



A Practical e-Learning Guide to the Intraoperative Nursing Care of the Obese, Adult Patient

Marjut Mustonen and Michaela Schiltz

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Laurea University of Applied Sciences

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Marjut Mustonen & Michaela Schiltz
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Intraoperative nursing care of the adult, obese patient is an under-represented topic, simple to neglect as the prevalence of obesity normalizes in patient populations. However, adult patients with obesity are a unique patient group requiring special considerations in the operating room, for whom increased nursing knowledge on the subject can improve standards of patient safety and efficiency.

The purpose of this functional thesis is to produce comprehensive, high-quality learning material in the form of a practical e-learning guide, addressing the special considerations involved in the intraoperative nursing care of obese, adult patients. In collaboration with Laurea UAS, a co-design approach has been applied in order to establish the production and pedagogic qualities of the e-learning guide, while working cooperatively with Laurea representatives. Through a systematic process of teamwork, communication and evaluation, the e-learning guide has been created as a learning tool with the flexibility to apply as a teacher-led or self-guided study for nursing students and nurses interested in furthering their knowledge of intraoperative nursing care. Inspired by the combined 20 years of international, intraoperative work experiences of the authors, the subject has been substantiated in both the thesis report and the e-learning guide by compiling current information from ethically valid, evidence-based resources. The e-learning guide has been developed using PowerPoint as a familiar, user-friendly platform. Finally, an assignment has been designed alongside the e-learning guide as a way to assess critical understanding of the subject, encouraging the full use of visuals, links, videos and information provided in the e-learning guide, and evoking solution-based problem solving within the context of a common, intraoperative nursing circumstance. While theoretical findings acquired throughout this thesis process emphatically elucidate the need for functional e-learning material on the subject of nursing knowledge of patients with obesity, limitations with time and resources have created space for development. Therefore, this functional thesis also highlights the need for further educational material addressing considerations of the obese patient group, encouraging nursing knowledge as a tool for improving patient care.

Keywords: Obese patient, intraoperative nursing care, patient safety, e-learning material

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1 Introduction

The issue of obesity has grown globally to pandemic proportions in the last couple of decades. According to the World Health Organization (WHO), in 2016 the number of obese adults (Body Mass Index [BMI] >30) worldwide was over 650 million compared to around 200 million in 1995 (WHO 2017, 2020). Obesity affects all ages and socioeconomic groups, in both developed and developing countries, and carries major risk factors for several chronic diseases, including cardiovascular diseases, diabetes, musculoskeletal disorders and some cancers (WHO 2017). In Finland, obesity trend is on the rise as well; of adults over 30 years 38% of women and 26% of men are obese (Terveyden ja hyvinvoinnin laitos [THL] 2020).

Consequently, obesity is having a significant effect on the healthcare system as well, including the perioperative services. It is now recognized that the number of obese patients is growing in all surgical disciplines and due to their condition, they pose a different set of challenges, requiring specific considerations in their perioperative care compared to non-obese patients (Nightingale et al.2015).

The core idea for this thesis topic originated from the authors' experiences as perioperative practitioners working in the operating room (OR) in the UK and US for several years. There, an observation was made that the issues with obesity were having a growing impact on the subsequent perioperative practices; for instance, lack of appropriate communication, preparation, skills and knowledge by the perioperative staff resulted in patient safety issues and delays in the operating lists. Hence, it was through personal experiences working in the OR where the authors initially identified the need for perioperative nurses to be aware of the extra considerations and challenges involved in the intraoperative care of obese, adult patients, and to have the relevant competencies in order to provide safer and more efficient care for this particular patient group. As obesity is rapidly increasing in Finland, similar, universal issues regarding intraoperative patient care of obese, adult patients are applicable here, as well.

The identified knowledge gap will be addressed in this functional thesis by theoretical reporting and by creating a tool, in a format of an e-learning guide, in collaboration with Laurea University of Applied Sciences, for increasing relevant knowledge and skills of future perioperative nurses in the intraoperative care of obese, adult patients. According to the research conducted by the authors, this type of educational/e-learning material concerning the topic does not yet exist in Finnish or international literature.

2 Purpose and Aims

The main purpose of this functional study is to produce a comprehensive and high-quality e-learning material addressing the special considerations involved in the intraoperative nursing care of an obese adult patient. The study is conducted as a co-design project with Laurea University of Applied Sciences (UAS) with the aim of the e-learning material to be used as additional educational material in (complementary) advanced perioperative studies at Laurea UAS. As this material will be made available through Theseus and as the study has been conducted in English, it will also be accessible and beneficial, to any nursing students or (perioperative) nurses nationally or internationally.

The study material is implemented as e-learning material in the form of a concise but comprehensive practical e-learning guide (utilizing PowerPoint as a platform). Its main aim is to support and enhance theoretical education in the advanced perioperative nursing studies at Laurea UAS, and to facilitate and improve the knowledge and skills of any nursing students and nurses with an interest in learning about the unique risks, challenges and considerations involved in the intraoperative nursing care of obese adult patients, in order to provide safer and more efficient care.

The subsequent aim of the e-learning guide and the associated learning comprehension assignment is to provide critical understanding and apply solution-based problem solving to address the special considerations involved in the intraoperative care of this particular patient group.

In addition to the product, the e-learning guide, a thesis report including theoretical background material on the most common challenges and considerations involved in the intraoperative nursing care of obese, adult patients, and a discussion on the thesis process, are provided.

3 Theoretical Background

3.1 Intraoperative Nursing Care of the Obese, Adult Patient

For the intraoperative care of an obese, adult patient to be safe and efficient, the perioperative team needs to be aware of the most central features of their practice as well as

the rationale for the practice. This practical e-learning guide and the accompanying thesis report will provide this rationale and aid the work of future perioperative nurses when caring for this specific patient group. It is the intraoperative nursing care of the obese, adult patient that is forming the theoretical framework of this thesis. This theoretical framework was chosen to serve the primary objective of the functional thesis; the development of effective learning material in the form of an e-learning guide. The key concepts to be defined within this framework were selected to be obese patient, intraoperative nursing care, patient safety and e-learning material. Additionally, a theoretical knowledge basis of the most relevant, special considerations involved in the intraoperative nursing care of obese, adult patients will be described and discussed.

3.1.1 Obese Patient

Obesity is the combined physical and physiological effect of “an increased intake of energy-dense foods that are high in fats and sugars” also associated with “an increase in physical inactivity” (WHO 2020), enhancing the risk of multiple, often coexisting noncommunicable, chronic diseases. The World Health Organization, WHO (2020), categorically recognizes obesity as the consequence of a form of malnutrition, resulting in an increased body mass index, (BMI), of 30 or greater. Käypähoito (2020) further distinguishes obesity into two more classifications; a BMI of >35 being severe obesity, and a BMI of >40 being morbid obesity, while Leonard, Davies, & Waibel (2015) classify BMI >60 as super obesity. For the purpose of this functional study, obesity most often refers to an adult who meets the BMI criteria for severe, morbid, and super classifications of obesity. Patient, in this context, is in reference to adult, male and female, non-specific surgical candidates, over the age of 19 (WHO 2020), excluding adolescents and children.

3.1.2 Intraoperative Nursing Care

Intraoperative nursing care carries implications of its meaning within the term itself. Intra - meaning within, and operative - referring to surgery Association of periOperative Registered Nurses [AORN] 2015. The nursing care provided within the operating room is intentionally specific, excluding any patient care occurring prior to surgery (preoperatively); likewise, following surgery (postoperatively). This intraoperative designation uniquely refers to all nursing care activities performed within the operating room, including all tasks related to

preparing equipment, instrumentation and medication for the surgery, patient care - ensuring dignity and safety during surgery, and maintaining sterility and documentation throughout surgery (AORN 2015). Uncommon amongst hospital wide nursing care, it is important to note that intraoperative nursing care is, according to the AORN Standards of Perioperative Nursing (2015), an act of facilitating surgical procedures by advocating for the patient from the perspectives of various, specialized nursing roles.

For the purpose of keeping the scale of the thesis within its given limitations, a decision was made by the authors to narrow the topic to include only intraoperative nursing care of the obese, adult patient.

3.1.3 Patient Safety

Patient safety is at the core of health care, defined by the World Health Organization as “the absence of preventable harm” and “reduction of risk of unnecessary harm to a patient during the process of health care” (2020). Patient safety risks are multifaceted and range from medication errors, nosocomial infections, and fall hazards, to surgical complications and misdiagnoses (WHO Europe 2020). These are managed through a systematic process of risk assessment and reporting, where improvements are made through funding, technology, education, adequate staffing, public engagement and patient participation (WHO Europe 2020). While national and hospital-wide patient safety policies also apply to the intraoperative patient care environment, the operating room takes unique measures in order to prevent harm to the patient. Within the operating room, a systematic approach to patient safety has been adopted, including a series of universal surgical checklists and emergency preparedness protocols, developed as a way to reduce common and preventable patient safety issues related to human error, while also addressing the nature of unpredictability of the intraoperative environment. The universal checklist was developed by WAPS (World Alliance for Patient Safety) as part of the WHO patient safety division in 2009 and began randomized implementation in Finland that same year. Since then, the Finnish Ministry of Social Affairs and Health has required the nationwide use of universal checklists and any subsequent amendments (Pauniahio & Ikonen 2010).

3.1.4 E-learning Material

By definition, e-learning (“e” standing for electronic) material means any digital content used as teaching or learning material, including online courses and simulations, educational games, videos, e-books and e-guides. Terms such as online learning material or digital learning material are also widely used. E-learning material should always aim to be pedagogically high standard; it should be naturally suitable for teaching and learning purposes, supporting the learner’s thinking and functioning, and have added pedagogic values like, new means for using and developing knowledge and skills. Effective e-learning material should not include complex or demanding technical setups but should be applicable and adaptable to normal teaching or learning situations, including self-study. It should be based on a high-standard, up-to-date, evidence-based knowledge, and form a visually pleasing and well implemented, technically sound entity. (Ilomäki 2012.) According to the quality criteria for e-learning materials set by Opetushallitus (2006), high quality, effective e-learning material should be usable, accessible and have high pedagogic, as well as production qualities, where the target audience should be known and established, the content well defined, and the producers of the material should have expert knowledge of the subject matter.

3.2 Special Considerations in the Nursing Care of the Obese, Adult Patient

3.2.1 Anesthetic Considerations

Obese patients are associated with a 30% increased emergence of difficult or failed intubation with indicators like, larger neck circumference (>60cm) or presence of obstructive sleep apnea [OSA] (Nightingale et al. 2015; Lang, Parekh, Tsui & Maze 2017). Therefore, the anesthetic nurse should use careful and effective planning and preparation prior to administering anesthesia. As recommended by Nightingale et al. (2015) and Fencl, Walsh & Vocke (2015), ASA’s Difficult Airway Algorithm (see Appendix 1), or equivalent, should be familiar to and followed by the whole anesthetic team, and difficult airway equipment or emergency airway cart should be made available and easily accessible. This should also include video laryngoscope, emergency cricothyroidotomy/tracheotomy kit and a fiberoptic scope. According to Carron, Safaee Fakhr, Leppariello & Foletto (2020), it would even be advisable to use video laryngoscope as a first-choice method for intubation for the obese patient group, as according to a current meta-analysis (combined from 13 RTCs) the choice of laryngoscope influences the success rate of tracheal intubation. Compared with a traditional Macintosh laryngoscope, video laryngoscopes significantly increase success rates, reduce intubation time and improve glottic visualization. According to Nightingale et al. (2015), even

though, when possible, regional anesthesia should be the preferred choice of anesthesia for obese patients, due to a higher occurrence of failure with regional techniques, a plan should always be in place for airway management as well. With regional anesthesia, the anesthetic nurse should ensure that, for instance, extra-long spinal or epidural needles, as well as an ultrasound machine are available.

Obesity is also considered to be an independent predictor of difficult bag-mask ventilation (Lang et al. 2017; Nightingale et al. 2015; Leonard, Davies & Waibel 2015). Therefore, the anesthetic nurse should be competent with bag-mask ventilation before attempting to ventilate patients with obesity. According to Nightingale et al. (2015), it is advisable that the bearded patients should shave or clip their beard before bag-mask ventilation.

Additionally, according to Lang et al. (2017), venous access is often more challenging with obese patients and hence intravenous line insertion can pose difficulties. The anesthetic nurse should be fully competent with venous cannulation, and in case major difficulties arise, the anesthetist should take over. Here, the use of a near-infrared vein viewer or ultrasound can be beneficial (SWAPNet 2017).

The recommended default position during the induction of anesthesia is the ramped, head-up position (with use of towels or a wedge), or a 20°-45° reverse Trendelenburg position. The ramped, head-up position is widely considered to improve the laryngoscopic view, oxygenation and ventilation, as well as prevent rapid desaturation and gastric reflux and aspiration with obese patients. The functional residual capacity (FRC) is often reduced in patients with obesity, in which prolonged periods of apnea are not well tolerated, causing desaturation to occur more rapidly. (Fencl et al. 2015; Nightingale et al. 2015; Leonard et al. 2015.) In order to augment the FRC and extend the safe apnea period, preoxygenation with obese patients, is vital. This can be achieved with, for instance, 10l/min nasal prong oxygen supplementation or pressure support ventilation with fitted mask to provide CPAP (SWAPNet 2017). Here, the anesthetic nurse should ensure that the appropriate ramping materials and preoxygenation equipment are available and that they are competent to assist the anesthetist in the correct positioning of the patient.

According to Nightingale et al. (2015), the airway management technique of choice for obese patients undergoing general anesthesia (GA) should be tracheal intubation with controlled ventilation. Supraglottic airway devices should only be used with carefully selected obese patients undergoing procedures with short duration and with the possibility to maintain the head-up position throughout.

The anaesthetization of the obese patient is recommended to occur in the OR, on the operating table, instead of in a separate anesthetic room to avoid risks associated with transporting or moving the anaesthetized patient, to minimize the occurrence of arterial

desaturation or accidental awareness during general anesthesia (due to the disconnection of the breathing system during transfer) and to aid patient involvement and collaboration in the positioning (Nightingale et al. 2015). The anesthetic nurse, as well as the entire perioperative team, should be prepared for this in advance, ensuring the OR environment is kept calm and quiet during the induction of anesthesia and that all the necessary anesthetic equipment is made available in the OR.

Other specific patient monitoring or otherwise needed equipment that should be made available by the anesthetic/perioperative nurse are, for instance, large blood pressure (BP) cuffs, arm boards, large tourniquets, nerve stimulator and a raised step for the anesthetist (Carron et al.2020; Leonard et al. 2015; SOBA 2020). The BP cuffs should be long enough to cover at least 75%, and wide enough to cover at least 40% of the arm circumference. Due to larger extremities with obese patients, it is also acceptable to place BP cuffs on wrists or ankles, if necessary. For super obese patients, with BMI >60, invasive arterial or pulmonary catheter may be required. (Leonard et al.2015.)

It has been demonstrated that due to decreased mobility, increased pressure on the venous system and increased venous stasis, obesity in itself is a risk factor for perioperative venous thromboembolism (VTE) or deep vein thrombosis (DVT). Hence, apart from those undergoing minor surgery, all obese patients should receive VTE prophylaxis, which includes perioperatively administered anticoagulant chemoprophylaxis and sequential compression devices. (Lang et al.2017; Nightingale et al.2015; Leonard et al.2015.) The perioperative nurses need to ensure the required chemoprophylactic medication is available, adequately sized compression devices are correctly applied onto the patient, and the equipment is appropriately turned on and functioning.

From the nursing perspective, management during anesthesia of the obese patient also includes preventing the decline in body temperature by utilizing, for example, active forced-air warming and heated intravenous fluids. If a neuromuscular blockade is used, a peripheral nerve stimulator should be used to monitor neuromuscular function. According to Lang et al. (2015), lung recruitment maneuvers combined with PEEP (positive end-expiratory pressure) should be used during the maintenance of anesthesia as a way to improve oxygenation and compliance of ventilations. Fluid management can be challenging with obese patients due to the difference in body fluid compartments compared with non-obese patients; however, in normal circumstances, approximately 4-5 l of crystalloids per 2-hour operation, with urine output of 1ml/kg/h, should be adequate. (Leonard et al.2015.)

It has been demonstrated that the emergence of anesthesia with obese patients can involve a high incidence of problems. Hence, a plan for extubation needs to be in place, in accordance with, for instance, the Difficult Airway Society (DAS) Extubation Guideline (2011). A nerve

stimulator should be used to guide the reversal of neuromuscular blockade, motor capacity should be restored before waking the patient, the return of airway reflexes with good tidal volume breathing should be present, and the patient should be awake and sitting before extubation. With patients who have OSA, a nasopharyngeal airway insertion before waking, can assist with partial airway obstruction. (Carron et al.2020; Nightingale et al.2015.) Thus, the anesthetic nurse should be familiar with the DAS Extubation Guideline, or equivalent, and have all the necessary adjuncts available for extubation.

3.2.2 Surgical Considerations

Intraoperative patient advocacy requires a few key nursing roles, often demarcated between anesthetic and surgical teams. The surgical team is further split into two defined surgical nursing roles, the circulating nurse and the instrument nurse (also referred to as the scrub nurse). As a general rule, the circulating nurse functions outside of the sterile field, and the scrub nurse functions within the sterile field. Although these are distinctly different roles, there may be an expectation of interchangeability depending on the culture of the hospital. It is crucial during the treatment of an obese patient to understand, assess and prepare for risks from all perspectives. This will help to facilitate teamwork, anticipating the needs of the entire team in the event that any element of the surgery takes an unpredictable turn.

The surgical nurses functioning within these roles have similar, basic responsibilities for every surgery; however, these are exceptionally important to consider in the treatment of obese patients as obesity becomes more prevalent in the general adult population throughout Finland. While the operating room may already be supplied with some patient safety equipment, it is important to consider that these may not be designed to meet the specific needs of the obese patient. Thus, the key to successfully navigating patient safety in both circulating and scrub nursing roles are anticipation and preparedness.

During the surgical treatment of obese patients, there are a few essential risks to be aware of. Due to increased body mass and the higher potential for underlying comorbidities, obese patients are more prone to poor surgical outcomes compared with non-obese patients (Stephen, Bermanno, Bruce & Kirkpatrick 2014). These risks can be reduced with improved staff communication and increased nursing knowledge of patient positioning, surgical site prep, available equipment and instrumentation intended for bariatric use.

Obese patients are at higher risk, compared with non-obese patients, of positioning related injuries. These include pressure injuries, nerve injuries, circulation risks and skeletal muscular

pain. Van Wicklin (2018) cites that excessive weight contributes to both poor skin condition and the increased risk of damaged skeletal muscle due to traumatic compression of the muscle tissue. Increased body mass is associated with extra skin folds which are both hypo-perfused and trap moisture, creating ideal spaces for bacteria and yeast to flourish, consequently breaking down the skin. These areas may put off a foul odor or appear irritated and compromised. Combined with poor skin condition, surgical related immobility and simple weight of the patient, these areas are susceptible to pressure injury and pressure necrosis of the skin and underlying tissue (Hughes 2020). For these reasons, it is the responsibility of the circulating nurse to make a full body assessment of the condition of the skin prior to surgery and immediately following the surgery, taking note of skin intactness around the surgical site, and more broadly. It is also crucial to ensure that IV tubing, catheters, cords, or other medical equipment are not resting under the patient or within any crevices, in order to prevent skin ulceration (Van Wicklin 2018). Likewise, scrubbed nursing staff should ensure that sterile instrumentation and equipment, such as the sterile back table and mayo stand are not resting on the patient during surgery. Taking care that instrumentation, such as table-fixed surgical retractors, do not pinch or press into the patient, and that other members of the sterile surgical team are not leaning into the patient.

While body mass and skin integrity of the obese patient creates an increased risk for pressure injuries, the improper use of patient positioning devices can also compromise skin integrity and cause other serious positioning injuries, such as nerve injury and compromised circulation. Normal anatomical landmarks may be more challenging to locate on obese patients; it is nevertheless, important to ensure that straps and safety belts are wide enough and long enough, so they do not press skin folds down onto the body or seed into crevices, and that they adhere to the same guidelines for safe positioning as with non-obese patients (Hughes 2020). Ensuring enough space between the patient and strap while avoiding joints and anatomically bony areas is crucial. Van Wicklin (2018) also elucidates the special condition of the OR tables, as they are a relatively hard surface compared with recommended hospital beds. With this in mind, it is important to ensure the pads of the OR table are intended to withstand use by obese patients and that pressure points are protected with the compressed measurement of 2.5cm of padding. In the effort to avoid creating unintended pressure points as the result of using padding, Hughes (2020) recommends using smarter padding material rather than more padding material, specifically highlighting the preferred use of gel pads over foam padding.

In preparation for patient positioning, anticipation is indispensable to both patient safety and the safety of the surgical staff. Consider the weight and size distribution of the patient, best position for surgical site access, alterations that accommodate more successful anesthesia, and the likelihood of using imaging during the procedure (Hammond 2013). Once the patient is induced, the ability to safely move the patient is jeopardized for both the patient and

staff. Therefore, if x-ray is required at the beginning of the surgery, consider placing film plates prior to positioning the patient, as well as preparing anesthesia positioning devices prior to induction. Once the patient is transferred to the OR table, place a wedge or roll under the patient's right flank relieving pressure from the vena cava while in the supine position (Fencl et al. 2021,122). Advance preparation of patient positioning allows for the seamless transition from hospital bed to OR table, either by the use of transfer devices and extra staff, or by having the patient move themselves, thus taking part in their own positioning prior to induction (Dunn 2005). Regardless of how the patient moves onto the OR table, it is during this time that anticipating patient moving and handling beyond the operating room should be arranged. Soft, lateral transfer devices, such as air assisted transfer devices or mechanical lift sheets and slider sheets can be placed directly on the OR table, as well as ensuring availability of an extra-wide hospital bed following the surgery (Hammond 2013).

Across all surgical specialties, obesity is viewed as an independent predictor of surgical site infection (SSI's), and wound complications (Lang et al. 2017,145). According to Lang et al. (2017, 145) this can be attributed to a heightened inflammatory response caused by obesity and common comorbidities associated with obesity (such as hypertension and diabetes), "increased tension on the wound edges" and ischemia of the surgical site due the hypo-vascular nature of fatty tissue. Skin integrity and increased microbial growth, as discussed earlier, also increase the risk of surgical site infection. These are all considered patient factors (Gupta, Schweitzer, Steele, Lidor & Lyn-Sue 2008). Operative factors, as noted by Gupta et al. (2008) "include surgical scrub duration, skin antiseptic, preoperative shaving, skin prep, duration of the operation, antimicrobial prophylaxis, foreign material, drains, and surgical technique." The solution to decreasing surgical site infection in the obese patient requires multidisciplinary action of the entire perioperative team; however, OR nurses are specifically responsible for decreasing nosocomial infection, by rigorously following scrub guidelines and hand hygiene recommendations, performing appropriate surgical prep, decreasing foot traffic within the operating room and maintaining sterility. The size of the patient and skin integrity is of particular importance when considering skin prep solutions. Taking into account manufacturer instructions for surface coverage may require anticipating more prep solution or applicators in order to satisfy adequate prepping standards for surgical antiseptic (Fencl et al. 2015). Depending on the initial cleanliness of the patient, washing immediately prior to administering a surgical prep may also be anticipated.

Although having easy access to required equipment, instrumentation, and testing supplies can reduce the duration of the operation, thus addressing a risk factor for surgical site infection, considering the size of the patient can also influence exactly what is needed for the operation. This impacts everything from ensuring the OR table can accommodate the patient based on weight limitations, to choosing extra-large positioning devices and table extenders,

and considering extra-long surgical instrumentation and imaging equipment intended for use on obese patients. It is also possible that familiar drapes intended for specific surgeries may not provide adequate exposure to the surgical site, requiring innovation and communication between surgical team members. Finally, depending on the size of the patient and type of surgery, having extra staff members on hand during patient positioning and transfer, as well as scrubbed in to assist with retracting during surgery, is fundamental to staff and patient safety.

Obesity is an increasingly normal phenomenon within the perioperative patient population and requires a deeper understanding of how to assess for risk, what unique attributes to pay attention to, and how to anticipate the unexpected. In handling and moving an obese patient, patient and staff safety are closely entwined. Likewise, the same precautions that are taken with non-obese patients are often the same as with obese patients, however, the consequences are all the more critical when left neglected. Advocating for the surgical patient is at the heart of decision-making in surgical nursing, where practical knowledge and critical thinking, anticipation and preparedness all aid in the successful, long-term treatment of the obese patient.

3.2.3 Special Circumstances

The special considerations involved in the intraoperative care of obese, adult patients that have been discussed here have consisted of factors that generally apply to the care of obese patients in most surgical disciplines. However, there are a few special circumstances that require particular attention in the intraoperative context with obese patients, these include obstetrics and cardiopulmonary resuscitation.

According to CMACE/RCOG Guideline (2018), maternal obesity is associated with several risk factors that need to be considered peri- and intraoperatively when caesarean section or other obstetric interventions requiring perioperative care is in question. These include pre-eclampsia, post-partum hemorrhage, gestational diabetes, anesthetic complications, prolonged operative times, venous thromboembolism, aortocaval compression and wound infections. Reportedly, epidural cannulation failure rates can be as high as 42%, a risk of reflux and aspiration as well as difficult endotracheal intubation increased, and vascular access considered significantly more challenging.

Due to these factors, it is vital that the perioperative nurses are prepared for possible obstetric complications. For instance, vascular access should be established as early as

possible, ultrasound machine should be made available for central neuraxial blockade, difficult airway equipment should be on standby, prophylactic antibiotics and antacids should be given, positioning should be established in consideration of aortocaval compression (left tilt on the operating table), and blood transfusion products should be planned, requested and made available with immediate access (Denison, Aedla, Keag, Hor, Reynolds, Milne & Diamond 2018; Nightingale et al. 2015).

Cardiopulmonary resuscitation (CPR) is an acute emergency situation that does occur relatively often in the intraoperative context and hence perioperative staff need to be competent and prepared to perform CPR at all times. Especially with morbidly obese and super obese patients, extra challenges may be involved in the CPR procedure. According to Nightingale et al. (2015), additional difficulties include delays caused by problems in defibrillator pad placement, insufficient quality of chest compressions due to physical and biological factors, difficulties in the establishing vascular access, securing an effective airway, and inefficacy of defibrillation shocks applied.

Hence, perioperative nurses should be prepared to optimize their position during CPR, for example, by utilizing a step or platform, or applying chest compressions from the patient's head end. Defibrillation should be started at the default setting, however, if they remain unsuccessful, pad placement should be altered, and shock energy levels increased. In case the vascular access is absent or difficult, intra-osseous (IO) route is recommended (preferably to the upper humerus) and hence the perioperative nurse should ensure IO equipment is readily available. (Nightingale et al 2015.)

3.2.4 Ethical Considerations and Patient Communication

Anticipating a surgical procedure is a vulnerable experience for all surgical patients, causing a range of feelings from nervousness and embarrassment to severe anxiety and fear. As the patient is not often an active participant in their surgical experience, it is necessary to create an environment of support and trust, not only by using supportive language, but by creating a physical environment that elicits confidence in the entire process. In alignment with patient and staff safety guidelines, and ethical treatment of patients, creating this environment specifically for patients with obesity means being prepared with equipment and supplies intended for use by a person with obesity. In essence, fostering an environment that creates a sense of action around preserving patient dignity cultivates a level of trust in the medical treatment provided.

Acknowledging obesity bias in the medical field requires an understanding of what it is, where it stems from, what its impacts are, and how to address it. Obesity bias is an overarching term indicating social stigmatization against people with obesity. This can knowingly or unknowingly translate into discrimination in the medical field, causing “exclusion and marginalization,” thus, negatively impacting the level of healthcare obese patients receive (WHO Europe 2017). From the intraoperative perspective, a dichotomy exists between providing unbiased care while advocating for the special needs of each individual patient, and suffering the consequences of being understaffed, underfunded, and lacking appropriate equipment and nursing education. These barriers to patient care have an impact on staff and patient safety, requiring extra time and planning to surpass (Lee & Calamaro 2012). By increasing awareness of available equipment and supplies intended to accommodate, transfer and safely position obese patients, as well as implementing the use of obesity packs and safety guidelines, the strain of meeting these special considerations becomes more streamlined and easier to accomplish (Thomas & Lee-Fong 2011). As obesity continues to rise in the general population, rather than placing blame on the patient, advocating for change on both hospital-wide and individual scales will help to extinguish obesity bias.

Although addressing tangible barriers to obesity bias can elicit a positive shift in the care of obese patients, obesity bias can be alleviated by an awareness of social stigma as well. The social stigma of obesity is as prevalent among medical professionals as with the general public (Lee & Calamaro 2012; Thomas & Lee-Fong 2011). Not surprisingly, obesity biases such as laziness and lack of self-control can be manifested within the patient as well (Thomas & Lee-Fong 2011; WHO Europe 2017). Putting a stop to the perpetuation of obesity bias can easily begin with the individual healthcare professional using tools to develop compassionate communication skills and educating themselves around understanding obesity as a disease process. Obesity should neither go ignored by medical staff in the effort to accommodate sensitivity, nor should it become the topic of shame. Treatment of the obese patient can be elevated by using memory tools, such as R.E.S.P.E.C.T, a model for the sensitive treatment of obese patients, and encouraging “supportive language”, focusing on reframing accusatory and judgmental phrases into supportive phrases when addressing obesity (Bejciy-Spring 2008; Thomas & Lee-Fong 2011). Trust and respect between nurse and patient can also be achieved by breaking down the veil of ambiguity, involving patients in their own care plan, for example, explicitly discussing with patients the transfer techniques and positioning aids used during intraoperative care, and thus eliminating the us vs. them mentality (Thomas & Lee-Fong 2011).

3.2.5 Intraoperative Teamwork and Communication

Ultimately, it is the perioperative teamwork that is the driving force behind successful, safe and effective care of a surgical patient. This team involves everyone in the OR, including the anesthetist(s), surgeons, perioperative nurses, porters or anyone else involved in the perioperative care of the patient. With obese, adult patients, special considerations are also involved when perioperative teamwork is concerned.

Nightingale et al. (2015) suggest that in general, all surgical patients should have their BMI recorded in the operating lists in order to inform the whole perioperative team if additional time, equipment and preparation may be required. They also propose that some variation on an obesity pack could be useful, including, for instance, the SOBA single-sheet guideline, some smaller items (e.g. large BP cuff, long spinal and epidural needles) and a checklist list of appropriate equipment with their locations (see Appendix 2). A safety briefing, including a WHO surgical safety checklist, should always be performed, and here for instance, any specific requirements for equipment or positioning, additional staffing (for example moving and handling), the anesthetic approach, the specific surgical procedure and the plan for post-operative care could be identified or communicated within the team. With obese patients, extra time should be allocated for the anesthetic preparations and positioning. (Carron et al. 2020.) By referring to a recent study. Carron et al. (2020) point out that factors like inexperienced staff, poor communication, inadequate teamwork and task fixation are indeed the main causes for major airway management complications with obese patients. They also add that appropriate management strategies and guidelines, in case of difficulties, should be in place and followed as needed.

4 Thesis Process

4.1 Functional Thesis as a Co-design Project

In principle, a thesis can be either theoretical or functional. The main purpose of a functional study is to develop a product that can be, for instance, a guideline, manual, portfolio or an event, and the method of the implementation can be, for instance, a guidebook, web page, brochure or an exhibition or other type of an affair (Vilkka & Airaksinen 2003, 9). However, in a functional thesis it is pivotal that the practical implementation is combined with a thesis

report that is produced by utilizing a research-based framework or theoretical knowledge basis, and describes the overall thesis process, including the planning, implementation and evaluation stages. In a functional study, theoretical knowledge and critical thinking are applied to the professional practice in order to promote development in that particular professional field. (Vilkkä & Airaksinen 2003.) According to Vilkkä and Airaksinen (2003, 56-57), it is not necessary to use empirical research methods in a functional thesis, however, their utilization can be included as well.

Hence, in order to fulfil the above criteria, this functional study was implemented as learning material in the form of a practical e-learning guide, accompanied by a thesis report. The professional development target was to provide high quality educational material for nursing students and nurses with a special interest in perioperative nursing, in order to enhance the evidence-based practice and safe intraoperative care of an increasingly growing patient group; the obese, adult patient. The accompanying thesis report includes the required theoretical framework and knowledge basis on the subject matter, as well as the description of the product development and evaluation processes. The practical e-learning guide is largely based on the theoretical knowledge of the thesis report, and for its content it is a synthesized version of the information presented in this theoretical knowledge basis. A qualitative approach was utilized with the collection of the feedback data for the e-learning guide.

As this functional study was conducted as a collaborative project with Laurea UAS, the methods of co-design were utilized. The product, the practical e-learning guide, was developed in partnership with two perioperative nursing studies teachers at Laurea UAS acting as co-designers or co-creators throughout the process.

By definition, co-design can be considered a “collective creativity as it is applied across the whole span of a design process” and the concept of co-creation as “any act of collective creativity, i.e. creativity that is shared by two or more people” (Sanders & Stappers 2008, 6). Hence, co-design and co-creation are considered to be heavily interlinked concepts. In principle, co-design is based on collaboration and can be utilized to create, redevelop and evaluate a product, service or system. In the co-design process as a whole, there are no checklists or other step-by-step procedures involved, and the applicable principles of co-design include inclusiveness, respectfulness, being participative, iterative and outcome focused. (NCOSS 2017.) In co-designing, the parties engaged with the process are either directly or indirectly benefiting from or impacted by the process or the outcome, and there can be several people, or “experts”, involved, including the designers/developers, researchers, clients and customers (Steen, Manschot & De Koning 2011; NCOSS 2017). According to Sanders and Stappers (2008, 12-14) the researcher and designer can also be the same person, and it is the researcher who adopts the role of a “facilitator” who may then

lead and guide as well as encourage creativity in the rest of the team. This scenario was indeed the case in this co-creation project; the authors were acting simultaneously as the researchers and designers, acting as leading “facilitators”, and the client was Laurea UAS, represented by the two perioperative nursing studies teachers involved.

Utilizing the co-design approach in this project was considered potentially beneficial, as according to Sanders and Stappers (2008), the assets of co-design, especially when practiced from the early stages of the creation process onwards, can have positive and long-range consequences and a significant effect on how we design, who designs and what is designed. According to a study conducted by Trischler, Pervan & Kelly (2017), for instance, user benefit and novelty of the outcome can increase significantly when co-design approach is applied.

4.2 Planning

As mentioned previously, the initial idea for the thesis topic originated from the authors’ personal work experiences in the UK and US, where they recognized the need for perioperative nurses to be aware of the extra considerations and challenges involved in the intraoperative care of obese, adult patients, requiring relevant knowledge and skills in order to provide safer and more efficient care for this particular patient group. It was also identified that as obesity is a rapidly increasing issue in Finland as well, similar, universal issues regarding the intraoperative patient care of obese, adult patients would also be applicable here.

At the topic analysis stage, the initial thesis tutor involved with the authors found the topic interesting and relevant in relation to the perioperative nursing care studies and suggested the topic could be implemented as a functional thesis by creating some teaching/learning material for the complementary, advanced perioperative nursing studies at Laurea UAS. Initially, the plan was to implement the learning material in the form of an online course; however, due to issues with time and resources, it was later decided that creating learning material in the form of a practical e-learning guide, would be more pertinent. As defined by Iilomäki (2012, 8), the function of a guide is to direct the user to implement or perform a concrete action and may also include an illustration or demonstration of an action or information in a form of, for example, text, images, sound or animation. Hence, the e-guide format was considered appropriate for the purpose of the product, by the authors. After having the topic analysis accepted, a change in thesis tutors took place, and the subsequent thesis tutor then suggested the collaboration with Laurea UAS could utilize aspects of co-design.

The co-design process was started by approaching a few teachers involved in perioperative studies at Laurea UAS-Tikkurila campus, via e-mail, in order to enquire about their willingness to be involved as co-designers or co-partners for the project. According to Sanders and Stappers (2008), co-design is meant to include collective creativity which is applied across the whole span of the creation process; hence, the participation of the teachers was to include consultation and provision of their ideas and input according to their needs for the product from the early stages of the planning and throughout the process. In the end, two teachers volunteered to participate as collaborators in this project.

Initially, according to the processes implied in the co-design method, a planning/ideation meeting was suggested by the authors, however, due to limited resources, it was not feasible to arrange this ideation meeting, or any consecutive meetings. Hence, the needs and ideas for the content of the practical e-guide were gathered via email, where one of the participating teachers gave the authors proposals such as including external links to the guide as well as creating an additional learning comprehension assignment to supplement the material presented in the e-learning guide and evaluate the learning of the users (the nursing students). Otherwise, full creative freedom with the design and content was given to the authors in the planning and implementation stages of the project.

At the planning stage, a preliminary investigation of the suitable research material to be utilized for the theoretical knowledge basis was also conducted, and consequently, for the content of the practical e-learning guide itself. The investigation was focused on universal concepts of intraoperative nursing care of the adult, obese patient, as well as on the materials regarding, for instance, co-design, e-learning material, functional thesis and research ethics.

This stage also included planning the content for the thesis report which was primarily conducted with thesis tutors, by receiving their feedback and guidance, and presenting ideas for the content and structure at thesis seminars. Eventually, the thesis plan formulation was completed, and the plan was accepted by the thesis tutors. At this point, a required research permit for evaluation purposes was applied for and granted by Laurea UAS (see Appendix 3).

4.3 Implementation

As far as the information retrieval for this thesis was concerned, a fundamental research collection and a theoretical analysis of relevant, scientific, and evidence-based material was undertaken in order to substantiate specified topics outlining the thesis report and the

corresponding e-learning guide. Research collection was obtained through an analysis of current materials found through respectable resources, made available online and at the 3AMK libraries. As an outcome of the literature analysis, a substantial amount of current material with a high degree of reliability and validity, such as literary reviews, expert opinion papers, standards for clinical care, discussion papers, as well as, guidelines and subject related books, were retrieved.

After the information retrieval, the implementation process started by writing most of the sections for the thesis report. Here, the emphasis was mainly on the theoretical framework and knowledge basis, as these would form the foundation for the content presented in the e-learning guide. The above-mentioned literary sources were effectively utilized for the content of the theoretical framework and knowledge basis, as well as for the introduction, thesis process discussion and ethical considerations in the thesis report.

With the actual product of the thesis, the e-learning guide, the implementation started after the required theoretical knowledge basis had been established in the thesis report. According to Opetushallitus [OPH] (2006), and Ilomäki (2012), the authors' objective was to develop the e-learning guide to be naturally suitable for teaching and learning purposes; to support the learner's thinking and functioning; to be usable, accessible and to have high pedagogic and production qualities, where the target audience was to be known and established. At the implementation and evaluation stages of the e-learning guide, the authors decided to primarily follow the quality criteria for e-learning materials set by OPH (2006).

The decision to use PowerPoint (PP) program as a platform for the e-learning guide was made to improve the accessibility and usability of the guide. As PP is a widely used program in the UAS studies, nursing students, as well as teachers, are familiar with the program and the format, and, as also stated by Ilomäki (2012), utilizing PP as the platform enabled the e-learning guide to avoid including complex or demanding technical setups, but instead to be usable, applicable and adaptable to normal learning or teaching situations, including teacher-led and self-guided study.

Visually, the authors aimed to use pictures and other images to make the product more appealing and interesting, as well as more structured and consistent. Appropriate images were searched and retrieved in connection with the content of the guide and the associated learning comprehension assignment. The visual appearance of the e-guide was aimed to be expedient and to support the learner's perception, where certain information or actions were emphasized and either connected or separated by visual imagery (OPH 2006). Per OPH (2006) criteria, an attempt was made to keep the structure, style, colors, fonts and different added functions clear, unified and consistent. Text was made logical and understandable by avoiding the use of difficult terminology or abbreviations, and by checking the text for spelling and

grammatical errors. The theoretical knowledge basis presented within the thesis report was extensively used for the content of the e-learning guide. Furthermore, external links as additional learning materials (such as algorithms, guidelines and videos) were searched, retrieved and included in order to bring added pedagogic value to the content. Adding links were also suggested by one of the co-designers, and therefore, important to take into consideration during implementation. The links chosen were aimed to be current and functioning.

However, as far as the criteria for accessibility and usability of the e-learning guide was concerned, some compromises were made at the implementation stage. For instance, as stated in the quality criteria by OPH (2006), different factors like learning difficulties, limited language skills and visual or hearing impairments, do create additional requirements for the usability and accessibility. It can be noted that this e-learning guide is not equipped for the consideration of these types of factors due to, for instance, barriers with time and resources, and the limitations of technical abilities of the authors to implement functions that would enable accessibility and usability for audiences with more restricted abilities.

According to the quality criteria established by OPH (2006), the target audience for the product was appropriately defined and presented both in the thesis report and the e-learning guide as nursing students or nurses interested in the perioperative nursing care, who already possess some previous perioperative nursing care knowledge. Additionally, as this e-learning guide is intended to be used as educational material within the advanced perioperative care curriculum, at Laurea UAS, some requirement of previous perioperative care core knowledge was appropriate to be established. The pedagogic quality criteria for effective e-learning material, as presented by OPH (2006), was followed in the content of the e-learning guide by stating the learning objectives and the presence of the associated learning comprehension assignment; by establishing the potential utilization possibilities, for example self-study, classroom teaching, and by defining the target audience and their required fundamental knowledge basis.

As per the proposal presented at the planning stage by one of the participating Laurea teachers as co-designer, a learning comprehension assignment was also included in the e-learning guide. According to OPH (2006), e-learning material should support production of personal knowledge and creativity, and hence, the assignment(s) should offer a possibility for different solutions and open-minded ways to combine and utilize knowledge. Furthermore, according to OPH (2006), the assignment should also take into consideration and enable the application of the previous knowledge the learner possesses, as well as to encourage the learner to adapt the learning into real-life problems and situations. Hence, the authors decided to create a patient case scenario with open, multiple-solution answers, which would

require creativity, critical thinking, problem-solving skills and efficient utilization of the provided knowledge.

In addition to the co-designers (the participating teachers), during thesis seminars the thesis tutors also provided regular feedback, making suggestions and providing guidance concerning the thesis report structure and content throughout the implementation stage, and on one occasion, regarding the e-learning guide itself. Pertaining to the e-learning guide, their proposals included adding more pictures and to unify the citing style. Their proposals were taken into consideration and were implemented accordingly by the authors.

For evaluation purposes, a feedback questionnaire (see Appendix 4), accompanied by an appropriate cover letter (see Appendix 5), were also designed and produced by the authors. The feedback questionnaire was executed using the GoogleForms application, and the questions were formulated according to the different aspects necessary for an effective evaluation of the product, including evaluation of the content, visuals, links, assignment and usefulness for the purpose.

4.4 Evaluation

The evaluation process of the implementation (the e-learning guide), started by arranging a suitable time with the two participating teachers. This was accomplished by sending an inquiry via email, and as they agreed with the proposed time frame, a link to the feedback questionnaire accompanied by the cover letter, were sent to both teachers, separately. The authors estimated that providing a maximum of five working days for responding to the feedback questionnaire would be sufficient. The responses were received from both of the respondents within three working days.

In this thesis, a qualitative approach to data collection was implemented, as feedback questionnaires including open-ended questions, were used (Vilkka & Airaksinen 2003). The questions within the feedback questionnaire were formulated in a manner that all the information required for the evaluation covered different aspects of the e-learning guide. These aspects included questions regarding the relevance and comprehensiveness of the content and the use of terminology, the visuality and visual appeal, the external links, the associated learning comprehension assignment, and whether the product was fit for the purpose (see Appendix 4). The authors considered the questions to be concrete, unequivocally and accurately presented, with response options that were clear and unambiguous.

As Vilkka and Airaksinen (2003, 64) state, it is not an essential requirement to analyze the evaluation materials or feedback that have been collected by utilizing qualitative research methods, but these can be considered as source materials instead, such as with consultations. Here, the results have been treated as source materials, like consultations, and they have been examined in relation to earlier research and professional discussion by following the quality criteria for e-learning materials by Opetushallitus (2006). As only two respondents were involved, the authors decided to present the questionnaire responses in the following table of results:

QUESTIONNAIRE RESULTS BASED ON RESPONDENT FEEDBACK	
CONTENT	<ul style="list-style-type: none"> • One respondent requested the term "bariatric surgery" be explicitly defined. • Both respondents agreed that the content was clear and understandable. • Both respondents agreed that the title of the guide was descriptive of the content within • Both respondents agreed the amount of information provided regarding the topic, was sufficient.
VISUALS & VISUAL APPEAL	<ul style="list-style-type: none"> • One respondent used the free text answer option to express that some of the slides were slightly "packed," containing too many elements or shapes. • One respondent recommended more visual imagery/ pictures. • One respondent noted that the text in one of the slides was too small. • Both respondents agreed that the visual appearance was generally clear and appealing.
LINKS	<ul style="list-style-type: none"> • One respondent noted that one link did not open. • Both respondents agreed there were a sufficient amount of relevant external links.
ASSIGNMENT	<ul style="list-style-type: none"> • Both respondents agreed that the associated learning comprehension assignment was clear, relevant and effective.
OVERALL FIT FOR PURPOSE	<ul style="list-style-type: none"> • One respondent said that the e-guide was very well designed and enjoyable to read. • One respondent stated that the e-guide could be utilized as an educational resource within the study units • Both respondents concluded that the e-guide would be beneficial for the target audience (nursing students and nurses interested in perioperative nursing care).

Table 1. Questionnaire results based on respondent feedback (Mustonen & Schiltz 2021).

As both the respondents evaluated the content of the e-guide to be clear, easily understandable and sufficient, the authors were able to conclude that the information provided in the e-learning guide was relevant, well selected and presented, and that the theoretical framework and evidence-based knowledge basis presented in the thesis report was effectively utilized for the content. Furthermore, as per the quality criteria by OPH (2006), and based on the feedback, the text was conclusively clear, logical and understandable. However, as one remark was made to define the term “bariatric surgery,” this was accordingly acknowledged and amended in the e-learning guide by defining the difference between “bariatric surgery” and “surgical patient with obesity.”

As far as the visual appearance of the e-guide was concerned, the respondents regarded the visual appearance generally clear and appealing. However, as per the feedback, more images were added, the text size of the identified slide was enlarged, and the shapes and elements in specific slides were reduced. The authors acknowledged that these proposals by the respondents were important to consider for the visual development and improvement of the e-learning guide. After the development proposals were implemented, the authors were able to conclude that the overall visual appearance of the e-guide was clear and appealing, well designed and enjoyable to read, and that the following quality criteria for the visual aspect of e-learning materials presented by OPH (2006) was adequately achieved: the incorporated images succeeded in making the e-guide more visually appealing, interesting and structured, and the visual appearance resulted in being sufficiently expedient, supporting the learner’s perception. Furthermore, as per the responses and the implemented amendments, the authors were able to establish that the style, structure, colors, fonts and functions could be considered consistent and clear.

Both respondents considered the external links relevant to the topic and sufficient in quantity. This was accounted as rather significant information by the authors, as one of the co-designers had proposed the use of links in the e-guide during the planning stage. However, it was noted by one of the respondents that one link did not open, prompting the authors to check and test all links prior to final submission. According to OPH (2006), ensuring the functionality of the links does improve the usability of the guide.

As the learning comprehension assignment was another proposal made by one of the co-designers at the planning stage of the thesis process, the feedback concerning the assignment was again considered rather significant by the authors. Hence, as both of the respondents evaluated the learning comprehension assignment as clear, relevant and effective, the authors were confident to conclude the assignment was well accomplished and fit for the purpose. The authors implemented the learning comprehension assignment as a patient case scenario, adhering to the quality criteria for e-materials presented by OPH (2006), where the assignment offered a possibility for different solutions and open-minded ways to combine and

utilize knowledge, encouraging the learner to adapt their learning into real-life, authentic problems and situations.

According to the responses from both participants, the e-learning guide can be determined fit for the purpose and beneficial for the established target audience (nursing students and nurses interested in perioperative nursing care). Significantly, one of the respondents stated that as the e-learning guide was well constructed, it had the full potential for being utilized as an educational resource in the study units at Laurea UAS. As one of the main objectives of this e-learning guide as a co-design project with Laurea UAS, was to support and enhance the theoretical education in the advanced perioperative nursing studies at Laurea UAS, the authors were able to establish that the pedagogic and production standards of the e-learning guide can indeed be considered high, and hence the e-guide would be suitable to be utilized as educational material within the study units, including the advanced perioperative nursing care studies at Laurea UAS.

As far as the co-design aspect is concerned in the different stages of this e-learning guide, the authors considered utilizing some of the methods of co-design approach as relatively beneficial for the project. Since both the authors and the participating teachers as co-designers possess relevant expert knowledge of the topic, and since all parties involved are either directly or indirectly benefiting by the process, the involvement of both parties in the development and evaluation processes of the e-learning guide can be regarded as beneficial to the outcome. Additionally, the authors do recognize that the user benefit and the novelty of the outcome can potentially increase with the involvement of a co-design approach (Trischler et al. 2017).

5 Discussions

5.1 Discussion and Recommendations

The purpose of this functional thesis was to produce comprehensive and high-quality learning material in the form of a practical e-learning guide, addressing the special considerations involved in the intraoperative nursing care of obese, adult patients. Applying a researched co-design approach in collaboration with teachers from Laurea UAS, the aim of the e-learning guide and associated learning comprehension assignment was to provide critical understanding of the subject, encouraging solution-based problem solving supported by evidential practice and scientific research. The e-learning guide was substantiated by a thesis

report including theoretical research compiling current information from ethically valid, evidence-based and scientific resources and statistics databases. This functional thesis and associated e-learning guide acknowledged the lack of learning material on the subject of intraoperative nursing care of the obese, adult patient; as per the authors' research, comparable material does not yet exist in Finnish national or international literature. Objectives were met for creating effective e-learning material in collaboration with Laurea UAS, allowing for versatility of use suitable for both teaching and learning, as well as in the context of both teacher-led and self-guided study. Likewise, implementing the e-learning guide in the form of a PowerPoint addressed convenience and usability, broadening the possibility for use by an intended audience of nursing students and nurses interested in furthering their knowledge of intraoperative nursing care.

While theoretical findings acquired throughout this thesis process emphatically elucidated the need for functional e-learning material on the subject of nursing knowledge of patients with obesity, limitations with content, time and resources have been taken into consideration throughout this thesis process. In order to avoid creating sweeping statements on the patient specific topic of pharmacology and to limit the scope of this thesis, the decision was made to disengage from detailed information or language surrounding medications within anesthetic considerations. This also allows for an audience with only core knowledge of intraoperative care to benefit from the e-learning experience. For the same reasons, in depth information regarding comorbidities associated with obesity were intentionally avoided. Due to limited resources, involvement of the co-designers representing Laurea UAS was limited to product recommendations during the planning stage, and initial evaluation of the e-learning guide. Ideal implementation of co-design approach would have benefited from multiple stages of collaboration throughout the planning and implementation process, as well as from a post discussion or re-evaluation following the first draft and evaluation of the e-learning guide. Likewise, feedback on the e-learning guide was limited to only two respondents. Given more time, including end-user feedback from nursing students would have again, enhanced the effectiveness of the co-design approach. Finally, although PowerPoint has universal benefits, the e-learning platform was limited to the technical expertise of the authors, dismissing the ability to create an interactive online course in place of an e-learning guide. Likewise, accessibility and usability for audiences with more restricted abilities, such as learning difficulties, limited language skills and visual or hearing impairments, have not been enabled in this e-learning guide.

Acknowledging these limitations while validating the decisions made throughout this thesis process, in turn provides opportunities for future development which can be expanded upon in further educational material. Given the limited resources available for implementation of the complete co-design methodology, focusing on increasing feedback for re-development to include end-user feedback from the nursing students could create a more well-rounded

evaluation and implementation process. Likewise, increased knowledge pertaining to online course development could enhance user experience and engagement by including, for instance, interactive features.

5.2 Ethics

Any type of research that is considered well conducted complies with a good, ethical scientific practice, or *research integrity* (Varantola, Launis, Helin, Spoof & Jäppinen /TENK 2012, 29). This includes, for instance, that the research objectives, information retrieval and handling, presentation of the results and the retention of the research materials do not harm the individuals, or the audience involved, and that they follow the responsible conduct of research. This responsible conduct includes, for instance, practicing general sensitivity, accuracy, meticulousness and integrity; the right for the participants to decline or abstain at any point of the research process, confidential information retrieval and handling, respectful and appropriate use of other people's research results, and the avoidance of disrespectful, stereotyping and repressive or invalidating expressions. Furthermore, the privacy of the participants needs to be respected by ensuring the personal information or data is converted as unidentifiable. Whenever research material that may be identifiable is collected (i.e. via email), a research permit is required. As far as citing is concerned, using appropriate referencing method can indirectly be a valid sign of reliability. For any research, it is always the researcher that is responsible for the choices made and their ratification as well as for the possible deficiencies or mistakes. (Varantola et al./TENK 2012.)

In this functional study, an attempt was made to comply with the responsible research conduct by being as respectful, honest, sensitive and thorough as possible when conducting the study. The participants in this study were informed of their right to decline or abstain at any point of the research process, and the information collected was handled with care and confidentiality throughout. Additionally, the required research permit was obtained from Laurea UAS. Every attempt was made to ensure the research objectives, information retrieval and handling, presentation of the results and the retention of the research materials of this study would not harm the individuals or the audience involved at any point, taking care that no disrespectful, stereotyping, repressive or invalidating expressions were used. For the evaluation, the participating teachers had the right to decide for themselves whether they wanted to provide feedback; with the feedback questionnaire, a cover letter, including an explanation of the right to decline or abstain, was provided. The feedback questionnaires with the responses were kept confidential by not letting other people but the authors to handle them and they were not used for any other purposes but the evaluation of the e-

learning guide. In order to maintain the confidentiality and to respect the privacy of the participants, anonymity was practiced (as the authors were not aware which response was from which teacher). After the examination of the results, the feedback questionnaire responses were appropriately destroyed.

5.3 Validity & Reliability

As far as the validity and reliability were concerned, a preliminary investigation, fundamental research collection and theoretical analysis of relevant, scientific, and evidence-based material was undertaken in order to substantiate specified topics outlining the thesis report and the corresponding e-learning guide. This investigation was focused on universal concepts of intraoperative nursing care of the adult, obese patient, as well as topics like co-design, functional thesis, e-learning materials and research ethics.

Research collection was obtained through an analysis of current materials (a majority published within 10 years) found through respectable resources made available through Laurea's online library, scientific article databases, national and international online statistics, and operating room specific literature. These included databases such as Laurea Finna, Google Scholar, ProQuest Central, Cochrane Library, CINAHL, PubMed, WHO, Terveysportti, THL, as well as relevant nursing articles provided through AORN.

As the topic chosen for this thesis is regarded relevant within the field of perioperative practice, a substantial amount of current material with a high degree of reliability and validity, like peer reviewed practice literature and reviews from academic journals, including literary reviews, expert opinion papers, standards for clinical care, discussion papers, as well as, guidelines and books were retrieved. Appropriate referencing guidelines by Laurea UAS were applied to all citations, which, as stated previously, is a valid sign of validity in itself.

According to OPH (2006) and Varantola et al. (2012), the information presented in both the thesis report and e-learning guide can be considered correct, legitimate and current; it has not been distorted or falsified, or presented as the authors' personal view, but is fully factual according to the referenced sources, which follow the referencing guidelines provided by Laurea UAS. As both the participating teachers as co-designers and the thesis tutors were involved at different stages throughout the thesis process by providing guidance and feedback, this can also be considered as a reinforcing factor in relation to the validity and reliability aspect of the project. Furthermore, as the study was conducted by two authors instead of one, both possessing several years of work experience in perioperative care, this

can also be regarded as a strength as far as objectivity and proficiency, and consequently, the validity and reliability, of this thesis are concerned.

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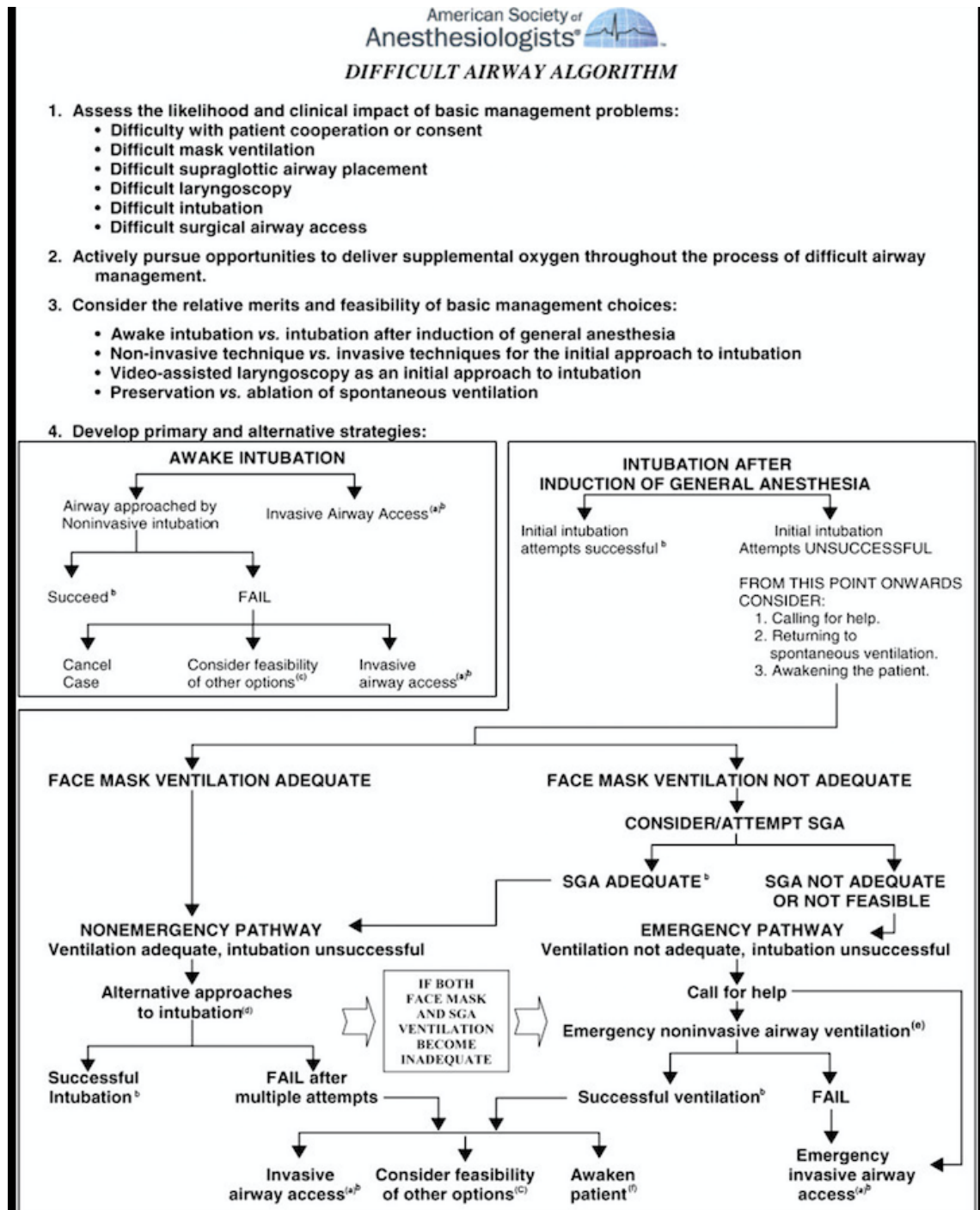
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Appendix 1: ASA's Difficult Airway Algorithm 2013.



Appendix 2: SOBA UK Obesity Guideline 2020 and Pack Checklist 2015

Anaesthesia for the Obese Patient

Society for Obesity and Bariatric Anaesthesia

Pre-operative Evaluation


Red Flags

- Poor functional capacity
- Abnormal ECG
- Uncontrolled BP, CCF or IHD
- SpO₂ <94% on air
- If bicarbonate >27, OHS likely
- Previous DVT/PE
- STOP-BANG ≥ 5
- OS-MRS >3
- Metabolic Syndrome
- High NSQIP ACS Risk

Yes →

Consider:

- Preoperative CPAP
- Blood Gases / Sleep Studies
- Echocardiogram
- Cardiorespiratory referral
- Experienced Anaesthetist
- Book HDU Bed




OS-MRS Calculator

tools.farmacologiaclinica.info


No →

- May be suitable for day-case surgery



NSQIP ACS Risk Calculator

riskcalculator.facs.org/RiskCalculator




STOPBANG Calculator

www.stopbang.ca

Central Obesity (waist > half height)

- Difficult airway/ventilation more likely
- Greater risk of CVS disease/thrombosis
- Higher risk of metabolic syndrome



Peripheral Obesity (Fat outside body cavity)


- Less co-morbidity
- Lower risk

Intra-operative Management

Suggested Equipment:

- Suitable bed/trolley and operating table
- Gel padding
- Wide strapping
- Table extensions/arm boards
- Forearm cuff or large BP cuff
- Device or equipment for ramping
- Step for anaesthetist
- Difficult airway equipment
- Videolaryngoscope
- Ventilator capable of PEEP & pressure modes
- Hover mattress or equivalent
- Long spinal, regional and vascular needles
- Ultrasound machine
- Appropriately sized calf compression devices
- Depth of anaesthesia monitoring
- Neuromuscular monitoring
- Sufficient staff to move patient

Ramping



- Tragus level with sternum
- Reduces risk of difficult laryngoscopy
- Improves ventilation and pre-oxygenation

Anaesthetic Technique:

- Consider premed antacid & analgesia
- Careful glucose control
- DVT prophylaxis
- Self-position on operating table
- Preoxygenate and intubate in ramped/sitting position
- Consider CPAP and HFNO
- Minimal induction to ventilation time
- Commence maintenance promptly
- Tracheal intubation recommended
- Caution with SAD in BMI >40
- Avoid spontaneous ventilation, use PEEP
- Use short-acting inhalationals or TIVA
- Short-acting opioids & multimodal analgesia
- PONV prophylaxis
- Ensure full NMB reversal
- Extubate and recover sitting up

Lean Body Weight: This exceeds ideal body weight in the obese and plateaus at:

- ≈100kg for a man
- ≈70kg for a woman

Ideal Body Weight: Broca formula

- Men: height (in cm) - 100
- Women: height (in cm) - 105

If in doubt, titrate and monitor effect

Suggested dosing for anaesthetic drugs		
Lean Body Weight (Males Max 100Kg Females Max 70Kg)	Adjusted Body Weight (Ideal plus 40% excess)	Total Body Weight
<ul style="list-style-type: none"> Propofol induction Thiopentone Fentanyl and Alfentanil Morphine Non-depolarising NMBDs Paracetamol Local Anaesthetics 	<ul style="list-style-type: none"> Propofol Infusion Neostigmine (max 5mg) Sugammadex (oad pack insert) Antibiotics 	<ul style="list-style-type: none"> Suxamethonium LMWHs (titrate dose with Xa levels)

Post-operative Care

PACU discharge:


- Usual discharge criteria should be met
- SpO₂ should be maintained at pre-op levels with minimal O₂ therapy
- No evidence of hypoventilation

OSA or Obesity Hypoventilation Syndrome:


- Sit up and avoid sedatives and post-op opioids
- Reinstate patient's own CPAP if applicable with additional time in recovery until free of apnoea without stimulation
- Patients untreated, intolerant of CPAP or ineffectively treated (persistent symptoms) are at risk of hypoventilation
- In these cases, IV opioids should be avoided but where necessary, patient should have continuous SpO₂ monitoring and level 2 care must be considered

General good ward level practice includes:

- Multimodal analgesia
- Caution with long-acting opioids and sedatives
- Early mobilisation
- Robust thromboprophylaxis regime
- Experienced Consultant Review

 @SOBAuk

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 SOBAUK.com



Obesity Pack

In the box	Large Equipment	Where to find it
Audit form	Bariatric operating table	
Single sheet summary	Step for patient	
Large BP cuff	People!	Recovery, ward
BIS/Entropy stickers	Oxford pillow plus arm attachments	
Large calf compressors	Arm, leg & side extensions	
Long epidural & spinal needles	Hoist	
Arrow 24cm lines	Bed for post op	
Long regional block needles	Desflurane	
Airtrach & bougie	Infusion pumps	
	Ultrasound machine	
Slide sheet	Step for anaesthetist	
Gel padding	Large tourniquet cuff	
Wide Velcro strapping	BIS monitor	
Cricothyroidotomy kit	Patient & fluid warming	
	Large retractors etc	
	Additional gel padding	
	Difficult airway equipment	

Appendix 3: Research Permit



Research permit application 1 (3)

18.1.2021

Research permit application should contain at least following elements.
If needed you may give additional information in attachments. Send the application in Word-document -format to Laurea's contact person.

Name: <i>Marjut Mustonen and Michaela Schiltz</i>	
Title: <i>Students at the Degree Programme in Nursing</i>	
Address: <i>Laurea University of Applied Sciences, Tikkurila Campus</i>	
Tel: <i>044-0735565</i>	
E-mail: <i>marjut.mustonen@student.laurea.fi and michaela.schiltz@student.laurea.fi</i>	
Date <i>18.01.2020</i>	
[Research, thesis, etc.] Author(s) /investigator(s):	<i>Thesis in a form of a functional study. Authors: Marjut Mustonen and Michaela Schiltz</i>
Degree programme / college / university:	<i>Degree Programme in Nursing, Laurea AMK, Tikkurila</i>
Unit/ department:	<i>The Department of Health and Social Sciences (Nursing)</i>
[Research, thesis, etc.] Instructor(s):	<i>Salla Kivelä and Emma Tamankag</i>
Title of the {research, thesis, etc.}:	<i>A Practical Guide to Intraoperative Care of the Obese, Adult Patient</i>
Objectives / research problem:	<i>The main purpose of our functional thesis would be to produce and provide high quality educational material in a comprehensive but concise and accessible format (a practical guide, in an electronic format) for nursing students at Laurea University of Applied Sciences, in order to enhance safe perioperative care of an increasingly growing patient group; the obese, adult patients. This study material would be implemented in a form of a practical guide in order to support, enhance and improve the theoretical education in the perioperative nursing studies at Laurea University of Applied Sciences. The aim of this practical guide would be to facilitate and improve the knowledge and skills of the nursing students with an interest in a perioperative nursing, in the care of the obese, adult patient.</i>

18.1.2021

	<p><i>We consider this topic very important, as obesity can be considered a growing epidemic in most western countries, including Finland, and hence it is consequently becoming an issue also within the perioperative practice. In our opinion, the perioperative nurses should be aware of the extra considerations and challenges involved in the care of the obese patients, and have the relevant knowledge, skills and competencies, in order to provide safe and efficient care for this particular patient group.</i></p> <p><i>According to our research, this type of educational/study material concerning our topic does not yet exist in Finnish literature.</i></p>
<p><i>Concise definition of what information is needed, the format in which they are needed and how the information is delivered:</i></p>	<p><i>As our functional study is going to be implemented as a co-design project with Laurea, we would be collaborating and consulting with some teachers of the perioperative studies at Laurea, Tikkurila, in regards of the product we are creating (practical guide/teaching package). The teachers would be participating by expressing their needs in relation to e.g. the content and the format of the product.</i></p> <p><i>For evaluation purposes we are also intending to collect feedback for our product from the teachers involved and possibly from some students on the programme as well.</i></p> <p><i>In order to collect and deliver feedback, we would be using feedback questionnaires.</i></p> <p><i>All data would be kept confidential and provided only for the purposes of this study. The identity and anonymity of all the persons involved would be secured.</i></p> <p><i>We have initially approached Lotta Tiikkainen, Fanny Kilpinen and Marja Tanskanen as our possible collaborators/consultants for this project</i></p>

18.1.2021

Timetable (in two months accuracy):	Planning: <i>Topic Analysis: 20.09.2019</i> <i>Initial Thesis Plan Seminar Presentation: 08.01.2021</i> <i>Submit Thesis Plan: January 2021</i>		
	Implementation: <i>First draft of theoretical background and practical guide: February 2021</i> <i>Editing and approval: February-March 2021</i> <i>Oppose Thesis: March 2021</i>		
	Publication: <i>Final Thesis Seminar Presentation: March-April 2021</i> <i>Maturity Test: April 2021</i> <i>Publish: April 2021</i>		
Attachments (research plan, questionnaire, framework for theme interview etc.):			
Filled by issuer of permit at Laurea	Research permit is granted	<input checked="" type="checkbox"/>	Research permit is not granted
	Grounds		
	<i>Developing education inside the Laurea UAS, Nursing degree</i>		
Name of the issuer of permit: Date:	Sanna Partamies 18.1.2021		

Research permit is granted on the condition that applicant complies with legislation when processing and saving personal data. All data is confidential and provided only for purposes of survey/research in question. The applicant is responsible for securing identity and anonymity of persons in data provided. After the survey/research is completed, the applicant is responsible for deleting the data in appropriate manner.

If personal data file is created during the research (Personal Data Act -523/1999- Section 10) then applicant must comply with the provisions of law when processing and protecting of personal information. If necessary, the application must be accompanied by Scientific Research Register Description.

The applicant is responsible for providing positive decision to a person who will provide information at Laurea. Practical implementation of survey is negotiated at this point.

Appendix 4: Feedback Questionnaire for the e-Learning Guide

A link for the original questionnaire as in GoogleForms application:

https://docs.google.com/forms/d/e/1FAIpQLSdpP5nNrnxf5grnE4XzxxvSGPjMSXTonO69dk0f_eIx-kqng/viewform?usp=sf_link

The PDF-copy of the Feedback Questionnaire:

FEEDBACK QUESTIONNAIRE https://docs.google.com/forms/u/0/d/1SAg2qHLq1896WiseQhfEWSS5...

FEEDBACK QUESTIONNAIRE

for
Intraoperative Nursing Care of the Obese, Adult Patient: An e-Learning Guide
by Marjut Mustonen and Michaela Schiltz

*** Required**

1. 1. Have you introduced yourself to the guide by reading it at least once? *

Mark only one oval.

NO
 YES

2. 2. Is the visual appearance of the guide clear? *

Mark only one oval.

YES
 NO

3. 3. If you answered NO to the previous question, please explain why the visual appearance is not clear.

4. 4. Are there enough visual imagery/pictures? *

Mark only one oval.

- YES
 NO

5. 5. If you answered YES to the previous question, are there too many pictures? *

Mark only one oval.

- YES
 NO

6. 6. Is the guide visually appealing? *

Mark only one oval.

- YES
 NO

7. 7. If you answered NO to the previous question, please explain why the guide is not visually appealing?

8. 8. Is the content of the guide clear and easily understandable? *

Mark only one oval.

YES

NO

9. 9. If you answered NO to the previous question, please explain why the content is not clear and easily understandable.

10. 10. Is the name of the guide descriptive of its content? *

Mark only one oval.

YES

NO

11. 11. Does the guide contain terminology that is not comprehensible? *

Mark only one oval.

YES

NO

12. 12. If you answered YES to the previous question, please explain which terminology is not comprehensible.

13. 13. Does the guide contain sufficient amount of information regarding the topic? *

Mark only one oval.

- YES
 NO
 NOT SURE/I DON'T KNOW

14. 14. If you answered NO to the previous question, please explain which information you would like to add to the guide.

15. 15. Is there too much information in the guide? *

Mark only one oval.

- YES
 NO
 NOT SURE/I DON'T KNOW

16. 16. If you answered YES to the previous question, please explain in which part there is too much information.

17. 17. Do you think the guide will be beneficial for its target audience (nursing students and nurses with special interest in perioperative nursing)? *

Mark only one oval.

YES

NO

18. 18. If you answered NO to the previous question, please explain why you think the guide is not beneficial for the target audience.

19. 19. Is the associated learning assignment clear, relevant and effective? *

Mark only one oval.

YES

NO

20. 20. If you answered NO to the previous question, please explain why the learning assignment is not clear, relevant and effective.

21. 21. Are there enough links (including videos) in the guide? *

Mark only one oval.

- YES
 NO

22. 22. Are the links relevant in connection with the subject matter? *

Mark only one oval.

- YES
 NO

23. 23. If you answered NO to the previous question, please explain why you think the links are not relevant in connection with the subject matter.

24. Have you got any additional comments or suggestions regarding the guide? Do you think the guide is lacking something relevant for its function?

This content is neither created nor endorsed by Google.

Google Forms

Appendix 5: Cover letter for the Feedback Questionnaire

Dear Recipient,

We are two nursing degree students from Laurea University of Applied Sciences (UAS) Tikkurila campus working on a functional thesis whose main purpose is to produce a clear, comprehensive and high-quality study/e-learning material in a form of an e-learning guide about the special considerations involved in the intraoperative nursing care of an obese, adult patient. The aim of this practical e-guide is to facilitate and improve the knowledge and skills of any nursing students or nurses with an interest in perioperative care about the unique risks, challenges and considerations involved in the intraoperative nursing care of the obese, adult patients. As the study will be conducted as a co-design project with Laurea UAS, this e-guide may also be used as additional educational material in the advanced perioperative studies at Laurea UAS in order to support, enhance and improve the theoretical education.

As the material will be made available through Theseus, and as the study has been conducted in English, it will also be accessible, and hopefully beneficial, to any nursing students or nurses nationally or internationally.

The content of the e-guide is based on the research- and evidence-based material presented and discussed in the theoretical report of the thesis.

We are kindly requesting you to introduce yourself to this e-guide by reading it at least once and then answering the questions in the associated Feedback Questionnaire. Answering the questionnaire will take approximately 20 minutes. Please choose the most applicable answer to you. Some of the questions are further presented as open question and hence have an option for adding free text.

Please return the questionnaire to us by ...

The participation to this study is voluntary and the information provided will be kept fully confidential and will not be used for any other purposes but the evaluation of this e-guide.

An appropriate research permit for this study has been obtained. After the analysis of the results, the feedback questionnaires will be appropriately destroyed.

Our aim is to utilize the results of these feedback questionnaires accordingly in order to evaluate, re-develop and improve the guide to become more effective and suitable for its purpose.

If you have any questions or concerns regarding the questionnaire or the study, please do not hesitate to contact us for more information.

Thank you in advance for your collaboration.

Sincerely,

Marjut Mustonen (marjut.mustonen@student.laurea.fi)

Michaela Schiltz (michaela.schiltz@student.laurea.fi)