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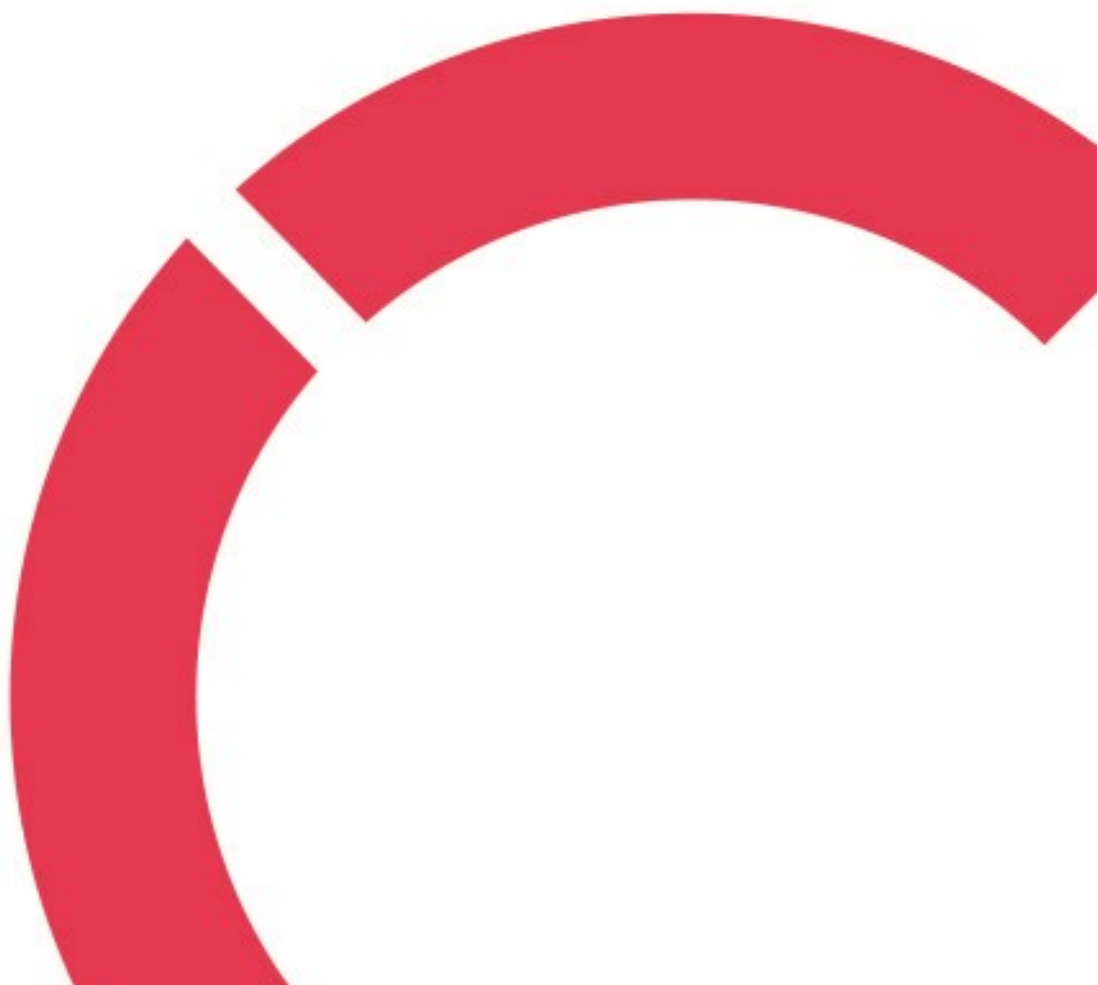
**SKIN PREPARATION AND DISINFECTION BEFORE INVASIVE
STERILE PROCEDURE**

Thesis

CENTRIA UNIVERSITY OF APPLIED SCIENCES

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ABSTRACT

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Name of thesis SKIN PREPARATION AND DISINFECTION BEFORE INVASIVE STERILE PROCEDURE. Educational video for nursing students of Centria University of Applied Sciences.		
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<p>The purpose of this thesis is to produce an educational video on skin preparation and disinfection before invasive sterile procedures for nursing students of Centria university of Applied Sciences. An educational video is an important teaching tool for students which is favourable for learning and making learning more accessible and enjoyable. The produced video's main goal is for educational purpose for Centria nursing students to improve their knowledge on aseptive techniques before invasive sterile procedures.</p> <p>This thesis explains and demonstrates how a proper skin preparation and disinfection must be done before an invasive sterile procedure for nursing students of Centria University of Applied Science. This video's is in English language, but the Finnish nursing student can also use it for studies. It is a vital topic for the student to at least know the basics of how to prepare and disinfect the skin before invasive sterile procedure and the possible complications of poor aseptic technique such as infection, surgical site infection, prolong hospital stay and extra cost to the patient before going for practice in the hospital in order to provide a safe care for the patients.</p> <p>The educational video was created in cooperation with the head of nursing department of Centria University of Applied Sciences with evidence-based materials from different sources such as books, articles, journals, and papers. At the beginning of the video's is listed the materials needed for the videos. The video's starts with preparation of the materials and skin for the surgical procedure and ends with removal of the bed shelters from the patient side utilizing the septic technique. The video's will be handed to the Faculty of Healthcare of Centria University of Applied Science for educational purpose.</p>		
Key words Invasive, Skin Disinfection, Skin Preparation, Sterile Procedure.		

ABSTRACT
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1 INTRODUCTION

Many of the known theses in skin preparation and skin disinfection focus on aseptic practices as a whole and learning more about skin preparation and disinfection before invasive sterile procedure. Skin disinfection competence is important for nursing students to paint the picture and indicate how big of a difference proper skin preparation and disinfection makes in any invasive sterile procedure. Aseptic techniques will help healthcare professionals safeguard patients from numerous infections cause by pathogens that are found on the skin surface. Aseptic technique refers to the various preventive methods of getting contaminated with pathogens with a main goal of removing pathogen completely from the skin with the used of antiseptic agent. (Avi 2018.).

The earlier students learn these methods of aseptic technique on skin disinfection before invasive sterile procedure the better it is for everyone included. Accurate use and information about skin preparation and disinfection before invasive sterile procedure are particularly important to prevent surgical site from pathogens during invasive sterile procedure there by decreasing patient morbidity and mortality rate, decreasing prolonged and costly hospitalization, and avoid patient discomfort. To add practicing good aseptic techniques helps to lower medical cost, medical examination, and the treatment cost as well.

With the number of increasing procedures, it is extremely easy to forget the basics procedures of skin preparation and disinfection and not properly disinfect the site before invasive sterile procedures leading to catastrophic infections or infection that could be avoided by proper skin preparation and disinfection.

More information and instructions on skin preparation and disinfection should be made available to look up for especially for moments when you need to remember aseptic techniques to be safer for everyone. This will help to remove microbes especially in any sterile invasive procedure or setting. Just in Finland, close to 100,000 healthcare related infections occur. These healthcare related infections refer to those infections acquired because of care from treatment or investigative procedures received by the patients in the hospital. These infections can occur in hospitals and long-term care facilities. The infections commonly found in hospitals were pneumonia, surgical site infections, urinary tract infections

and infections in blood. The infections commonly found in long-term facilities were respiratory tract infections, urinary tract infections, and skin infections. Hospital related infections were more severe than long-term facilities one. (Finnish Institute for health and wealth fare 2020.).

In this present century an educational video's has been seen as a very useful tool or learning material method. Just by watching an educational video's one is receiving information in both visual and auditory manner. Educational video's is seen as a traditional way to pass information in both auditory and visual form and it is seen that technology has proven to improve study and better understanding. (Brame & Perez 2016.).

This thesis consists of two parts that is a written portion and the educational video's about skin preparation and disinfection before invasive sterile procedure and how to properly take care of the surgical site to mitigate the risks of infections that occur because of improper skin preparation and disinfection. Knowing how to properly manage skin preparation and disinfections can have a huge effect on patient safety and not only patients but everyone including healthcare workers. This thesis is aims to promote Centria UAS nursing students' clinical competence on skin preparation and disinfection before invasive sterile procedure.

2 PROJECT PURPOSE AND OBJECTIVES

The purpose of this thesis is to develop an educational video's concerning skin preparation and disinfection before invasive sterile procedures. An educational video's is an important and descriptive diverse teaching method which is favourable for learning irrespective of time and place and how fast or slow the student can understand as it provides room for repetitions. The video can be played several times, and even paused thus making learning more accessible and enjoyable. The produced video's is made for educational purpose for nursing students of Centria University of Applied Sciences to improve their knowledge on aseptic technique before invasive sterile procedures. This will go a long way to grow their clinical skills and knowledge about skin preparation and disinfection before invasive sterile procedures.

The objective of this thesis is to provide information in an audiovisual form for nursing students of Centria University of Applied Sciences about skin preparation and disinfection which is one of the major ways to reduce or prevent surgical site infections. This topic is extremely important because skin preparation and disinfection is paramount in a healthcare setting especially about surgical site and proper skin preparation and disinfection can go a long way to prevent many surgical site infections and prevent unnecessary prolonged hospitalisation or coming back to the hospital because of wound infection. Surgical site infection is classified as local such as cellulitis, prolonged wound healing, abscess and systemic complication such as sepsis. The responsibility to stop the spread of infection starts with the students and then healthcare professionals and goes around to even patients to stop the spread of infections especially surgical site infections and to show ways on how infection control can be carried out. Together as a whole students, healthcare professionals and patients can reduce the number of infections in healthcare setting and make sure that patients and healthcare professionals go home safer.

The educational aspect of the video's provides excellent information and will be clear, and concise. This way we can provide important information in an audiovisual form to the nursing students while the video's remains visually eye catching and educative and will also serve as a self-studying material for the nursing students.

3 SKIN PREPARATION AND SKIN DISINFECTION

“Clean hands are safer hands”, this summary was done by WHO guidelines on hand hygiene in health care. Hundreds of millions of patients are affected by healthcare associated infections every year in the world. Infections lead to complications such as more serious illness which can also lead to some disabilities like amputation of the leg or hand because of severe chronic infection, staying for longer time in hospitals, bringing high expenses for the patient, relatives, and healthcare system. Also, infection can lead to unnecessary patient deaths. (World Health Organization 2005.).

Hand hygiene is seen as the basic method to minimise the rate of pathogenic spread from nurses to patient and vice versa and within healthcare workers. The procedure involves in hand hygiene include washing hand with soap under running water and the use of alcohol-based hand disinfectant with the concentration of 60-95% or hand-based rub. If hand is not physically broken then alcohol hand rub is advisable over water and soap in most clinical setting because it is more effective in killing pathogens than soap, it also takes a shorter time to apply, it is more easily accessible than hand washing sink, and is more comfortable on the skin than soap. (CDC 2016).

3.1 Skin and microbes on the skin surface

The skin is the biggest organ of the human body composed of water, fat, protein, and some minerals which is occupied by different types of microorganisms of which majority are not harmful and even have some benefit to the host. The skin is made up of three layers namely epidermis also known as the outer part, the dermis also known as the middle layer and the hypodermis also called the fatty layer. Firstly, the main function of the epidermis is protective barrier that protects the body from foreign bodies or toxic substances, make new skin every 30 days (the body shed about 40,000 skins on daily basis), the Langerhans cells of the epidermis determine the correct adaptive immune system and it also help to regulate the body temperature. In other word the skin is seen as a physical barrier. The skin harbours different types of microorganisms such as bacteria, fungi, viruses, and mites. The skin also protects the body from the invasion of more microorganism into the body. The skin form part

of the immune system, and lastly, it contains melanin which provide the skin it colour. The more melanin the skin has the darker the skin colour. The function of the dermis include hair growth, making oil from the oil gland which make the skin soft and shine, produces sweat, help to supply blood to the epidermis, contain collagen responsible for strong skin cells and elastin for skin flexibility. (Lin, Zhong & Santiago 2013.).

“Hospitals are intended to heal the sick, but they are also sources of infection. Ironically, advances in medicine are partly responsible for the fact that, today, hospital infections are a leading cause of death in some parts of the world.” (World Health Organization 2023.).

Infection acquired in the hospital are known as hospital associated infections or nosocomial infections and it is one of the biggest problems of public health in the developed countries and more in the developing countries. Nosocomial infection is referred to as any infection that was not initially present at the time of hospital admission of the client but occur because of the treatment procedure of the disease. It can occur in places like hospital, long term care facilities, ambulatory setting, diagnostic centres, and some can even occur after the patient has been discharge from the hospital or after visiting any healthcare facilities. For an infection to be called nosocomial infection it must occur 48 hours or more after admission. To add in case of operation it can be up to the period of 30 days if no implant was installed and up to year if there was any implant installation. Basically, depending on the source of microorganism, nosocomial infections occur because of endogenous or exogenous pathogens. An endogenous means that the pathogens are from the patient's own body normal flora while exogenous mean the pathogens comes from outside the patient body such as another person, animals, furniture's, and in other word the person environment which get to the body via a portal route of entry due to skin breakage such as surgeries, urinary cauterization, intravenous catheter, and even intramuscular injection. (Custovic, Smajlovic & Dzafic 2020.).

The main Pathogens responsible for these nosocomial infections can either be viruses, fungi, and bacteria. The most common type of pathogen been bacteria followed by fungi and then viruses. Basically, there are four main types of nosocomial infections namely central-line associated bloodstream infections (CLABSI), catheter associated urinary tract infection (CAUTI), surgical site infection (SSI), and ventilator associated pneumonia (VAP). Other types of nosocomial infection include non- ventilator associated hospital acquired pneumonia,

gastrointestinal infections, and other urinary tract infection, infection of the ear, eye, nose, and throat, infection of the lower respiratory tract, reproductive system infection. In European hospitals the occurrence of at least one nosocomial infection in healthcare setting where as followings, primary healthcare hospital 4.4%, tertiary healthcare 7.1%, intensive care unit 19.1%, and long-term care facilities 3.7%. It was noticed that in Europe approximately 8.9 million different types of nosocomial infection occur annually in long term care facility and acute care. (Sikora & Zahra 2023.).

Microbes are living organism which are too small to be seen with naked eyes and may be important to the body and this is known as normal flora or can cause harm to the body that is causing disease or may be neutral. These microbes live in water, air, soil, furniture and even human body and it harbour about a million of microbes. For infection to occur in the body there is always a portal of entry for the microbes, it enters the body mostly via the mucous membrane, or skin or medical procedure such as surgeries, catheterisation, and injections. To add the mouth also act as route of infection to the body such as contaminated teeth or other oral infection. Additional microbes enter the body via the following that is either by touch or droplet. Microbes are transmitted either directly or indirectly. Direct transmission refers to a process where a person suffering from infection spread it to other healthy person through direct contact with the person blood or any other contaminated body fluid. Mode of direct spreading of microbes including kissing, sexual intercourse, body fluid, oral secretion, lesions from the infected person body. In indirect contamination there is no physical contact with the infected person. The mode of spread is mostly when the infected person sneezes or cough there by spreading the infectious droplet in the air which can also directly land on a healthy person eyes, mouth or nose and thus spreading the infection to the person. Droplet can travel at a speed of 3 to 6 feet in the air and land on furniture's and doorbell and telephone or common areas. When a healthy person touches these contaminated objects and touches their eyes or nose or ears or mouth, they are at risk of becoming infected. Examples of diseases spread via contact transmission include Hepatitis A and B, chicken pox, herpes simplex, measles, influenza, common cold, conjunctivitis, adeno virus. (Delaware health and social services 2011.).

Normal flora are microorganisms namely bacteria, fungi, protozoa, and viruses that are usually present on the different site of the human skin. Normal flora is also referred to as resident flora. Normal flora is usually stable and always have a positive relationship between

the host and microbes. Normal flora usually occupies the space of potential pathogen that may cause infections. The development of normal flora starts from birth and continues as the person grows. There are four main functions of normal flora in the human body which are they colonised pathogenic bacteria, produced useful vitamins to the host cell, they activate the formation of antibodies and finally also help in the breakdown of food. Basically, there are specific site of the body where normal flora lives these include the oral cavity, the small intestine, the vagina, the nasopharynx, stomach, and the colon. The second type of microorganisms that lives on the skin is called the transient flora which is made up of both non-pathogenic and potential pathogenic microbes that invade different site of the body temporarily which can last for a few hours, days or ever weeks. Transient mostly lives on outermost part of the body like the hands. Transient flora on the hands mostly occurs because of poor hygienic surrounding and hospital environment which are mostly spread directly via contact or indirectly by touching contaminated objects. Even transient flora harbours on the body for only a short time is still a major concern as the inability to get rid of the transient flora can lead to spread of infection. Healthcare workers are at a higher risk of getting infected with transient flora because they work around infected patient. (Davis 2020.).

The resident flora usually coagulates negative staphylococci, micrococci and diphtheroid which multiply on the surface of the skin or pores. Also, there are microorganisms which cannot be washed or destroyed by disinfectant. Usually, they are situated below the skin and are caused by infection following implant surgery. On the skin also, can be deposited transients' organisms gotten from the environment or touching a contaminated surface. They easily can be removed from the surface of the skin by washing, touching or they will just die. Staphylococcus aureus, pseudomonas aeruginosa, salmonellae, gram-negative bacilli and other viruses are sources of transient flora in the hospital. (Hoffman, Ayliffe & Bradley 2004.).

One of the important factors to keep on mind when dealing with the possibilities of surgical site infection is based on the types of surgeries and site of operation. Surgical sites are further classified into four main categories namely clean, clean-contaminated, contaminated and dirty-infected. According to CADTH report of 2011, a clean wound refers to surgical wound where aseptic techniques was observed during the operation with no inflammation and with the exclusion of interference with the following sites urogenital, gastrointestinal and the pulmonary tract. The second type is clean contaminated that is procedures that involve or penetrate the urogenital, pulmonary and gastrointestinal tracts without any contamination.

The third type of classification is contaminated that is a procedure which involve acute inflamed site which is non purulent, traumatic wound that is more than 24 hours, procedure where aseptic techniques is not implemented to the fullest or when there is abundant discharge from the urogenital, pulmonary and gastrointestinal tract during procedure and lastly, dirty-infected wound is one that involve acute inflamed site which is purulent, or an operation on perforated hollow viscera and a traumatic wound which is necrotic or wound that is in contact with faecal matter. (Zabaglo & Harman 2023.).

It is well known that sterile gloves are the main barrier that prevent the transmission of infection from the surgeons and nurses to the surgical site. Research has proven that when these sterile gloves get perforated during operation it becomes a channel of infection to the surgical site. In other words, surgical gloves perforation means a breakage in the protective barrier between the surgeons and instrumental nurse hands and the surgical site and act as a route of infection from the patient to the medical personnels and vice versa. One of the biggest issues that occur during gloves breakage is that about 70% of gloves breakage is not recognised or noticed until the end of the procedure but this can be manage to a greater extend with the use of putting on two gloves. (Bekele, Makonnen & Tesfaye 2017.).

3.2 Skin disinfection process

Skin disinfection is the procedure of administering an antiseptic agent on the patient's skin which helps to minimize the number of pathogens on the skin surface thereby minimizing the risk of infection, reduces the chances of surgical site infections, as well as healthcare providers disinfecting their hands to avoid pathogenic transmission via contact with the patient. Skin disinfection is a vital component of providing patients with safe and effective care. One of the most essential elements of surgery is sanitizing the healthcare workers' hands and disinfecting the patient's operating site. Properties of good antiseptics agents are it should have a wide antimicrobial window, fast antibacterial action, continuous action on the skin, no allergies or irritations, and no sort of systemic penetration. (Judith, O'Donnell & Safdar 2015.).

According to the skin disinfection guideline (2015) the following factors must be put into consideration before using antiseptic on the patient skin. These include the operation site, patient sensitivity to the antiseptic, the state of the patient skin, compatibility of the antiseptic agent with the product use for the operative skin disinfectant, it should have a rapid onset of action, it should be non-toxic and non-allergic. The potency of antiseptic agent relies on the cleanliness of the skin. The most common examples of antiseptic agents used in skin disinfection, are chlorhexidine, and povidone-iodine. Others include chloroxylenol, isopropyl alcohol, hexachlorophene, benzalkonium chloride, and hydrogen peroxide. Characteristics of selecting an appropriate antiseptic agent include the patient health issue, the location of the surgical site, and the aftercare procedure. Some common examples of surgical site infections are staphylococcus aureus and enterococcus, group A streptococci, Escherichia coli and pseudomonas. The properties of chlorhexidine include rapid onset and continuous action on the skin, fast bactericidal action, wide bactericidal window, and little proof of allergy and irritation, and very little absorption into the circulatory system. Chlorhexidine provides 24 hours bactericidal action after applying on the skin for two minutes. It is good for long procedures. Chlorhexidine is contraindicated for skin area near the eyes and conchal bowl due to its adverse effect of irreversible keratitis middle ear ototoxicity. Another type is povidone-iodine which is made up of povidone, hydrogen iodide, and some element of iodine. Povidone has microbicidal property that acts on both gram negative and positive bacterial, fungi, viruses, protozoa, and also acts rapidly on the skin. Isopropyl alcohol is best effective against gram positive bacteria. Isopropyl alcohol is the antiseptic agent with the fastest onset of action. (Bednarek, Nassereddin & Ramsey 2023.).

The skin disinfection agent is applied on the skin using friction starting from the cleanest area that is the operative site to the dirtiest in a circulation manner or using the up and down manner. If there are two areas to be operated upon, the least contaminated area should be prepared first before the one which is dirtier in order to prevent carrying dirt from the dirtiest site to the clean site. To add, cleaning two surgical sites should never be done simultaneously as this increases the risk of dirt transmission, but one at a time and gloves must be changed in-between the two sites starting from the clean one to the dirt one. After the site has been thoroughly cleaned, it should never be dried off by using any drying material but allowed to dry naturally because by so doing the antiseptic agent will get enough time to kill the microbes on the skin and this also avoid the risk of fire in related to alcohol-based use antiseptics. It should never be dry up because research has proven that it lowers

the antimicrobial agent's effectiveness and increases the chances of decontamination. The disinfected area should be large enough to contain all the draping material that will be used to drape the operation site and should in case the surgeon needs to extend the operation site, create enough room for the surgeon to work, and to create drainage side, if necessary. (Carrol 2015.).

In low- and middle-income parts of the world, especially in Africa, it is mostly faced with surgical site infection which accords as a result of medical treatment while in Europe and America it is seen as top two reasons for nosocomial infection and reason for most hospital admission. Research has proven that the use of alcohol-based chlorhexidine isopropanol has reduced the number of surgical site infections, but it is contraindicated to neonates that is less than 28 days (about 4 weeks) of age, in eye surgery and in mucous membrane too. (WHO 2016.).

3.3 Skin preparation

Currently, thousands of people lose their lives daily because of nursing care-acquired infections. When offering care to a patient the hands are the main channel or portal of entry of microorganisms to the patient's body. The most effective method of minimizing or stopping microorganisms' transmission to patients and vice versa is through hand hygiene. According to WHO hand hygiene is defined as a broad term referring to any procedure of making the hand clean or free from microorganisms. One of the most important ways of preventing or controlling infection is by proper hand hygiene. Healthcare-associated infection is a major concern in the world today not just because of the associated mortality, mobility, and the expenses involved in treatment but as a result that most nosocomial infections are avoided especially via proper hand hygiene. It is truly clear today that hand hygiene reduces the number of infections and cross-transmission. In other words, clean hands are also referred to as safer treatment. (Mathur 2011.).

Also, bathing a day before the procedure or on the day of the procedure helps to remove dirt like soil, debris, and transient pathogens on the body prior to applying the antiseptic agent leading to a lower risk of the surgical wound becoming infected. It is advisable to bath with soap on the day of surgery or a day before if not contraindicated. Studies have proven that

shaving the surgical site a day before or on the day of surgery increases the risk of surgical site infection. If the surgical site must be shaved due to interference with the procedure it is done on the day of the surgery outside the operating room with a battery-operated clipper with a single patient use head or a clipper whose head can be changed and never should a razor be used due to high risk of abrasion and subsequently infection and additionally, only the hair at the surgical site should be removed. All jewellery should be removed. (Carrol 2015.).

According to WHO (2016) global guidelines for the prevention of infections at the surgical site recommendations recommend the use of alcohol base-antiseptic solutions which contain chlorhexidine gluconate to be used for surgical skin preparation in patients before any surgical procedure. Chlorhexidine gluconate has the following beneficial properties: it kills both gram negative and positive bacterial, fungi, viruses, and remains effective when in contact with organic matter. This preparation of the skin is done in the operating room and is considered a preoperative treatment of the skin. The skin is washed and cleaned around the incision site. (WHO 2016.).

The association of preoperative nurses recommend the wearing of headwear to cover the hair and ears in order to reduce and prevent contamination of the surgical site from hair falling off. (Bartek, Verdial & Patchen 2017.).

The disinfectant solution is applied on sterile gauze. The prepared gauze is applied on the surgical site using friction starting from the cleanest site to the dirtiest site in a concentric or up and down manner and throw it away when it reaches the peripheral or in other words starting from the center of the incision site and moving outside maintaining an aseptic technique. This procedure is repeated at least three times. In case there are two surgical sites to be operated upon, disinfection is started from the site which is less dirt or the cleaner site first and change gloves in-between and perform hand hygiene before going to the second site. Skin disinfections for two sites or more should never be done at once but one after another and proper hand hygiene should be practice in between and changing gloves as well. The disinfected site is allowed to dry off naturally because drying it with gauze reduces the efficacy of the antiseptic agent and higher chances of contamination. Additionally, the site is allowed to dry off because the antiseptic agent contains alcohol which is flammable and must be dried off to prevent fire break out and reactions with other

operative substances. The prepared area is large enough in case there is need for surgery extension, creating of drainage site, or making new incision. During skin preparation it is essential to note the recommended time that is needed for the antiseptic agent to dry up and note that area with hair may take a longer time to dry up. (Carroll 2015.).

In addition, WHO recommends all surgical site skin preparation that has been performed be recorded in surveillance forms and patient records, including the time, the products that were used. (WHO 2021.).

After disinfection of the surgical site by the circulatory nurse the instrumental nurse proceeds with sterile drapes to cover the patient skin and to prevent the surgical site from becoming contaminated there by producing a sterile field throughout the procedure. Additionally, the surgical team wear a surgical gown which helps to maintain the sterility of the surgical site and prevent the spread of microorganism from the surgical team and patient own skin to the surgical site there by reducing the risk of contamination and infection. The surgical drapes are either made up of plain or being impregnated with iodophor antimicrobial agent which is proven to have some microbial barrier preventing transmission of pathogens from the patient body to the operating site. The drapes are placed on the patient just before the start of the operation. Additionally, the drapes also help for mobilization of the limbs and other parts of the body, if need be, without contaminating the sterile site. (WHO 2018.).

3.4 The Competence of Nurses in Carrying out Skin Disinfection

Competence is a holistic word that defines the quality or the most appropriate manner in which a particular job is needed to be done in other to be up to standard or meet the necessary job description. Nursing competency is the ability of the nurse to show good knowledge, skills, values, and behaviours that define the responsibilities of their work. One of the most important aspects of nursing competence is technical skills which include good communication among the team, teamwork, coordination, a holistic approach to working, and efficiency resulting in safe preoperative, intraoperative, and postoperative care. Research states that knowledge acquired through training plays an important part in nurses' competency, but the experience gained in the operating room or working experience is more substantial than the one learned in school. Measuring the competencies of nurses lead to

improvement and better care and help nurses discover their strength, weakness, and need for further studies. (Ucak & Cebeci, 2021.).

Nurses play an important role in preventing the spread of infection by carrying out effective disinfection procedures on surfaces and skin. There are also some known common ways that nurses carry out disinfection and control microbes on the surface of the skin like proper hand hygiene and aseptic techniques. Here nurses frequently wash their hands using soap and water or use alcohol-based hand sanitizers to disinfect their hands before and after patient contact. This helps to reduce the number of microorganisms on their hands and prevent the spread of infection. (West 2021.).

Nurses also use personal protective equipment (PPE) like gloves, masks, surgical caps and gowns to prevent transmission of the microorganisms from nurse to patient or from patient to nurse. It is important in settings where patients are suspected to be infected with highly contagious pathogens. (Carrico, Hudson, Balcom & Burton 2018.).

Competence of the nurses is also shown in the use of disinfectants to clean surfaces and equipment's which were touched or used by patients and nurse. Common disinfectants used in healthcare settings include bleach, hydrogen peroxide, and quaternary ammonium compounds. Another competence of the nurses is seen in performing skin disinfectant before performing invasive sterile procedures. Skin can be cleaned by nurses with an antiseptic solution such as chlorhexidine and iodine to reduce the number of microorganisms on the surface of the skin. Nurses, in some cases, can implement isolation precautions to prevent the spread of infection from the patient with certain types of infections. Patient can be placed in a private room to limit contact with other patients or healthcare workers. (Garcia 2018.).

Overall, nurses play a vital role in the prevention of the spread of infection in the operation room by carrying out effective and strict disinfection procedures on the skin and surfaces. Nurses carry out a huge responsibility in ensuring strict aseptic and hygiene during and after the surgery to prevent surgical site infections. (Vogelsang, Swenne, Gustafsson & Brynhildsen, 2019.).

Also, a nurse`s competence requires continuous and systematic work intellectually and organisationally. Essential aspects like strict adherence to details, inspections, strict sterile competence, and vigilance prevent surgical sites infection. (Qvistgaard, Lovebo & Almerud 2019.).

4 PROJECT

The thesis is planned to be carried out at Centria University of Applied Sciences. Timo Kinnunen, the head of the Nursing Department supervises this thesis. Paracltter Ngatard and Tatiana Houtsonen are the project managers of the thesis. With this project, a video's will be made in Centria practical room for the nursing students of Centria University of Applied Sciences to help increase their knowledge of skin preparation and disinfection before invasive sterile procedures.

4.1 Project phases

According to Watt & Barron project phases also known as, project "life cycle", show the pathway a project goes through from the beginning till its end. These phases include the Initiation phase, planning, implementation and ending phase. Splitting the project in to phases is a paramount step towards achieving a successful project. (Watt, & Barron 2022.).

According to Malsam (2023) he defines a project as the collection of actions that must be performed within a certain time frame in order to achieve a particular set of goals or their aims. These duties are carried out by the project team members who organize and run the project together till the end. (Malsam 2023.).

Practice-based research is original research carried out in order to acquire new information, primarily through practice and the results of that practice. The new information acquired can be proven through creative products such as photographs, videos, music, designs, models, and digital media. (Candy 2006.).

In the initiation phase of this thesis project, the managers gathered their theoretical information about the project by collecting evidence-based information from previous works concerning it. The central point of the theoretical framework was mostly referenced from the World Health Organization (WHO).

The managers held a meeting together and planned to conclude the project by September 2023. The timetable for the project has been discussed between the project managers. The target group of the thesis is the nursing students of Centria University of Applied Sciences to guide them on proper skin preparation and disinfection before sterile invasive procedures.

4.2 Project organization

Project organization involves the team's involvement in a project (Career Guide 2023). In this thesis project, Paractter Ngatard and Tatiana Houtsonen are the managers who handle this project from beginning to the end. Timo Kinnunen, the head of the Nursing Department, is the Supervisor for the project and overlooks the progress made by the managers. Centria University of Applied Sciences is the working partner of the managers of the project. The produced video's will be given to Centria as part of their learning material.

5 ETHICAL CONSIDERATIONS

Following ethical guidelines in thesis work is extremely important as this will show how the thesis will be looked upon. A thesis that does not follow ethical guidelines will never be successful or accepted. Following the guidelines set forth by the university can prevent deceit in research and truly enhance the thesis itself. Having references that are scientific and peer-reviewed makes the trustworthiness of the thesis. (Finnish National Board on Research Integrity TENK 2023.).

As this thesis is not based on research on people or have private information of patients or persons connected to it, many ethical guidelines will not be followed for example ethical principles for research on people, and handling of personal data and data protection. (Finnish National Board on Research Integrity TENK 2023.).

Plagiarism meaning quoting someone else's work without authorization or not crediting them is a violation of the Copyright Act. Due to plagiarism control being the number one source of research fraud, every thesis will be run through a plagiarism checking system to identify instances where plagiarism might have appeared in. This allows the thesis to be original and with all works listed as references. Plagiarism control is paramount as this thesis will not steal anyone's work or research and all references will be fully credited. This thesis will be run through plagiarism checkers to make sure of its originality and that all previous works will be referred to. (Finnish National Board on Research Integrity TENK 2023.).

Responsibilities of students in a thesis are removing possible conflicts of interest, being knowledgeable about the topic they are writing about, knowing the guidelines of research ethics, consulting with their supervisor whether a research permit is needed based on the topic and content of the thesis, and having signed agreements with all parties involved in creating a thesis. (Finnish National Board on Research Integrity TENK, 2023.).

Having research and science be an open source helps promote knowledge and increases the availability of research on a given topic. This will have a great impact on the world around us and to have information close to us. A thesis drafted at a university of applied sciences is a public document. (Finnish National Board on Research Integrity TENK 2023.).

6 DISCUSSIONS

During our studying we realised that one of the reasons for hospitalization especially in Europe is because of surgical site infection which can be prevented by proper skin preparation and disinfection. Improper skin preparation and disinfection was one of the leading causes of surgical site infection and because of this we were interested in carrying out research about skin preparation and disinfection before invasive sterile procedure in an aseptic manner. There are four subtopics under this discussion of which we are going to elaborate more on. These subtopics include methodological consideration and limitation, the significant of this thesis for nursing education, discussion and lastly reflection on the project.

6.1 Methodological consideration and limitation

We decided to choose a functional thesis as the method of carrying out this thesis because the authors wanted to produce an educational video for the nursing student of Centria University of Applied Sciences which could also be used for teaching. The authors also wanted to expand their knowledge and practical skills on this field because they are interested in this part. The authors of this thesis research for up-to-date information which are scientific based on skin preparation and disinfection before invasive sterile procedures from many different sources online. The researched information added our knowledge on this topic and especially the consequences of poor skin preparation and disinfection for example surgical site infection, patient prolong stay in the hospital, poor wound healing, extra cost to the patients.

The educational video was filmed at the practical room of Centria University of Applied sciences in Kokkola campus. Shooting the video was a bit challenging for us because we were unable in get the school camera and had to use our phone for filming the video. Building and editing the video was another challenge for us, but at the same time, we acquired new learning process and experience.

The manuscript for educational video on skin preparation and disinfection was outline from the up-to-date evidence-based information gotten during the research process. An educational video was the outcome or product of the research materials gather from several scientific sources. This thesis was a successful one which met all it goals set by the authors.

Carrying out this thesis was not as easy as we thought. At one point we got of data from scientific sources, and we seek help from some of our teachers and make used of the school library. It was also very challenging especially with the video filming because we had ongoing work practice and some lectures on campus. Also, the authors live in different cities and planning an appointment was not easy too. Luckily for us, our supervisor was flexible and helpful, which made it easier to plan the meetings and organize our video project at Centria University.

6.2 Significance of the thesis to nursing education

The significance of this thesis for nursing education is to outline the proper aseptic technique and the correct method of carrying out skin preparation and disinfection before invasive sterile procedures. This thesis is very significant to the nursing education because surgical site infection is one of the reasons for hospitalization in Europe and can be prevented by proper skin preparation and disinfection. Skin disinfection competence is paramount for nursing students to paint the picture and indicate how big of a difference proper skin preparation and disinfection makes it in any invasive sterile procedure. Another significance of this thesis to the nursing education is that it helps students to familiarise themselves with the basic of skin preparation and disinfection before invasive sterile procedure before going for practice during their studies.

6.3 Discussion

The goal of this thesis is to produce an up-to-date educational video on skin preparation and disinfection before invasive sterile procedures mainly for nursing students of Centria University of Applied Sciences. An educational video is a more engaging tool for learning than text pages.

Based on theoretical framework, asepsis technique is the corner stone in preventing surgical sites infection and infection in general during invasive sterile procedures. With strong theoretical knowledge on skin preparation and disinfection the patients and nurses will go home safer and reduce the numbers of infection and nosocomial infections.

The authors are pleased with the outcome of the video's which was produced from scientific sources and follow the right step by step procedures. Many scientific sources from books and online was consulted to ensure reliability of the data sources.

6.4 Reflection of the project

Writing a practice-based thesis is a long process which requires time, effort, willingness and research from several up-to-date scientific sources from different researchers works on same topic. Skin preparation and disinfection before invasive sterile procedure is one of the corner stone of quality or safer care for the patients. It is said that clean hands mean safe care. This project was not as easy as we thought but carrying out this research has impacted and upgraded our knowledge and skill on skin preparation and disinfection before invasive sterile procedure. At one point we ran out of material, and it was also very difficult to be doing practice, writing thesis and having lectures at the same time frame. Our supervisor was readily available to direct us whenever we needed help. To crown it all the authors, feel that this project was a challenging one due to the challenges they went through but on the other hand it was a huge success as we got the opportunity to implement the theoretical knowledge gained during our studies process into an educational video which will also serves as a study material for the upcoming nursing student.

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APPENDIX 1

Manuscript for the video

Educational video on skin preparation and disinfection before invasive sterile procedure.

Scene 1

The circulatory nurse assembles all the material needed for skin disinfection namely disinfectant solution, sterile swabs or gauze, a kidney dish, forceps and a pair of clean gloves and an electric shaving machine if hair is needed to be removed from the site, a bold marker, cotton wool pulp and chronicles to collect extra fluid from the gauze swab.

Scene 2

Putting the patient in the right position. The patient is always placed in the right position after the anesthesia has been given. The patient is covered with warm blankets in order to keep the patient warm throughout the procedure and prevent hypothermia. Another device used for keeping the patient warm during operation is the forced air device. The surgical site is well exposed with enough lighting and marked with a bold marker.

Scene 3

The circulatory nurse proceeds by disinfecting the hands and opens the sterile kidney dish, opens the sterile kidney dish, place the gauzes or cleaning swabs or sponge into the kidney dish using aseptic techniques or open the readily made dish with sterile gauze and pour in the disinfectant solution until the gauzes are saturated. Disinfect the hands again and put on a pair of sterile gloves. The disinfection process starts from the marked site or incision site by applying the gauze in a gentle but firm manner either up and down or in a concentric manner and the process is repeated at least three times. When using the up and down method the disinfected area is constantly reduced inward to the incision site. The disinfected site is allowed to dry up naturally, trash taken away and the instrumental nurse proceeds with draping.