 2008, 106-108; Hemani & Lepor 2009; Wicker & Dalby 2018). It is one of the most essential practice implemented by intraoperative nurses to reduce the incidence of post-surgical site infections (Wicker & Dalby 2018). The solutions used for mucosal and skin disinfection are known as antiseptic. For pre-operative skin disinfection, the most frequently used disinfectant is chlorhexidine alcohol. (Sandle 2016.)

Surgical site disinfection is implemented when the patient is in the correct surgical position, and when the marked incision site is well-lit with a surgical light by the circulating nurse. The patient and surgical table surroundings are covered with an absorbent sheet to prevent disinfectant solution to flow to the patient's body's sensitive area. (Lukkari et al. 2015, 294). Preoperative nursing care before skin disinfection includes ensuring that the patient has showered either the previous day or the morning before the operation. The antiseptic entire body wash is unnecessary because it is not proven to affect the number of surgical site infections. Regular liquid soap is enough. Preoperative monitoring of the patient's skin is a standard practice that ensures patient skin integrity is intact before skin disinfection. (Rantala et al. 2010, 219-220.)

Before surgical site disinfection, it is essential to ensure the surgeon has marked the surgical site with a marker, and the patient's skin is intact is. When performing surgical site disinfection, it is essential to follow safety, individuality, and principles of asepsis. (Korte et al. 2000 387-390).

According to the authors' planned surgical skin disinfection procedure, the supplies needed for the procedure will be nonsterile gloves and ChloraPrep™ 10.5ml orange color solution, which contains 2% or 20 mg/ml chlorhexidine gluconate (CHG) and 70% or 0,7 isopropyl alcohol (IPA).

ChloraPrep™ delivers a simple, quick-acting, and unrelenting formula of chlorhexidine gluconate (CHG) and isopropyl alcohol (IPA) broad-spectrum antibacterial action against microbes and can be used for a variety of minimal and major surgical procedures. It provides antiseptic action for at least 48 hours after use and is proven to decrease surgical site infections. (BD ChloraPrep™, n.d.)

Fig 4: ChloraPrep™ applicators

The circulating nurse collects the surgical skin disinfection material (Lukkari et al. 2015, 293). The nurse disinfects hands with an alcohol-based solution and dons a pair of non-sterile gloves before performing skin disinfection (Heikkinen, 2015). If the patient's skin is visibly dirty, it should be cleaned with antimicrobial soap and water (Heikkinen 2015). Hairs are shaved from the surgical site if needed, with an electric shaver (Karma et al. 2016, 109). The surgical area should be disinfected from a sufficiently wide area while taking the incision site and sterile drape boundary areas into consideration (Similä et al. 2015, 14). An appropriate distance of

about 10 centimeters from the incision site to the drape line is suitable during skin disinfection (Lukkari et al. 2015, 294).

The direction of the dripping solution should be considered when performing skin disinfection, i.e., disinfection solution flows from clean to dirty areas. Additionally, the area to be disinfected should be reduced and ensure that the sponge area considered dirty does not encounter a pre-disinfected area. Disinfection should begin on the incision site and then towards the peripheral parts. The incision site should be disinfected three times (Karma et al. 2016, 111-112). When performing surgical site disinfection, it is essential to remember the hand's mechanical movement and how much time it takes for the solution to dry up. Drying time affects the effectiveness of surgical skin disinfectant. (Heikkinen 2015.)

6.4 Draping

The process of using a sterile barrier material to create and maintain a sterile field throughout an invasive procedure is known as draping. Draping aims to block the passing of microbes from nonsterile to sterile areas. Fabrics used for draping may be disposable or reusable. Disposable drapes are usually paper or synthetic or a combination of both and can or cannot be permeable. Reusable drapes are generally dual-width cotton fabric. Drapes used for surgical procedures must be sterile. Draping establishes a microorganism free area known as a sterile field. It is achieved by laying sterile sheets and towels in a specific position to preserve the sterility of surfaces on which sterile tools and gloved hands can rest. A surgical patient is draped so that only the disinfected boundaries and the incision site is visible. Drape can be used to create a sterile field on the surgical and instrument table. (Arjunan 2011.)

The draping principles include holding the drapes slightly as possible, and draping should begin from the sterile to the unsterile area. The instrument nurse should not bend across the operating table to drape the other side. Standard practices require a go-around to the other side of the patient. Keep the drapes elevated as possible to prevent contact with the nonsterile area. Hold the drape high enough but within the sterile field until it is precisely over the area to be draped. Once attached to the patient’s skin, it should not be taken off for readjustment. If the drape is wrongly attached, place another drape over it. Keep the sterile glove protected by cuffing hands with the edges of the sheet folded over them. Gloved hands should not encounter the patient’s skin. If a drape becomes contaminated, dispose of it at once. If the drape falls lower than the waist level, do not use it. Dispose of it and request for an extra drape. Whenever in doubt about the sterility of the drape, dispose of the drape. Dispose of the draping set if a perforation is noticed on a drape after being attached to the patient. (Arjunan 2011.)

7 Educational video

Over the years, educators have included video as learning material. Studies have revealed that introducing audiovisual material into lectures improves learning outcomes, particularly for students who struggle with the subject. (Chapman 2012, 189-200.) An educational video purpose is to educate and enlighten students about the subject taught through audiovisual means. Educational video is a useful and descriptive means for learning, diversifying teaching methods, and supporting learning irrespective of time and place. (Mehtälä 2016.)

Additionally, audiovisual learning is an effective learning method as it allows the viewer(s) to play the video material more than once until learning has been achieved (Vainionpää 2006). If necessary, the viewer can stop and replay and fast forward the video, thereby making learning more accessible. Video is an exciting method of learning, and it stimulates a student to learn a subject. (Mehtälä 2016.)

The characteristic of an excellent educational video is a well-written manuscript. The video should be clear and logically presented so that viewers can easily follow and understand the topic. An outstanding educational video contains the following components: engagement, cognitive loud, and interactive learning. A video should be comprehensive by keeping the length of the video moderate. According to a survey, viewers' interest in watching a video drops after six minutes; therefore, a good video should last no more than 10 minutes. (Mehtälä 2016.)

The length of an educational video and the reserved lecture time is usually the disadvantage of using a video as a learning material. In most cases, if the video's knowledge is challenging for students to follow, the educator may face difficulties managing the minutes available for the course. The vocabulary and terminologies used in an educational video may be a disadvantage to specific students, and this would need clarification from the educator who has limited time to act. (Dimitriu 2017, 278.)

When creating a video, it is crucial to have the following components to capture a suitable material: a good location, camera, subject, lighting, audio (sound), distribution medium, and editing tool. A camera is required to record an audiovisual content; it can be a smartphone or digital camera. The next essential component of the video is the subject. The subject is the focus of the story. Another component is the light. It is an integral part of the video because it helps convey the story by generating the mood. The fourth component is the audio. Audio, i.e., narration, is not needed in a video; nevertheless, it is essential because it tells more about the theme and defines the subject. Editing is where the captured images are trimmed and connected rationally to build the story. When editing, additional elements such as songs, illustrations, and color grading are supplemented to the video to create viewers' engagement. The final component is distribution, and it is a medium where the video can be accessed. The

distribution medium can be unrestricted or restricted so that only members of the institute can gain access to the video. (Ebiner et al. 2020.)

Before producing a video, the producer or person who wants to create the video must consider the purpose and aim. Producing an educational video has various purposes, and one of the purposes is to use it as educational material. The next thing to consider is the target group of the video. The educational video should be brief in length but informative enough to keep the viewers engage while watching the video. (Ebiner et al. 2020.)

Creating a video starts with pre-production preparation, which involves creating a directive manuscript, and clarifying the timeframe for actualizing the final output. When writing the manuscript, it is essential to know when the video is ready as it helps to clarify time estimation during preparation, filming, and editing stages. (Ebiner et al., 2020.)

The last stage involves the filming of raw footage as materials for video production. This stage involves assembling equipment, lighting, sound, doing the actual filming, and taking additional footage. After getting sufficient footage, the post-production stage can begin. At the post-production stage, an editor will choose the parts needed to create the final version of the video and adding additional effects like sounds and text, thereby making the video engaging. This video production stage takes a long time because the editor needs time to re-evaluate the final product before publishing. (Heil, 2018.)

8 Purpose and aim

The thesis's purpose is to produce an evidence-based educational video on aseptic practices in perioperative nursing. The thesis video aims to promote nursing students' competence in surgical hand preparation, donning sterile gloves and gown, preparing patients' skin, and draping a patient.

9 Working life partner

Laurea University of Applied Sciences is situated on six different campuses in the region of Uusimaa, Finland. The organization was founded in 1992. Laurea University of Applied Sciences was previously called Espoo-Vantaa University of Applied Sciences, not until the 1st of August 2001 when it adopted its current name. Laurea's campuses are in Hyvinkää, Leppävaara, Lohja, Otaniemi, Porvoo, and Tikkurila. With approximately 7800 students, 595 staff members, 355 academic staff, and 24000 alumni, Laurea has ranked the 4th most prominent university of applied sciences in Finland. Throughout the preceding years, Laurea has been

rated high amongst Finnish Universities of Applied Sciences and was acknowledged on several occasions in categories such as quality of education. The Laurea community can boastfully say it belongs to the top for achievement in Finland's schooling system. The tutoring language used in Laurea is Finnish and English. In Laurea, it is possible to study in international programs, and in these programs, there are 650 students. Furthermore, Laurea welcomes about 300 exchange students annually in its degree programs offered in English language. (Laurea 2019.)

Laurea's learning style, called Learning by Developing (LbD), is an exceptional learning style that requires students to emphasize their learning by taking up practical projects and development works with real-life partners. Learning by Developing model is established on a development task embedded in the work sector, with a course that calls for collaboration amongst lecturers, students, and workplace professionals and produces new skills. (Laurea 2012, 6.) In Laurea, students and teachers are not alone, that is why the Laurea community prides itself with the motto "Together we are stronger" (Laurea 2019.)

9.1 Cooperation with working life partner

This thesis was introduced to the authors as part of Laurea UAS "Guidance in Nursing" project. Co-development is a valuable mechanism to allow two parties to develop a project meant to solve a question or a need that promotes the workplace's improvement (The government of Canada 2005). Promoting research collaboration among the academic community is an innovative way to meet the need for high-grade, profitable, and clinically oriented study. (Thompson et al. 2001.) The co-development stages involve five steps: ideate, create, prove, implement, and launch. (Daems 2019)

Ideate involves two parties coming together to develop and enhance an idea (Daems 2019). The topic for the thesis Aseptic Practices in Perioperative Nursing; surgical hand preparation, donning of sterile gown and gloves, preparing patient's skin and surgical draping, and functional thesis as the implementation method was agreed upon by the working life partner and the thesis authors.

Create involves the process of sharing ideas, enhancing them through planning, and creating an innovative solution through cooperation, adaptability, and expertise (Daems 2019). This thesis's target group is the nursing students of Laurea UAS Tikkurila campus. The authors presented a topic analysis to representatives of the working life partner in August of 2019, and in January of 2020 at a thesis seminar, the authors presented a written thesis plan, which was approved, and a thesis agreement was signed afterward. According to the working life part-

ner's collaboration principles, the authors had to register the thesis in Laurea UAS Partner Relationship Management (PRM) program. "PRM holds information on Laurea partnerships linked to student projects, job placements, thesis, and other projects."

Prove is the process of testing how a product solution works and ensure it possesses the best outcome (Daems 2019). As part of the agreement signed, the working life partner provided the working space, equipment, and supplies needed to accomplish the thesis's final product, i.e., an educational video. The authors and a third party (Töölö ortopedinen leikkausosasto and Töölö teho-osasto) provided additional supplies used during the educational video production. There was an active communication between the authors and working life partner concerning the thesis's progress through active participation in a monthly thesis guidance seminar organized by the working life partner. During the seminars, the authors presented a preliminary version of the educational video, manuscript, and written report to students and the working life partner's representatives for feedback and guidance. Feedback collected at the seminar prompted a change to the educational video's original idea and written report structure.

Implement involves the process of resolving essential issues and seeking guidance through product piloting (Daems 2019). Collaboration between the authors and working life partner continued into the final stages of the thesis. e.g., the authors were able to present and defend their thesis in a thesis seminar. Two tutors from the working life partner supervised and guided the progress of the thesis. Feedback was provided for the written report, while changes to the educational video were not required.

Launch in co-development is the process of bringing a product into use through various platforms (Daems 2019). The authors and the thesis supervising tutors had a meeting during the thesis publication phase to discuss the thesis's conclusion and the portal where the educational video and written report can be published. The author uploaded the thesis's final product to Laurea UAS YouTube channel, while the report was published on Theseus, the thesis database for the University of Applied Sciences.

10 Thesis process

10.1 Functional thesis

A functional thesis is one of the methods used by students at universities of applied sciences to execute a thesis. An educational video in thesis work is a functional method used in demonstrating theory in practice. This thesis method usually has a target group, and the final product is made for the targeted group. A functional thesis aims to produce an actual product, such as an educational video, a guidebook, and portfolio, coordinating or scheduling an

event or both. Irrespective of the implementation method chosen for a functional thesis, it would always include a report and a product. (Airaksinen 2009.) The differences between a functional and research thesis are acquiring new knowledge from the research process, which is then documented in the form of a research report, and the students' ability to produce a concrete product from evidence-based research findings. A functional thesis also requires different participants to be involved in the implementation phase. (Salonen 2013.)

The combination of theory and practice is the characteristics of a functional thesis. It is essential to reflect on the importance of the information obtained and its contribution to the sector's development. In a functional and research thesis, the data collection method is the same, but in a functional thesis, research practices are flexible. (Vilkka & Airaksinen 2003, 57.) A functional thesis combines practical implementation and reporting through research communication. The thesis must be a work-centered, practical, research-oriented, and adequate demonstration of knowledge and skills in the field. (Vilkka & Airaksinen 2003, 9-10.)

10.2 Educational video planning and implementation

The educational video planning began in early January 2020 when representatives of the working life partner accepted the thesis plan during a thesis guidance seminar, and a thesis agreement between the working life partner and the thesis authors ensued.

Before video production, it is essential to rationalize the educational video's topic with evidence-based literature, identify the target group, and consider what the video should inform the viewers. It is crucial to use a manuscript written from evidence-based literature to direct video production. A clear and concise, documented manuscript helps the overall process of shooting a video to be easy. The manuscript should have a clear division of scenes, accompanied by a narrative text in each set. (Aaltonen 2019, 114.)

The sources used to create the manuscript were retrieved from several databases and search engines such as CINAHL, ProQuest, Laurea Finna and Laurea’s library, Google, Theseus, Google Scholar, EBSCOhost, ProQuest eBook Central, and ScienceDirect (Elsevier). Keywords include perioperative nursing, disinfection, surgical site infections and asepsis, infection control, surgical skin preparation, surgical drapes, educational video, and audio-visual learning. Additionally, the authors used textbooks and unpublished guidebooks from HUS. The sources used were published from the year 1996-2020. The language of selected sources was English and Finnish.

After concluding the theoretical information retrieval, the authors began writing the manuscript based on the information gathered. The manuscript helped the authors and working life

partner, and the video producer decide on the equipment and materials needed to produce the educational video. At different stages of video production, new information and ideas promoted an update to the manuscript. The authors wrote the thesis report using the same database, search engines, and similar keywords when creating the manuscript.

The essential surgical equipment needed to implement the video includes a surgical bed and trays, a drip stand, an oxygen analyzer device, and a surgical mannequin that served as the patient. The materials required to perform the procedures captured in the educational video include personal protective equipment, antiseptic solutions, and soap, disposable paper towels, sterile and nonsterile gloves, surgical gowns, universal drape set by Mölnlycke Health Care. Additional materials include pillows and blankets, an absorbent sheet, and a dustbin. The video producer provided the equipment used for video production.

Filming the first educational video took place in February of 2020. The authors booked the skills lab for two days. Two days before the actual filming day, the authors prepared the simulation room by putting all the essential equipment and materials in the right workspace and rehearse the scenes. The rehearsing idea was to identify things that could be improved and get accustomed to the role-playing. Filming and editing of the educational video took place in the last week of February. Representatives of the working life partner were shown a preliminary version of the educational video during a thesis guidance seminar at the end of March 2020. The authors collected feedback and recommendations on how to proceed with completing the video. The procedure featured in the video was a surgical heart bypass. The working life partner and students at the seminar thought the procedure was complicated, and the authors should rethink implementing the video with a simple to follow procedure.

However, the authors had to stop working on the video in the post-production phase because of the Covid-19 pandemic. The pandemic forced the working life partner to close its institution to stop the spread of Covid-19 among its community. This unforeseen situation meant the authors had the chance to rethink how to proceed with the educational video production when Laurea UAS skills lab is made available for use after the summer. In July 2020, the authors agreed on a second educational video concept, and the procedure featured in the new educational video was lumbar laminectomy.

The second educational video implementation began in August 2020 when representatives of the working life partner informed the authors about the institution's possible resumption date. The authors reached out to the representative of Laurea UAS to reserve the skills lab for a day in mid-September to begin work on the educational video.

The authors reserved Laurea UAS simulation room for a day to film the educational video. Three days before filming, the authors prepared the simulation room by putting all the essential equipment and materials in the right workspace and rehearse the scenes. The rehearsing

idea was to get accustomed to individual roles and identify things that could be improved on the actual filming day. Filming of the educational video took place in the second week of September 2020.

Before filming commenced, the producer considered the angles, space, background, and lighting of the workstation. The workstation and mannequin, which served as the patient, were set-up to create authenticity. The authors acted as a scrub, circulating, and anesthesia nurse. The filming lasted for eight hours because the producer wanted to capture multiple footage from each scene. Several sets failed to portray the author's vision for a particular procedure; therefore, the producer often filmed the process. The team observed breaks while filming. At the end of the filming session, the authors and producer reviewed the entire footage captured for the educational video after cleaning up the simulation room.

After filming, editing on the educational video began immediately. The videographer edited the video with Adobe Premiere Pro 2019 program. The program enabled the video to have a narrator's voice and text attached to various scenes. The decision not to have a narration in some part of the video was agreed upon by the authors based on advice from a team member at Laurea's media office and the videographer. The authors informed the producer to create 7 minutes and 30 seconds' long video; however, the video's final version was 8 minutes and 13 seconds and the video production process lasted for a month. The authors received a version of the raw video one week after the filming. After watching the raw video version, the authors had comprehensive ideas on how to finalize the video, e.g., which part of the scenes requires a narration and text. The videographer received feedback from the authors on how to finalize the video. The final version of the manuscript was completed, and the preliminary version of the educational video was made available in the first week of October 2020 for evaluation purposes. An online feedback form was shared via social media platforms to evaluate the video's preliminary version. Respondents for the feedback were degree nursing student and a perioperative nursing lecturer from Laurea UAS. The video received feedback between October 9 and 13, 2020. Open feedback from respondents prompted the authors to make minor adjustments to several subtitles attached to the video's scenes. The videographer sent a link of the video's final version to the authors on October 14, 2020. The authors created the YouTube link that was uploaded to Laurea UAS YouTube Channel. The video can be used as support material during the perioperative course for Laurea's degree nursing students.

10.3 Educational video evaluation

The educational video was evaluated based on degree nursing students' feedback from the academic year 2017 and 2018, and a surgical course lecturer from Laurea UAS Tikkurila campus.

The authors used an online tool known as Microsoft Forms, to create the feedback form. The educational video link was attached to the feedback form (Appendix 2) and was sent to the respondents through WhatsApp and Microsoft Outlook email. The feedback form was sent using the social media platform because the authors could not meet in a group meeting with the respondents due to the Covid-19 recommendation. The evaluation questions were prepared based on the aims of the thesis. Feedback was voluntary, and replies were given and processed anonymously. The authors targeted 30 respondents, but there were 35 respondents in total. The duration for received feedback was five days. The Microsoft Forms was used to analyze the results. However, the result's chart was created in Microsoft Excel.

The feedback form used was the Likert scale survey, where 1=strongly agrees, 2=agree, 3= neutral, 4=disagree, and 5=strongly disagree. When seeking opinion feedback, the Likert scale gives the respondents the platform to choose the option that best reflects one's own opinion. With option 3, i.e., neutral, the respondent must ponder if it is too irresistible to answer the questions. If the respondents' answer to every question is "Neutral," the feedback results are difficult to evaluate. At the end of the feedback form, there is an open question where respondents provided open feedback and recommendations. Getting fresh perspective and improvement suggestions are the positive aspects of having an open question in a Likert scale feedback form. (Heikkilä 2008, 49-50, 53-54.)

Collecting information using a questionnaire has several aims. The main aim is to change the authors' need for information into questions that the respondent can answer. If the form has answer options and the answers are also consistent, it makes the data processing easier. The purpose of the form is also to be as easy as possible for the respondent. Ready-made response options facilitate this goal. (Holopainen & Pulkkinen 2008, 42.)

The bar chart was adopted as the feedback reporting format as it gives a quick overall picture of the questionnaire performance. A graphic pattern can illustrate feedback results; therefore, it should not contain too much information. (Valli 2015, 73.) Six of the diagrams illustrating the feedback results was created. The diagram was kept simple according to the feedback questions.

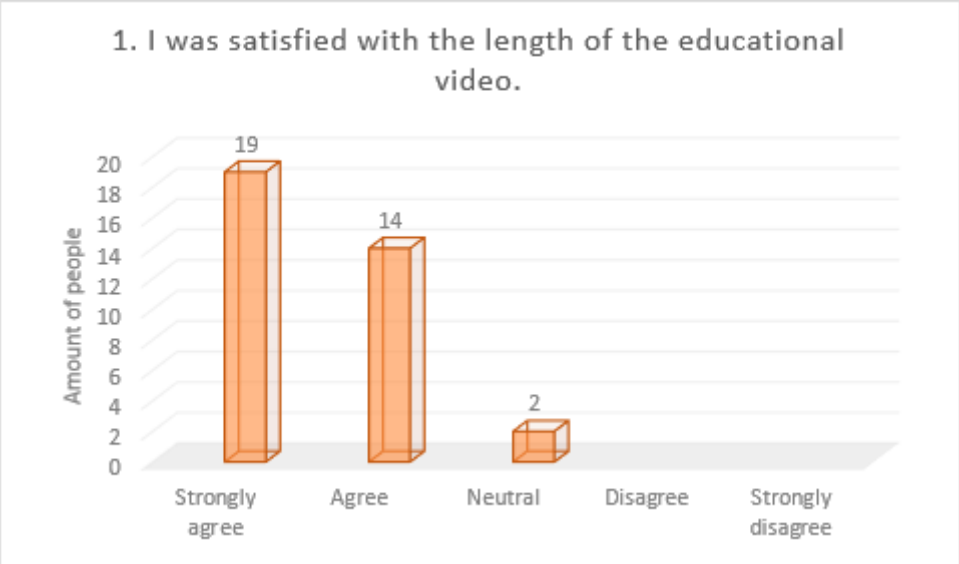

Table 1: Length of the educational video

The first question on the feedback form asked if the length of the video was satisfactory. 19 people answered that they strongly agreed. 14 people responded that they agreed. 2 people responded “Neutral”.

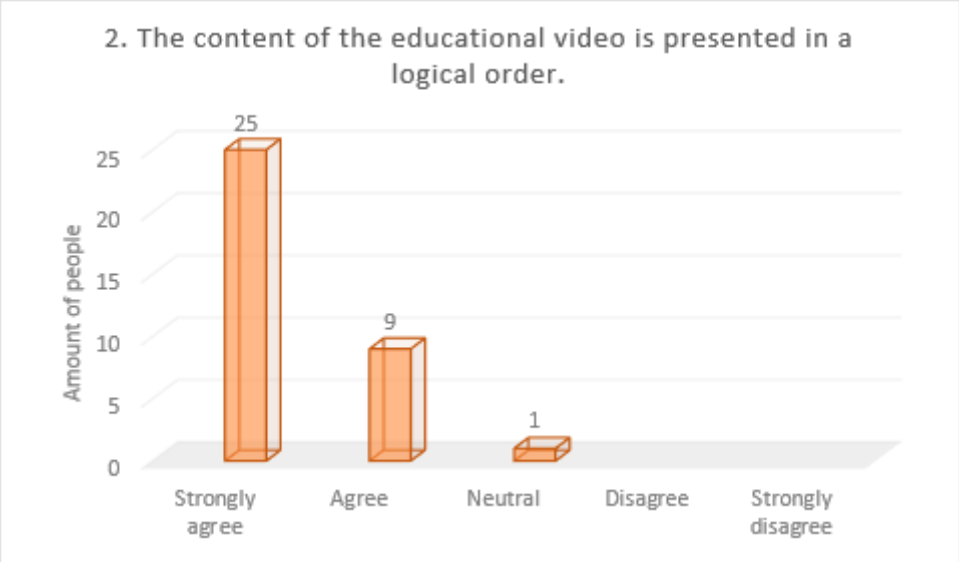

Table 2: Order of presentation in the educational video

The second question asked if the video is in a logical order. 25 people answered that they strongly agreed. 9 people responded that they agreed. 1 person responded “Neutral”.

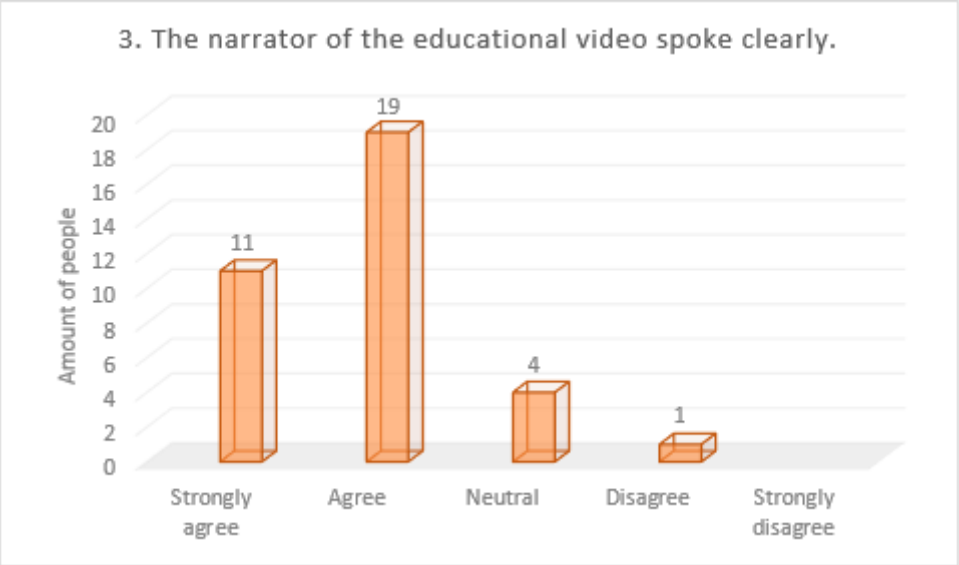

Table 3: Narrator's interpretation in the educational video

The third question on the feedback form asked if the narrator spoke clearly. 11 people answered that they strongly agreed. 19 people responded that they agreed. 4 people responded "Neutral". 1 answered disagree.

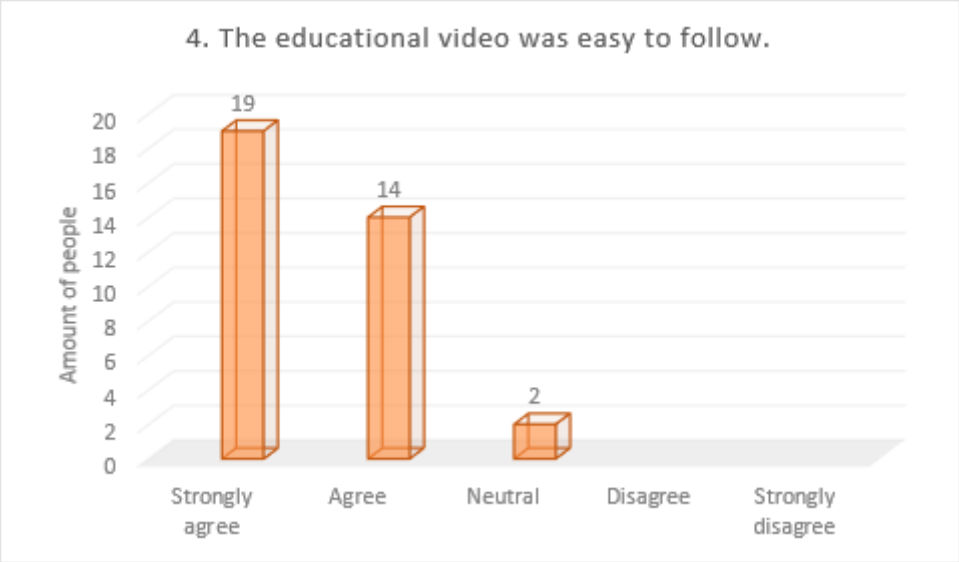

Table 4: Simplicity of educational video

The fourth question on the feedback form asked if the education video is easy to follow. 19 people answered that they strongly agreed. 14 people responded that they agreed. 2 people responded “Neutral”.

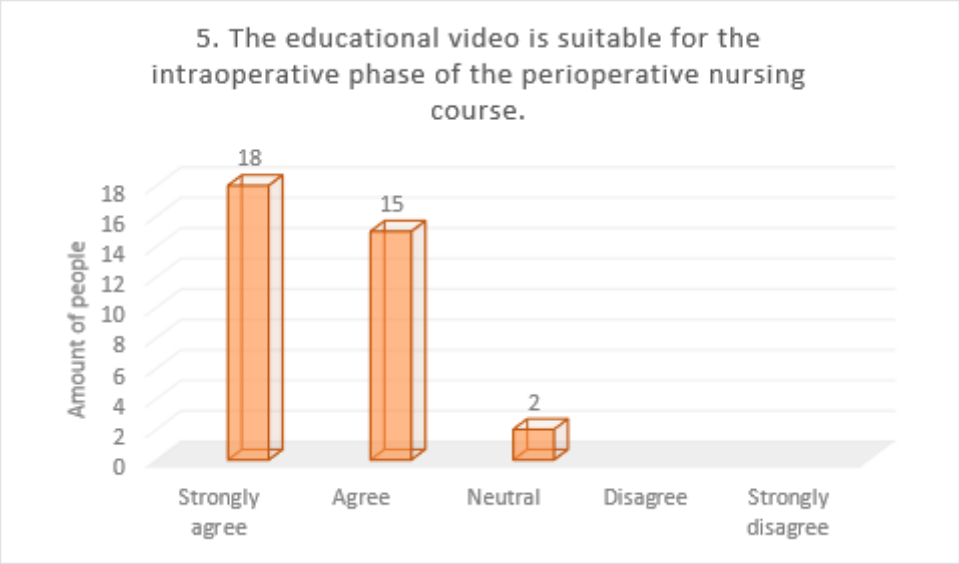

Table 5: Suitability of the educational video

The fifth question on the feedback form asked if the educational video is suitable for the intraoperative phase of the perioperative nursing course. 18 people answered that they strongly agreed. 15 people responded that they agreed. 2 people responded “Neutral”.

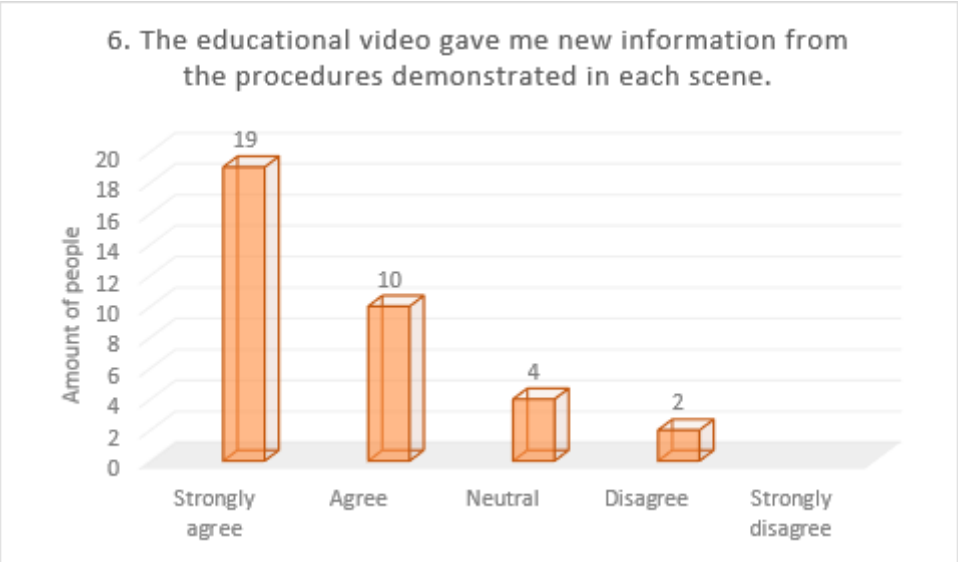

Table 6: New information from the procedures demonstrated in the scenes of the educational video.

The sixth question on the feedback form asked if the video gave them new information from the procedures demonstrated in each scene. 19 people answered that they strongly agreed. 19 people responded that they agreed. 4 people responded “Neutral”. 2 answered disagree.

The authors received 15 open feedbacks. The answers to the open feedback questions were mostly positive, and there were few suggestions for improvement, clarification, and corrections to subtitles. Based on the received comments, minor changes were made to the educational video. The feedback highlighted that the educational video's content was logically presented and easy to follow, informative, and suitable for nursing students participating in surgical lectures and those who wish to partake in clinical practice in the operating theatre. Additionally, the students indicated that the educational video's length was suitable, and the narration was understandable; however, few respondents mentioned that the narrations were slightly unclear.

There were a few suggestions for the video improvement. Suggestions for improvement emphasized adding subtitles to help clarify draping procedures and drape names, having a close shoot on donning of surgical sterile gown and gloves, and patient draping. Few students pondered about the use of double gloving, and other students made an emphasis on the incision site disinfection technique and the Chloraprep® disinfectant applicator.

Based on the feedback, the students were mainly satisfied with the final product. The feedback received from the respondents indicates that the video is useful as educational material for the Perioperative and surgical nursing course under Decision-Making in Acute Nursing care module.

11 Discussion

11.1 Ethical consideration

Scientific research can be ethically acceptable and trustworthy when carried out according to sound scientific practice principles. According to research ethics, acceptable scientific practices include diligence, honesty, and accuracy in research work, recording and presenting findings, and evaluating research and its findings. A research report must mention the relevant links and sources of funding for the research and mention them to the research members. Each researcher is principally responsible for adhering to good scientific practice. (Tutkimuseettinen neuvottelukunta 2012, 6.) When reporting a thesis, it must include the topic discussed, its knowledge base, reference frame, viewpoint, methods, and sources. The report's features are argumentation, the definition of concepts and terms in the field's profes-

sional language, use of sources, and accuracy of information and structure of the text. Students must use a research attitude when implementing a functional thesis. The findings of the research should be assessed critically from an investigative viewpoint. In its entirety, evaluating a thesis is considered as a learning process. (Airaksinen & Vilkka 2003, 80–82 & 154.) Students should be critical about the sources they use when writing a thesis. (Alla et al. 2016, 55).

The authors ensured that the thesis followed good scientific practice to guarantee it was ethically acceptable. The thesis's phases were implemented accurately and truthfully. The authors produced the study questionnaire together and respected other researchers work. Anonymous feedback on the educational video was requested, processed, and ethically documented in the thesis report.

According to the working life partner, the authors did not require a research permit to collect educational video feedback. However, the authors applied for a research permit. The authors informed the respondents about the purpose and aim of the educational video, the need for evaluation, and the participants' rights. The respondents were degree nursing students from the academic year 2017 and 2018 and a perioperative nursing educator at Laurea UAS. The criteria used to identify the students for the educational video feedback requires the degree nursing student to possess basic knowledge of the procedures demonstrated in the educational video. The authors requested feedback from the nursing educator because of her expertise in the thesis topic. The authors needed thirty respondents to evaluate the video; however, the total feedback received was thirty-five.

Urkund plagiarism system was utilized to check this thesis. Urkund identifies for any signs of plagiarism, to guarantee there was no plagiarism in documented text. In this thesis, dishonesty, fabrication, and falsification were avoided. The authors, as well as the videographer consented for their names to be listed at the end of the educational video.

When searching for and utilizing sources, source criticism was adhered to, and adequate time was spent investigating and using primary sources. Laurea UAS referencing guidelines formed the basis upon which used sources were referenced. In the educational video, the mannequin representing the patient was treated according to the nursing care standard. In the manuscript, the mannequin was named patient X. While performing surgical skin disinfection on the mannequin, the nurse adhered to the procedure's principles and asepsis according to evidence-based knowledge.

11.2 Reliability

When producing an educational video, ethics, reliability, and truthfulness are particularly crucial because of the purpose of producing the final output, i.e., a learning material for nursing students that will play a significant role in future nurses' skills and professionalism. Scientific research aims to provide the most reliable and credible knowledge regarding the phenomenon under study. Appraising the reliability of a study is crucial for research, scientific knowledge, and the application of findings. (Kylmä & Juvakka 2007, 127.)

Credibility refers to confirming the trustworthiness of research and its outcomes. A study's credibility can be increased, for example, by discussing research findings with partners about the results of the research at different stages or by discussing the research process and its results with other people researching the same topic. The researcher needs to relate to the research topic for a sufficient time because there is a particular interest in qualitative research and the perspective of the research takes time. When a researcher can describe and reflect on choices made during a study, the credibility of research output increases. (Kylmä & Juvakka 2007, 128.)

This thesis's credibility increased because the authors used reliable national and international sources. The reliability of the sources increased because, severally researchers referenced the sources, which makes the sources more relevant irrespective of the year it was initially published. Sources used were scientific articles published in national and internationally distinguished nursing journals. Finding, selecting, and criticizing sources took much of the authors' time. The authors regularly discussed the progress and output of the thesis process with the working life partner. The stages of the thesis process, i.e., the start of the research and the choices that brought about the final output, were documented in this report.

Dependability means documenting the entire research process to make it possible for another researcher to follow the study path. In qualitative health research, the research diary is essential because, as a practice, a qualitative research basis on an open plan, which becomes more definite as the research progresses. (Kylmä & Juvakka 2007, 129.) This thesis proof of dependability increased because the authors were accurately documenting the thesis process in this report, allowing the reader to follow the entire thesis's path.

Transferability refers to how qualitative study can be generalized or transferred to another context. To ensure transferability, the researcher must present adequate detailed information about the research partners and the environment to enable the reader to appraise the results' transferability. (Kylmä & Juvakka 2007, 129.) The authors achieved transferability in this thesis by producing the final output, i.e., the educational video is as realistic as possible and corresponds to the natural care environment, making it easy and smooth to put the educational video into use.

11.3 Educational video output analysis

The thesis's purpose is to produce an evidence-based educational video on aseptic practices in perioperative nursing. Laurea UAS did not have its video material on this subject; that is why the final product was necessary. The educational video produced is undoubtedly beneficial for group or self-learning. In the feedback collected, majority of the respondents also felt that the video is suitable for the intraoperative phase of perioperative nursing, and the educational video provided new information from the procedures demonstrated in each scene.

It is reasonably useful and ethical to enhance surgical aseptic practices (Aholaakko & Metsälä 2016). According to Tengvall (2010), more than half of operating theatre nurses believed they worked according to the latest aseptic recommendation, and a third of surgeons thought a surgical nurse frequently acts following the latest aseptic information (Tengvall 2010). Base on this information, the authors' decision to collaborate with the working life partner to produce an educational video to support operating room practices is justified.

If used correctly, video is an efficient way to learn new skills and keep students engaged in a topic. An educational video can wake up student interest in illustrating and stimulating the subject taught and getting the student to commit to the topic. A video is always direct in its narrative, i.e., it should be viewed from beginning to end, so the video's duration should not be too long. (Hakkarainen & Kumpulainen 2011, 12; Keränen & Penttinen 2007, 197; Schwartz & Hartman 2007, 2.)

According to Guon et al. (2014), the viewer's interest when watching a video last up to 6–9 minutes, and after 12 minutes, the viewer's concentration starts to decrease. In this thesis, the educational video was limited to aseptic practices in surgical hand scrub, donning sterile surgical gown and gloves, surgical skin disinfection, and patient draping. Clear and straightforward steps were speed-up to save time and maintain viewer interest. Furthermore, based on feedback collected from respondents, the length of the educational video is suitable. The duration of the final product was 8 minutes and 13 seconds.

Making a video includes several processes; careful planning is crucial. The manuscript is the basis of the educational video and an absolute requirement for producing an engaging video. The manuscript tells what will happen in the video. Without a manuscript, a video will be unstructured and confusing; thus, viewer engagement and learning would be unrealistic to achieve. (Aaltonen 2017, 12-13; Keränen et al. 2005, 186-187.)

12 Conclusion and Recommendations

There are many pictorial and video instructions on the intraoperative procedures demonstrated in the authors' educational video, but no comprehensive video materials describing all the procedures performed can be found. Therefore, giving the authors the opportunity to deliver a unique product.

While implementing this thesis, the authors have been working part-time and attending compulsory clinical placements. Differences in schedules made it difficult to have regular group meetings to work on the thesis. Nevertheless, simultaneously working and having the clinical placements while implementing the thesis brought experiences and practical knowledge on time management skills. The entire process of the thesis helped the authors' development skills that were essential not only in nursing field, but also in filming and multimedia tasks.

The authors believe this collaborative project with the working life partner has offered individual and collective achievement in increasing knowledge base to implement this thesis work. Personal and mutual experience from the authors, both in perioperative clinical placements and media field was used to develop and contribute to produce the educational video that would serve as a learning material for current and future nursing students.

The methodology used to implement this thesis presented the authors with the opportunity to use collective and individual ideas and evidence-based theories to develop new ways of solving research questions, convey ideas, provide, and accept criticism. At different stages of this thesis, the authors noticed a collective and individual increase in critical thinking ability, which was applied to produce the final product of the thesis. The authors were delighted with the outcome of the educational video.

The thesis's final product can be utilized as a learning material in perioperative nursing to nursing students. The educational video can also be used by nursing students to promote self-study. English educational videos on clinical nursing and surgical skills could be an area for further thesis development, e.g., cannula insertion and preparing a sterile table. An additional possible development idea would be for degree nursing student to appraise the educational video's use by the working life partner.

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Tables

Figures

Appendices

Appendix 1: Manuscript

Introduction	Aseptic Practices in Perioperative Nursing, Laurea UAS logo and authors' names (Lin Meishan, Nduka Phillip and Tamrakar Rusum) Areas of aseptic practice: Surgical hand scrub, donning of sterile gown and gloves, surgical site disinfection, and fitting surgical drapes on a patient (mannequin)
Disclaimer	"This video is for training purposes only and should not be considered in any way a replacement for a surgical room standard aseptic practice."
Scene 1: (Narration)	The Scrub nurse demonstrates having the appropriate working attire, and absence of all jewellery and good hand hygiene.
Scene 2: Narration Picture and text	"Personal protective equipment (PPE) refers to protective materials and equipment worn to protect the wearer from injury or the spread of infection or illness." 1. Surgical cap. 2. Surgical hood. 3. Surgical mask 4. Protective eyes shield.
Scene 3: Narration	The scrub nurse disinfects hands and puts on personal protective equipment in a systematic order.
Scene 4: Narration/close shot Surgical hand scrub Supplies: Soap, Hand disinfectant and disposable paper towels	"The purpose of surgical hand scrub with soap, water and disinfectant rub is to remove transient microbes from the nails, hands, and forearms. This scrub reduces the number of microbes." "Set water to desired temperature." "Wet hands and arms in an upright position with elbows bent allowing water to flow from clean to dirty area." "Apply at least 5 milliliters of the soap to the palm using the elbow." "Start the hand wash by rubbing hands palm to palm."

	“Rub the fingertips of right hand against the palm of the left hand in a rotational manner and vice versa.” “Rub palms with fingers interlaced.” “Rub the right palm over the left dorsum with the interlaced fingers and vice versa.” “Rotational rubbing of the fingers in the left hand starting from the thumb clasped in right palm and vice versa.” “Wash the back of the fingers to the opposing palms with the fingers interlocked.” “Wash the arms in a circular manner from the wrists downward till the elbow.” “Rinse the hands one at a time in an upright position while maintaining a safe distance away from the other hand. Make sure the water flows from the tip of the fingers to the elbow.” Repeat the hand washing procedure in the same manner. The second time wash the arms from the wrist halfway to the elbow. “Dry the hands from the fingertips, gently continue drying the arms downward to the elbow and dispose the towel.” “While drying the hands, avoid going back from dirty to clean area to avoid contamination”
	To start with the hand disinfection, apply 3-5 milliliters of disinfectant rub on the left palm using the right elbow. “Dip the fingertips into the disinfectant rub to decontaminate under the nails.” “Rub the palms against each other.” “Rub the right palm over the left dorsum with the interlaced fingers and vice versa.”

	"Rotational rubbing of the fingers in the left hand starting from the thumb clasped in right palm and vice versa." "Rub the arms in a circular manner from the wrists downward halfway to the elbow." Repeat the hand disinfecting procedure in the same manner. The second time disinfect the arms from the wrist halfway to the elbow. "After the surgical hand scrub, hands should be kept in an upright position as the scrub nurse proceed to the operating room."
Scene 5: Text	"While the scrub nurse is performing surgical hand scrub, the circulating nurse performs surgical site disinfection."
Scene 6: Narration, picture	"Surgical site disinfection supplies" "Surgical site disinfection is indicated to reduce the amount of pathogen and the risk of a patient developing a surgical site infection." 1. Disinfectant rub 2. Non-sterile gloves 3. ChloraPrep®
Scene 7: Narration Surgical site disinfection Supplies: Absorbent towels, non-sterile gloves and ChloraPrep® 10.5 ml liquid solution (Chlorhexidine solution 20mg/ml and Isopropyl alcohol solution 0.70ml/ml).	"Before performing skin disinfection, the patient should have been placed in the right surgical position (prone position)." "Blankets are placed over the patient to prevent heat loss while making sure the marked surgical incision site is exposed and lighted up." "Absorbent towels will be placed on the lateral sides of the patient to collect excess flowing solution." "Circulating nurse collects skin disinfection supplies: non-sterile examination gloves and ChloraPrep® 10.5 ml liquid solution (Chlorhexidine solution 20mg/ml and Isopropyl alcohol solution 0.70ml/ml)."
	"Circulating nurse disinfects hands before putting on non-sterile gloves and proceeds to disinfect patient's skin as follows."

	"Hold the applicator with sponge edge in a downward position while in the sealed pack." "Pinch the wing lever once to release the antiseptic solution. Applicator's sponge edge is kept in the downward position to allow the solution to steadily fill-up the sponge." "Begin disinfection from the marked incision site by applying the solution gently but firmly using repeated up-and-down and sideways strokes for about 30 seconds." "After 30 seconds, the disinfected area is expanded from the incision site to the periphery of the surgical field." "After disinfecting the periphery areas, the disinfected area is reduced inwards toward the incision site with each stroke." "The circulating nurse moves to the other side of the surgical table to continue skin disinfection." "The marked incision site should be disinfected 3 times." "Allow the skin to dry completely. The solution takes 3 minutes to dry up." Circulating nurse disposes the applicator and informs the scrub nurse to initiate patient draping.
Scene 8 Narration, picture, and text	"Donning surgical gown and sterile gloves using the open method" "Surgical gown and sterile gloves are indicated for performing all sterile and invasive procedure, and to reduce the risk of contamination and transmission of infection from patient to scrub staff, and vice versa." 1. Surgical gown 2. Sterile gloves
Scene 9: Opening and donning of surgical gown and gloves (Open method)	"The circulating nurse opens the gown carefully using the edges of the paper wrap." "Avoid reaching across the sterile field to the other edge, always go around the table or turn the table."

	“The scrub nurse picks the gown grasping at the single fold below the neck.” “Place the fingers of each hand under the side flaps of the arm holes.” “Open gown laterally.” “Allow the body of the gown to fall open. Extend arms into the sleeves.” “Have circulating nurse fasten inside rear waist ties and then fasten neck closure.”
	“Circulating nurse opens the appropriate sterile gloves by peeling the plastic glove packet and exposing the gloves in the right direction for the scrub nurse.” “Scrub nurse picks up the exposed inner glove (green color) by the folded cuff with her non-dominant hand.” “While holding the glove with the non-dominant hand, scrub nurse slips the dominant hand into the glove with the palm facing up and pull the glove onto the hand above the sleeve’s knitted cuff.” “Scrub nurse will pick up the left glove by tucking the gloved dominant hand in between the fold cuff and in a single movement, slip the second glove onto the ungloved hand while avoiding any contact of the gloved hand.” “After donning both gloves, scrub nurse will adjust the fingers to fit inside the gloves.” “Scrub nurse will unfold the cuff of the first glove donned on the dominant hand by gently slipping the fingers of the left hand inside the folded cuff, making sure to avoid contact with the part of the glove from which the glove was picked up.”
	“Once the first layer of sterile gloves is on the scrub nurse is ready to secure her gown with help from the circulating nurse.”

	"The scrub nurse will take hold of the belt tab which is securing the belt ties. Holding the tab marked with 'sterile', hand the tab marked 'non-sterile' to the circulating nurse standing behind." "The circulating nurse will take hold of the tab marked 'non-sterile' being careful not to touch the tie and will stay behind the scrub nurse. The scrub nurse will then turn around to retrieve the tie." "The circulating person would hold on tightly to the tab so that when the scrub nurse pulls on the tie the tab doesn't come with it and contaminate the scrub nurse." "The scrub nurse will secure the ties on the left side and proceed to wear the second gloves."
	"Scrub nurse picks up second glove (creamed-color) that has been exposed by the circulating nurse." "The same procedure is repeated with the second gloves. The scrub nurse makes sure the outer gloves are fitted well above the inner green gloves." At this stage, donning of gown and gloves is completed and the scrub nurse will maintain hands in a sterile manner to avoid contaminating the sterile gown and gloves.
Scene 10 Narration, picture, and text	Sterile draping set "Drapes are sterile barrier materials used for covering a patient and surrounding areas to create and maintain a sterile field during a surgical procedure." 1. Universal drape set 2. 3M Ioban antimicrobial incise drape
Scene 11: Close-up shots and narration Fitting sterile drapes on the patient Supplies:	"Scrub nurses proceed to drape the patient in the following order: 2x approach drape, lower extremity drape, split sheet, the anesthesia arch drape, and lastly the 3M Ioban antimicrobial incise drape." Approach drape

Mölnlycke Barrier Universal Set Standard and 3M Ioban antimicrobial incise drape. Already displayed on the sterile table and it comprises of the following sets: 947069: 2 x Adhesive OP-Towel 100x100cm, patched 967773: 1 x Adhesive OP-Sheet 240x150cm, patched (with a leg sign indicator) 967772: 1 x Adhesive OP-Sheet 175x175cm, patched (with a thoracic indicator meant for anesthesia arch) 60504: Split Sheet 200x260cm, patched 3M Ioban antimicrobial incise drape	"2x adhesive OP-towels are attached to both lateral sides of the patient by first removing the sticker paper attached to the drapes. Afterwards, cuff the hands with the drapes and proceed to apply the split as low as possible away from the disinfected area on the lateral side of the patient. Repeat this procedure on the opposite side of the patient." Lower extremity drape "Follow the picture direction of the drape then remove the middle sticker paper of the drape. Place hand inside the folding of the drape then position and place the drape right above the buttock of the patient making sure the upper side film is secured properly on the patient's skin and then hands are cuffed securely using the drape. Partly unfold the drape and remove the second and third sticker papers. Continue unfolding the drape, first towards scrub nurse and then away from the nurse. Lastly, unfold the drape towards the feet, making sure the entire legs are covered." Split sheet drape "Next, take the split sheet and place it on the patient's back, below the disinfected area. First the scrub nurses unfold the sides of the sheet towards themselves, then slightly above the lateral side removes the sticker paper." "First apply the split sheet drape inches above the lower extremity drape. Afterwards, continue applying the wing parts of the spilt sheet inches above the adhesive OP-towel area and along the outer disinfected area towards the upper side of the patient's body. Hands must be cuffed with the split sheet as the scrub nurses extends the split sheet along unsterile sheets used to cover the patient's upper body. This procedure is repeated on the other lateral side of the patient. Finally, the split sheet is spread towards the patient's legs." Anesthesia drape "Remove the middle sticker paper of the anesthesia drape. Place hand inside the folding of the drape and place it on the patient. Partly un-

	fold the drape and remove the second and third sticker papers. Continue unfolding the drape, first towards scrub nurse and then away from the scrub nurse. Cuff hands with the drape and unfold the drape entirely towards the head of the patient and have the anesthesia and circulating nurse attach the drape securely to the anesthesia arch." 3M Ioban Antimicrobial Incise Drape Two scrub nurses perform this task. "Remove 3M drape from peeled package followed by removing drape from paper overwrap while maintain integrity of the drape." "Hold the drape with the printing on the grip facing up and separate the printed grip from the white handle. With help from nurse two standing on the opposite side, nurse one (on the left side of the patient) holds the printed drape grip with the printed side up above the patient body, while nurse two reaches across the patient to separate the printed grip from the white border linear and pulls the white border linear evenly away from nurse one." "When unfolding the drape both nurses place hands on the outer corner at the borders as this will offer minor pressure on the drape and keep it crumple-free as possible." "Nurse two will stop unfolding the drape when the clear film appears on the white border. Position the drape over the intended incision site and stick it to the patient." "Smooth-out the drape first along the incision site with a sterile gloved hand by pressing down firmly on the film and working hands away from the incision line to achieve adhesion that is rumple-free." "Smooth-out the remainder of the drape laterally into place and away from the incision site." After the 3M Ioban incise drape is attached to the patient, draping is completed. At this stage, patient draping is completed.

Appendix 2: Feedback form

The thesis purpose is to produce an evidence-based educational video on aseptic practices in perioperative nursing. The thesis video aims to promote nursing students' competence in surgical hand preparation, donning of sterile gloves and gown, preparing patient's skin, and surgical draping of the patient for surgery.

This feedback will evaluate the educational video on aseptic practices in perioperative nursing. The video is directed to the nursing students.

Feedback response will be given voluntarily and anonymously. All the responses will be handled confidentially.

Your feedback counts!
Thank you very much for watching.

Questions	1. Strongly agree	2. Agree	3. Neutral	4. Disagree	5. Strongly disagree
I was satisfied with the length of the educational video.					
The content of the educational video is presented in a logical order.					
The narrator of the educational video spoke clearly.					
The educational video was easy to follow.					
The educational video is suitable for the intraoperative phase of the perioperative nursing course.					
The educational video gave me new information from the procedures demonstrated in each scene.					

Please provide any additional comments or suggestions on the aspect(s) of the educational video that needs to be improved.

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