Abstract of dissertation entitled

“An evidence-based guideline for preoperative nursing education to alleviate postoperative pain among patients undergoing video-assisted thoracic surgery”

Submitted by

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Abstract

In the cardiothoracic surgery unit in Hong Kong, patient who received lung surgery is different from that of heart surgery in the perspective of postoperative care.

Preoperative nursing education has been well developed for those cardiac patients while patients undergo lung surgery received a simple one. Nevertheless, it is found that patients undergone lung surgeries were poor on postoperative pain management.

Hence, the efficiency of current practice is doubtful and the responsibility lies on
nurses for the preoperative education.

Since the high incident rate of lung cancer over the past years in Hong Kong, it results in an increasing number of candidates for lung surgeries. Meanwhile, as the video-assisted thoracic surgery has been getting mature over the past decade, there is reduced operation time and postoperative complications. The demand for the lung surgery rises.

This dissertation outlines an evidence-based preoperative nursing education to reduce postoperative pain for patients who undergone video-assisted thoracic surgery. It aims to provide an efficient intervention for better postoperative pain management. The results of the journal articles proved the use of multimedia as a tool to illustrate information in the education can possibly reduce the postoperative pain score by twenty percent.
An evidence-based guideline for preoperative nursing education to alleviate postoperative pain among patients undergoing video-assisted thoracic surgery

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A dissertation submitted in partial fulfillment of the requirements for the degree of Master of Nursing at the University of Hong Kong

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Declaration

I declare that this dissertation and the research work represents my own work, except where due acknowledgement is made, and that it has not been previously included in a thesis, dissertation or report submitted to this University or to any other institution for a degree, diploma or other qualifications.

Signed: ___________________________

Yu Kai Man Raymond
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Chapter 1: Introduction

1.1 Background

Patients who undergo surgeries experienced various degree of physical and psychological stress, including anxiety, fear, insomnia and uncertainty about the perioperative situations (Guo, East & Arthur, 2013). Meanwhile, it is widely reported that preoperative education program prepared for those pending elective surgeries would be beneficial in a number of aspects such as preoperative anxiety and postoperative pain management (Kruzik, 2009). Patients undergo lung (medically named as thoracic) surgeries would experienced “severe acute traumatic pain” postoperatively since thoracotomy, which is an surgical opening into the lung, involved much nerves than many other surgeries, and thus higher intensity of pain would be experienced (Kol, 2014; Soto & Fu, 2003). In the light of tremendous medical development and research efforts made in recent years, the Video-assisted Thoracotomy Surgery (VATS) in lung operation was proven to minimize postoperative complications since it involved relatively small opening than the traditional thoracotomy procedure (Grallert, Uhlmann & Bartels, 2013).
1.2 Affirming the Need

In Hong Kong, there are only three hospitals having the Department of Cardiothoracic Surgery (CTSD), which offer elective lung surgeries such as lobectomy, surgical pleurodesis and decortication, while the Queen Mary Hospital is one of the three.

Patients planned for elective lung surgeries are usually admit first for preoperative workup and re-admit one day before surgery.

According to the statistics from the Hong Kong Cancer Registry (2014), lung cancer has been the leading cancer since the past 5 years in Hong Kong that more than 4000 new cases reported annually. Patients with primary stage of cancer are usually advised for surgical interventions (Smart Patient, 2014). It is not surprising that the more newly reported lung cancer cases would yield more candidates for surgeries.

Nevertheless, the surgical beds available are limited. Hence, reducing the length of hospitalization of the post-surgery patients is thought to be one of the solutions.

Addressing to this, many studies evidenced that providing preoperative nursing education program to patients prior to surgery could significantly shorten the length of postoperative stay since better pain management was performed (White & Dixon,
2015; Kruzik, 2009). Hence, a tailored nursing education program is necessary. At the same time, the CTSD of the Queen Mary Hospital has adopted its own education program for a certain period of time.

The current practice of education program could be divided in three parts. Firstly, patient would receive a number of wordy information sheets regarding the surgery, blood transfusion, general anesthesia during operation and postoperative pain management. All these factual information would be further explained in detail by surgeon and anesthesiologist separately at the time of signing the informed consent.

Secondly, Day-Centre nurses would visit patients individually and deliver information based on a printed black and white version of PowerPoint slides, which are some brief information on perioperative routines; postoperative pain management and chest drain and wound care. It is noted that no hard copies of the PowerPoint would be provided to patients afterwards. Thirdly, physiotherapist would educate patients on the use of Triflow, which is a crucial self-preformed lung expansion exercise in postoperative patients.

Nevertheless, it is observed that postoperative patients are always unsure of and have
misconceptions on the pain management methods, especially in the pharmacological pain management. Although they are informed about the available painkillers used commonly for postoperative pain control, they always forget it. Moreover, they prefer tolerating the pain to seeking for additional available painkillers. In 2011, Guo did a RCT, which is about on preoperative education on Chinese cardiac patients. The intervention method was similar to the current practice that information leaflets and verbal advice were given to patient preoperatively. However, it showed that the intervention had no significant difference on reduction of postoperative pain and it is coherent to the present situation. There is a problem between message delivery from nurses and reception by patients. The efficiency of current practice of nursing education for those preoperative lung surgery patients is doubtful and the responsibility lies on nurses for amending and providing an effective preoperative education.

Consequently, it is necessary to revise the current preoperative education strategy, especially the part of nursing education. Some recent journals pointed out that the incorporation of multimedia like videos, audio and pictures with detailed, item-based
but simple information leaflets and verbally delivered by nurses to patients in the
preoperative nursing education would produce significant efficiency in reducing
postoperative complications like pain, and thus, early mobilization and shortened
hospitalization could be achieved (Kol, Alpar & Erdoğan, 2014; Chen, Chen & Lin
2013; De Aguilar-nascimento, Leal & Dantas, 2013; Sadati, Pazouki, & Mehdizadeh
2013; Sayin & Aksoy 2011; Stergiopoulou, Birbas & Katostaras, 2006).

Thus, a systematic review is necessary since the provision of multimedia with
structured written and verbal information for patients undergo surgery is new and
good evidence reported from various study trials and yet it have not been any
systematic reviews.

1.3 Objectives and Significance

Research question (in the format of PICO)

In lung cancer patients undergo Video-assisted Thoracic Surgery, how effective is a
evidence-based preoperative nursing education with the use of multimedia compared
to traditionally written and verbal information given to patients to effectively reduce
postoperative pain?
Objectives

1. To review recent available controlled trials on basic and new essential elements that can be included in a preoperative nursing education

2. To formulate and write an evidence-based preoperative nursing education program protocol for lung cancer patients who undergo Video-assisted Thoracotomy Surgery

3. To assess the feasibility of implementation of the evidence-based preoperative nursing education program on patients undergo elective VATS

4. To implement and evaluate the evidence-based nursing education program in real clinical settings

Significance

The continuously high incident figure of lung cancer in Hong Kong in recent years would prone surgical interventions much to higher demand, particularly the Video-assisted Thoracotomy Surgery (White & Dixon, 2015; HA, 2014). An evidence-based preoperative nursing program can alleviate patient’s postoperative pain. Hence they can achieve early mobilization and be discharged as soon as
Furthermore, according to the Association of Hong Kong Nursing Staff (2014), the nurse to patient ratio rises to 1:11 while it is still high compared to the international suggestion 1:6. The workload of nurses is still heavy. Patients with better postoperative outcomes would reduce nurses’ workload to a certain extent.

Finally, the implementation of visual media is thought to be economy and efficient since it can be re-use again (Chen et al., 2013) and it is easier for patients with low education level to learn through visual and audio than texts.

Chapter 2: Critical Appraisal

2.1 Search and Appraisal Strategies

Methodology

Two electronic databases were used for searching relevant journal articles in the study, i.e. PubMed and EBSCOhost, which provide primary and secondary sources respectively. Keywords used in searching were under three major concepts, the target group, the intervention and the outcome. They include preoperative education, lung
surgery, standard or structured, nursing, nurse-led, multimedia, pain management and pain level. Also, they were validated by MeSH. Filtering was applied to yield latest results that were full-texted, clinical trials within 10 years. The PRISMA flow chat (2014) in Appendix 1 was used to illustrate the searching process.

Inclusion and exclusion criteria

Inclusion criteria

- Studies reported in English-medium
- Clinical trials with randomization are preferred
- Education done before a elective surgery
- Postoperative pain level is one of the outcomes
- Patients with no significant difference in demographic parameters

Exclusion criteria

- Sample aged less than 18 years old or pediatric patients
- Any emergency surgeries

Methods for appraisal

The Scottish Intercollegiate Guidelines Network, SIGN (2014), which consisted
various checklists based on different methodological study trials, was used as the reference tool for critical appraisal in this study. Checklists will screen selected studies in order to study the quality and the level of evidence. The SIGN checklists are attached in Appendix 3.

2.2 Results

Searching was performed since 30/11/2015 with filtering, which yielded 102 and 66 journal articles from PubMed and EBSCOhost respectively. Among the total of 168, 53 were removed due to duplications and the remained 105 were screened based on the inclusion and exclusion criteria and finally 6 out of them were selected out for systematic review and represented in the PRISMA flow chart (2009) in Appendix 1. The 6 journal articles were then analyzed individually. The data, which based on the study designs, sample characteristics, intervention and control groups, outcome measurements and possible effect sizes, were extracted out and incorporated into the Table of Evidence (Appendix 2). In addition, the study quality of each selected article was reviewed through the SIGN.
**Summary of appraisal results**

Five studies were published from 2011 to 2014 inclusive while one study was published in 2006. Majority of the studies was conducted in the Western countries, which were Brazil, Greece, Turkey and Iran (Kol et al., 2014; De Aguilar-nascimento et al., 2013; Sadati et al., 2013; Sayin et al. 2011; Stergiopoulou et al., 2006), and the other one was conducted from Taiwan, where is a Chinese country (Chen et al., 2013).

All participants were adult patients who undergo elective surgeries in hospitals with different ward settings. Sample size ranged from 60 to 100 in all the studies. Additionally, all of them were ethically proven and consented for studies.

**Methodology**

In the six selected articles, four pieces were conducted in controlled trails with randomization (RCT) (Kol et al., 2014; De Aguilar-nascimento et al., 2013; Sadati et al., 2013; Stergiopoulou et al., 2006) while the remaining were controlled trial (Sayin et al., 2011) and Quasi-experiment (Chen et al., 2013). In the randomization process, computer-based randomization methods were used in De Aguilar-nascimento et al. (2013) and Sadati et al. (2013); nevertheless, Stergiopoulou et al. (2006) did not show
the randomization method while it was mentioned that the samples were “assigned randomly”.

Blinding method

Two studies mentioned the use of blinding strategy to minimize bias. De Aguilar-nascimento et al. (2013) stated that single-blind strategy that all the working staff in ward were “blinded” for the study. Besides, Kol et al. (2014) noted that a single-blind method was used but the blinding targets were not clearly stated. The remaining studies did not show or mention any blinding strategies.

Intervention strategies

Two key elements were noted for superior postoperative pain management.

Multimedia source of information like videos, audio and pictures, were combined in preoperative education strategies (Chen et al., 2013; Sayin et al., 2011, Stergiopoulou et al., 2006). Simple but detailed, structured information of postoperative pain care given to patients verbally with leaflets (Kol et al., 2014; De Aguilar-nascimento et al., 2013; Sadati et al., 2013).
Measuring outcomes

All studies included the postoperative pain level as one of the assessment outcomes.

Different assessment tools were used. They were the Visual Analogue Scale (VAS) Numerous Rating Scale and Visual Numerous Rating Scale ranging pain score from 0 to 10 in three studies (Chen et al., 2013; De Aguilar-nascimento et al., 2013; Sadati et al., 2013; Sayin et al. 2011; Stergiopoulou et al., 2006). Besides, Kol et al. (2014) adopted the Verbal Category Scale ranging from 0 to 5 and the Behavioral Pain Assessment Scale ranging 1 to 4 in 3 categories for postoperative pain assessment. All interventions were proven to significantly reduce postoperative pain (p<0.05).

Dropout rate

According to SIGN (2014), it stated that the dropout rate would be preferable for not more than 20%, while the reasons behind should also be taken into account at the same time. There were no dropout participants in five studies, which may account for short period of study time (Kol et al., 2014; Chen et al., 2013; Sadati et al., 2013; Sayin et al. 2011; Stergiopoulou et al., 2006). Meanwhile, it was calculated that the dropout rate in the RCT conducted by De Aguilar-nascimento et al. (2013) was 37.8%.
It was contributed to early patient discharged before assessment and more operations performed during the surgery.

2.3 Summary and Synthesis

All the six selected studies were rated as “acceptable (+)” through the SIGN (2014) checklists evaluation, since they partially met the criteria items. Hence, there was no a preferable one among the six though there were RCTs that higher level of evidence were expected (Kol et al., 2014; De Aguilar-nascimento et al., 2013; Sadati et al., 2013; Stergiopoulou et al., 2006).

Summary of studies

Among the studies, five of them included detailed pharmacology information in preoperative education (Kol et al., 2014; Chen et al., 2013; De Aguilar-nascimento et al., 2013; Sadati et al., 2013; Sayin et al., 2011) while Stergiopoulou et al. (2006) did not elaborate on the information provided. In addition, all studies consistently concluded that verbal explanation is necessary; as well as provided by nurses (Sadati et al., 2013; Stergiopoulou et al., 2006).

Moreover, various studies used multimedia like printed or digital pictures, movies and
audio that were supplementary to word-based leaflets and verbal explanations in the
preoperative education and it was thought to have better comprehension in patients
with lower education and it was used to be more economy (Chen et al., 2013; Sayin et
al. 2011; Stergiopoulou et al., 2006).

Postoperative pain level was one of the measuring outcomes of all participants in the
selected studies in which most of the results showed $p<0.05$ that all interventions
showed significant pain level reduction within 48 hours postoperatively (Kol et al.,
2014; Chen et al., 2013; De Aguilar-nascimento et al., 2013; Sadati et al., 2013;
Stergiopoulou et al., 2006) except that from Sayin et al. (2011) showing intervention
is only significant in pain levels 2 to 6 hours postoperatively. The more negative-valued
the effect size in the table of evidence, the stronger the effect of using multimedia as a
tool in education in order to effectively reduce postoperative pain level.

Other measuring outcomes included the postoperative Nausea score reported by De
Aguilar-nascimento et al. (2013), Sadati et al. (2013) and Stergiopoulou et al. (2006);
the postoperative well-being score reported by De Aguilar-nascimento et al. (2013);
painkiller consumptions in 48 hours postoperatively reported by Kol et al. (2014) and
mobilization time in 6 hours postoperatively reported by Sayin et al. (2011). All these outcomes were found statistically significant with p<0.05 with the interventions.

*Synthesis of studies*

All the results were taken into considerations since the samples undergo elective surgeries that were similar to the proposed elective VATS for lung cancer patients to a certain extent. It is necessary to include the possible type and number of surgical drains in postoperative patients since it could affect the perceived pain as stated by Sayin (2011).

The sample size was another area to concern. In the RCT conducted by Stergiopoulou et al. (2006), the sample sizes were different in comparison of postoperative pain in the “informed” group and “Group D” in which the “informed” group was stated as all the interventions. The sample size of the informed group was 35 while the control group (Group D) was 15. Although it showed significantly different for both groups with the p-value <0.05, it is better to include more samples in the control group for a more persuasive comparison, analysis and representation. Other studies showed adequate sample sizes.
The provision of information materials in preoperative education was similar to the current practice that patients would receive leaflets and verbal nursing education.

However, the selected studies pointed out the printed information, i.e. leaflets, should be simple and include detailed, itemized information on perioperative affairs, particularly pain management methods as it was highlighted to be an “important component” (Kol et al., 2014; Chen et al., 2013; De Aguilar-nascimento et al., 2013; Sadati et al., 2013; Sayin et al., 2011). Moreover, the supplementary of multimedia like video-contained CDs, audios and pictures, was another important element in preoperative education for better information delivering (Chen et al., 2013; Sayin et al., 2011; Stergiopoulou et al., 2006). The multimedia approach was said to be a better way than written information (Chen et al., 2013). Besides, all the studies consistently showed that the verbal explanation by nurses in preoperative education should align with the digital and printed information giving to patients (Kol et al., 2014; Chen et al., 2013; De Aguilar-nascimento et al., 2013; Sadati et al., 2013; Sayin et al., 2011; Stergiopoulou et al., 2006). Furthermore, it was noted that nurse-led education was preferable (Sadati et al., 2013; Stergiopoulou et al., 2006). In the current practice, as
stated before, Day-Centre nurse would use a copy of PowerPoint slides for preoperative education. Nevertheless, the information on the PowerPoint slides would not be given to patients and the information was not similar to those information leaflets received by patient upon admission. Hence, this is another essential element to be noted for the proposed innovation.

Hence, the proposed innovation would focus on a structured preoperative nursing education in which detailed but simple information on postoperative pain management is delivered verbally with supplementary leaflets and multimedia afterwards where all contents are consistent, in the light of better postoperative pain management in terms of alleviation of pain level.

Chapter 3: Implementation Potential and Clinical Guideline

After reviewing the clinical studies, it is recommended that using an evidence-based preoperative nursing education could effectively reduce the postoperative pain experienced by patients (Kol et al., 2014; Chen et al., 2013; De Aguilar-nascimento et al., 2013; Sadati et al., 2013; Sayin et al., 2011; Stergiopoulou et al., 2006). In the past
10 years, the health expenditure in Hong Kong has been increasing (Food and Health Bureau, 2013) and the trend is increasing since the demand is great. Formulating clinical guideline for the evidence-based measure as mentioned definitely helps better utilization of limited resources.

In this chapter, the checklist from Polit and Beck (2004) would be used to evaluate the transferability, feasibility and the cost-benefit ratio of the proposed evidence-based innovation under scrutiny.

3.1 Transferability

The proposed innovation is using an evidence-based preoperative nursing education with postoperative pain management information delivered by the use of multimedia, such as movies and photos inputting into a tablet, for nurse-led teaching and self-review afterwards.

Clinical setting

In the light that the approach of the innovation is for patients who undergo elective surgeries, hence it fits to the proposed clinical settings, which are the general surgical wards of the Cardiothoracic Surgery Department in the Queen Mary Hospital. There
are two general wards in which one is for male patients and the other is for female patients. There are around 25 thoracic surgery beds in total while the remaining are cardiac surgery beds. Nurses who are responsible for preoperative education are the Day-Centre nurses and their working place is at the female ward. Both wards are nearby.

Besides, the Queen Mary Hospital is an acute hospital. The ward settings meet the hospital accreditation requirements which is a global standard to ensure healthcare services quality (HA, 2013). Hence the standard of clinical setting is similar to those of the research studies from worldwide developing and developed countries.

**Target population**

Candidates who undergo elective video-assisted thoracotomy surgery are eligible for the innovation. There are 2 to 4 scheduled elective thoracic surgery cases every weekday while weekends and public holidays are exclusive since there are no scheduled operations. It is estimated that more than 500 operable cases would be done annually. The target population is similar to the previously found research studies that the participants were planned for elective surgeries and were admitted for surgical
wards for nursing education before operations. Also, the demographics of the target population were alike that it is proven by all studies with no significant difference (Kol et al., 2014; Chen et al., 2013; De Aguilar-nascimento et al., 2013; Sadati et al., 2013; Sayin et al., 2011; Stergiopoulou et al., 2006). Furthermore, the innovation could benefit more than 500 patients every year and due to the high incident figures as said before; it is thought to be a sustainable measure.

*Philosophy of care*

The Hospital Authority (2016) pinpointed that healthcare professionals are encouraged to empower patients in order to help themselves to stay healthy as its mission. It should also correlate into the approach of nursing care. By providing comprehensive postoperative pain management information and using multimedia as evidence-based innovation, patients receive perioperative information in the way of watching videos and pictures, which are easier to comprehend to provide better understanding and hence they can empower themselves more on postoperative pain management effectively.
Implementation and Evaluation

To implement the evidence-based preoperative nursing education, it starts off by a 3-weeks time setting up team members, finalizing proposal and acknowledging to and getting support from the Chief of Service (COS), Department Operation Manager (DOM) and Ward Manager. The next 4 weeks would be the collection of information and video making and then get screened and approval by the managers. Another 2 weeks is required for introducing the innovation to all ward staff, especially for the Day-Centre staff. It is followed by a pilot test and its evaluation would be done for 6 weeks simultaneously to determine the effectiveness, revise and finalized the guidelines. After that, 2 weeks is used for informing staff the evaluation and the possible change. Finally, the finalized program will be implemented for 8 weeks and then the result will be evaluated in 6 weeks.

3.2 Feasibility

Resources

Manpower

Day-Centre nurses perform the current preoperative nursing education after patient’s
admission for scheduled elective thoracic surgeries. The Day-Centre consists of three nurses who are responsible for both thoracic and cardiac cases. Their workload is high and manpower is limited. Hence, usually only one of them is responsible for the preoperative nursing education each day for all lung surgery cases who have their surgeries the day after. Furthermore, they are responsible for collecting data from patients on department researches so they have the skills to implement and evaluate the project. All Day-Centre nurse would be introduced and given the tablet, which include updated information and newly made videos and pictures for patients self reading. The mode of delivering information remains the same unless the medium used switching from printed PowerPoint slides to tablets. Moreover, all the current staff will also be introduced about the tablet and are encouraged to screen the information. Extra manpower for the position is not necessary.

**Equipment**

The video clips are focused on postoperative both pharmacological and non-pharmacological pain control methods and management. To record the videos, it is easy to make it done by using personal smartphone, which is user-friendly and
costless. Producers can playback for review once the video is taken. Materials inside
the video clips would not contain any information on real patients to eliminate risk of
disclosing patient data and privacy. Videos taken will be processed in personal
notebook. At the end, the finished materials will input to a table. Not many skills are
required.

Working environment

The working environment refers to the ward setting and department culture. Firstly, as
most of the operative candidates are put on the operation list a week before,
Day-Centre staff can make arrangements for the education schedule. It is ideally good
since it can provide flexibility to staff to get a better plan for time management to
finish all cases as scheduled. Secondly, it is about the culture of the department. The
department develops numerous evidence-based perioperative nursing clinical
pathways and assessment forms to aim better patient’s health outcome, for example
the elective thoracic surgery clinical pathway and nursing care plan for patient
undergo Fiberoptic Bronchoscopy. Also, therapeutic interventions like therapeutic leg
pump, is used routinely for patients who undergone Coronary Artery Bypass Graft to
promote their circulation of the “harvested” vein. New ideas or innovations with evidence-based approach would be preferable. Thirdly, the 5 working-days nature of the department contributes to longer working hours in each shifts. Staff who has the morning shift would go for lunch after handover. After lunch, there is a period of time before duty ends. This period is acknowledged for staff learning and development, like attending lessons, case study sharing. Hence, it is possible to use this time to introduce the new innovation to staff without interfering them when they are taking care of their cases. Fourthly, the department strongly encourages staff to have ward contributions under the Staff Development Record (SDR) every year. Under the SDR, all nursing staff is assigned to follow their own Advanced Practice Nurse. They can seek advices and form a group of committee and contribute to the project. Friction of extra workload could be hindered since it is not a compulsory work task.

*Administration support*

Since the innovation is evidence-based approach and it is proven to benefit patients by reducing the postoperative pain level effectively. Patient could also contribute to the postoperative pain management. Administrative supports from the COS, DOM and
Ward Manager are crucial and essential since the change involved all ward staff. All information materials are also necessary to be audited and qualified by them as well as the allied health staff like the physiotherapist on non-pharmacological ways to reduce pain.

Potential barriers

The cost of the tablet and the corresponding possible repair afterwards are major potential barriers since they could be costly. Hence, tablet with high quality-to-cost ratio is preferred. Besides, the infection control team may challenge as the tablet is circulated for use. There is a risk of spreading disease in the form of contact infection. Advice from the infection control team should be taken into consideration and corresponding preventive measures could be carried out.

Evaluation

Impact evaluation

After the face-to-face education, patients will be given the tablet and they can watch the information videos and pictures. Interview will be given to them by Day-Centre nurse to evaluate their understanding of the postoperative management and questions
to evaluate the effectiveness of using the multimedia device as a mean of deliver
ing education.

**Process evaluation**

Questionnaires will be given to postoperative patients to evaluate the pain level using
the Visual Analogue Scale and the effectiveness of using multimedia as a tool to
receive information. Data are to be processed in every two weeks.

**3.3 Cost-Benefit Ratio**

The cost-benefit ratio is the “first step” to evaluate if resources or funding is used
efficiently (Detsky & Naglie, 1990). In other words, it is a way to determine the
worthiness of implementing the proposed innovation by contrasting the potential
benefits, risks and the costs.

*Potential benefits*

As noted in all the clinical studies, preoperative nursing education with the
supplementary of any kind of multimedia such as videos and pictures to illustrate
postoperative pain management methods can evidently alleviate the postoperative
pain level experienced by patients and there were no adverse events reported (Kol et
Moreover, patients come from surgeries have various level of education and range of ages. Using multimedia as a medium to deliver information could benefit to a greater extend since patients with lower education level or in more advanced age, they could be easier to comprehend the information (Chen et al., 2013; Sayin et al. 2011; Stergiopoulou et al., 2006). Patients could replay the information videos anytime for better comprehension and understanding. It is less boring than reading texts and pictures on papers. It could also allow time for patients to think and ask questions in order to achieve better understanding. Besides, the current information materials would be revised and incorporate into new information, especially the postoperative pain management methods. Information is standardized for staff to educate or answer patients if necessary. Patients can get more information and this could reduce their level of preoperative anxiety (Sadati et al., 2013). Tablet is chosen in the view of its convenience to use and retrieve.
Potential Risks

From the perspective of patients, as the tablet is circulated and reused, there is a risk of cross-infection between users, i.e. preoperative patients, and between staff and patients. Hand hygiene is performed and the tablet should be disinfected after use.

From the perspective of staff, since the circulating tablet could be damaged or lost by accidents, extra work is needed for handling the repair progress. A good after-sales service is preferable. Besides, it is not uncommon that some staff may resist any new changes or any implementations of new innovations unless they think that it is greatly useful as they hesitate to spend time to get to know the details.

Implementation costs

The implementation costs can be divided into the material costs and the non-material costs. For the material cost, the majority of cost in short-term comes from the tablets. At the beginning, one tablet is necessary as it is still piloting. Also, materials used in movies are included. In the long run, one more tablet would be better so that one tablet is reserved for one ward. In cases one of them is not functioning, the other one can still be used. Besides, the repairing fee beyond warranty if the instrument is out of
order or physically damaged. In addition, materials used in movies for future updating should also be counted. For the non-material costs, it may have lower staff morale since the innovation maybe a kind of burden to them in addition to the high workload.

In conclusion, the potential benefits of implementing the innovation outweigh the potential risks and the implementation costs. Meanwhile, it is proven that the innovation is highly transferable and feasible in the current proposed setting and thus it is recommended to implement.

3.4 Evidence-Based Practice Guideline

The evidence-based practice guideline of preoperative nursing education for patients undergo elective video-assisted thoracic surgeries in the cardiothoracic surgery department, aiming to alleviate the pain level of those postoperative patients. The EBP guideline will include details of the clinical background, objectives, target population and recommendations based on the clinical studies (Kol et al., 2014; Chen et al., 2013; De Aguilar-nascimento et al., 2013; Sadati et al., 2013; Sayin et al., 2011; Stergiopoulou et al., 2006). The recommendations would be evaluated or graded by using the Grades of Recommendation (SIGN, 2014). Details of the evidence-based
Chapter 4: Implementation Plan

After discussing the implementation potential and clinical guideline thoroughly in the previous chapter, it showed that the evidence-based practice is transferable and feasible to the current clinical setting while the cost and benefit ratio are reasonable. Hence, the next step is planning of implementation of practice. It involves plans for communication, pilot study and evaluation.

4.1 Communication Plan

Identification of stakeholders

Stakeholder, possessing authorities to make changes of the future of the organization, ranges from personal to organizational levels in which leaders, managers and front-line staff are usually involved (Bryson, 2004). In addition, stakeholders are widely reported to be essential components in sustaining plans and programs in the long run (Bryson and Crosby, 1992; Baumgartner and Jones, 1993; Roberts and King, 1996; Jacobs and Shapiro, 2000; van Schendelen, 2002; Bryson, 2004).
Hence, stakeholder identification is necessary in the first step of the communication plan.

According to Bryson (2004), it is possible to classify stakeholders into at least three parties, the leaders, managers and front-line staff.

**Leaders**

In this category, it refers to the Advanced Practice Nurses (APN) in the general ward of the cardiothoracic surgery department (CTSD). They are experienced senior leaders in the ward and are responsible for the Staff Development Record (SDR) of the Registered Nurses and Enrolled Nurses. The SDR encourages nurses to think and make better for the ward. It is possible to seek advice from the APNs first before introducing the plan for the managerial level. Moreover, the APNs can act as a facilitator to negotiate with the Ward Manager for adopting the proposed evidence-based practice since it benefits ward patients and improves the standard of clinical nursing care in the unit. In addition, they can also facilitate ward colleagues, particularly the Day Centre staff about the benefits of the interventions and motivate them to accept and agree to the change. Last but not least, they can be the advisor on the clinical
information materials included in the multimedia used for the preoperative nursing education.

**Managers**

The managerial level can also be regarded as the administrative level of the unit. It involves the Chief of Service (COS), Department Operation Manager (DOM) and Ward Manager (WM) of the general ward of the CTSD. They possess the power for approving or rejecting any kinds of proposals in the general ward. The WM can also be an advisor of the administrative aspect, such as manpower, budgets and resources. Feedbacks are crucial for revising the proposal to get approval from all above decision makers. Once the intervention is ratified and endorsed by the administrators, it is believed that the unit supports the intervention and the implementation plans can be further preceded. Furthermore, the information materials included in the final product have to be endorsed by the three parties finally.

**Front-line staff**

The front-line staff involves all nurses of the general ward, surgeons and physiotherapists. Nurses are the ward case nurses and the Day Centre nurses. Day
Centre nurses are the major service provider to carry out the intervention since they have been doing preoperative nursing education as usual. Ward staff can contribute by involving in the communication group, assisting Day Centre staff and supporting the intervention. Benefits like alleviating postoperative pain level of patients and reducing workload of staff should be highlighted in order to gain their support. Details will be announced and informed to all ward staff after materials are finalized. Besides, surgeons and physiotherapists are the advisors. They are invited to review the education information and provide feedback accordingly. This is to assure that the information is accurate and state of the art.

**Receivers**

Apart from the stakeholder categories mentioned by Bryson (2004), the receivers can also be counted as one of the stakeholders. Patients who are eligible, as discussed in Chapter 1, are the receivers for the intervention will be consented for the pilot test.

The effectiveness of the intervention on postoperative pain level is anticipated. Hence further revisions on the guideline can be made.
Communication Process

The communication process starts by introducing the intervention to the managerial level of the stakeholders, particularly the Ward Manager. The ward culture emphasizes the use of evidence-based practice. Hence, it is crucial to show the advantages, which are concluded from previous studies. Meetings are arranged to the managerial stakeholders. After gaining approval, it is essential to communicate the intervention to the other stakeholders. It is necessary to get them involved to the intervention process and gain support from them. When there are any amendments or updated information, it is necessary to inform them and answer their inquiries. Last but not least, a work team for the intervention should be set up to prepare, carry out, evaluate and sustain the intervention. The whole communication process would take around five-months.

4.2 Pilot Study Plan

Conducting pilot studies makes a number of advantages for the proposed innovation plan, like exploring feasibility and workability of the research protocol, identifying unexpected problems and barriers for further revision and refinement, convincing the
stakeholders for support and funding, despite of a “guarantee” of the final success of practicing the intervention in the long run while the chance of success can be increased (Teijlingen & Hundley, 2001).

**Objectives**

1. To examine the transferability and feasibility of the proposed evidence-based intervention

2. To identify potential barriers and difficulties in operating the intervention

3. To revise and refine the evidence-based guideline

4. To collect feedbacks from front-line staff

5. To evaluate the appropriateness of the evaluation tools

**Preparation**

After setting up the communication team, all the information and resource materials will be collected, purchased and made in 8 weeks’ time. Then, the resource material contents will be submitted to WM and DOM for endorsement in 2 weeks. When the resources materials are ready, Day Centre nurses will then be informed and trained in order to get them familiar with the contents in 4 weeks time. At the same time, the
communication team will start introduction of the intervention to all ward staff in ward. An attendance record will be given to them to sign afterwards and the record will be submitted to the WM finally for reference.

**Sampling and settings**

Samples are recruited based on the criteria discussed in Chapter 1. Participants will be consented before the test. The intervention will be performed in the 2 general wards of the CTSD. The pilot test will be carried out for 6 weeks. Evaluation and revision of the intervention will be commenced from the third week of pilot test and last for 8 weeks in total, including feedbacks from all staff are collected. Particularly the Day Centre nurses, the main users of the new intervention, will be interviewed directly for more advices. Refinement on pilot test will be reported to the WM and DOM first then informed to all staff in two weeks.

**4.3 Evaluation Plan**

Evaluation can provide a clear picture of the effectiveness of the implementing programme (Duerden, 2012). Hence, it is essential in order to sustain the programme in the long run and possibly seek more funding and support from the stakeholders for
further development.

Identifying outcomes

The postoperative pain level experienced by patients, which is the primary outcome of the study, will be determined by using the Numeric Rating Scale (NRS). It is a kind of Visual Analogue Scale (VAS) and is frequently used for measuring intensity of pain (Dauphin, 1999). The scores of the scale range from 0 to 10, while the two extremes mean “no pain” and “worst pain”. The less the number indicated by patients, the less postoperative pain experienced by them.

Time for Taking Measurements

Patients who are eligible for the study would first get the baseline pain score one day before surgery. Since the innovation will take effects after operations, candidates will be asked for the pain score at the 6th, 12th and 24th hour after surgery.

Sampling and Sample Size

Participants who undergo elective Video-assisted thoracic surgeries are invited for the study, based on the inclusion and exclusion criteria discussed in Chapter 1.

The sample size will be calculated based on the primary outcome, the postoperative
pain level by using the Numeric Rating Scale. In calculation of the sample size for the evaluation, computer software is used (Lenth, 2006). The standard deviation is set at 2.5 in accordance to the linear scale of the NRS. According to previous studies in Chapter 1, the mean effect size of the intervention on postoperative pain at 24\textsuperscript{th} hour is 1.7 (De Aguilar-Nascimento et al., 2013; Chen et al., 2013 & Sadati et al., 2013), while it is used here to determine the sample size. Hence, in order to obtain a 5\% level of significance (p<0.05) and a statistical power of 80\%, the sample size calculated will be 19. With the attrition rate of 10\%, the number of sample size required will be 21.

Data analysis

For the data analysis, the Statistical Package for Social Science (SPSS) software will be used. A two-tailed paired t-test with 5\% of level of significance is used. The pain score of the postoperative patients will be collected and computed into the software for analysis. A timeline is illustrated in Appendix 5.
4.4 Basis of Implementation

After data analysis, the evaluation report will be submitted to the stakeholders of the administrative level for reviewing the implementation and possibly encouraging further development of using the innovation in other aspects.

In the view of patient outcome, our primary focus is on the postoperative pain. From the previous studies, there was an average reduction of pain score of 1.7, which is about one-fifth alleviation of painful sensation experienced by postoperative patients, represents possible effectiveness of the suggested implementation. Since the pain experienced by the patients is reduced effectively, it benefits them in various ways. It can facilitate them to perform deep breathing exercises and Triflow exercises effectively for promoting lung expansion and recovery. Since then, they can get rid of the surgical chest drains in earlier times and at the same time it can promote early mobilization. As a result, fewer postoperative complications and reduced length of hospitalization could be made.
References


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Hospital Authority (2013). Retrieved February 13, 2016 from The Hong Kong Special Administrative Region, Hospital Authority Web site:

http://www.ha.org.hk/visitor/ha_visitor_index.asp?Content_ID=10009&Lang=ENG&Dimension=100&Parent_ID=10004&Ver=HTML


Lung Cancer (2014). Retrieved Month Date, from Hospital Authority, Smart Patient Web site:


Statistics (2014). Retrieved December 20, 2015 from Hospital Authority, Hong Kong Cancer Registry Web site:

http://www3.ha.org.hk/cancereg/statistics.html#annualfigures


Appendix 1 – PRISMA Flow Diagram (2009)

Identification

Records identified through database searching (PubMed) (n=102)

Additional records identified through other sources (EBSCOhost) (n=66)

Records after duplicates removed (n=105)

Screening

Records screened (n=9)

Recorded excluded (n=96)

Eligibility

Full-text articles assessed for eligibility (n=6)

Studies included in qualitative synthesis (n=0)

Included

Studies included in quantitative synthesis (n=6)

Full-text articles excluded, with reasons:
- Results are not analyzed completely
- Intervention not feasible (n=3)
## Table of evidence

<table>
<thead>
<tr>
<th>Study</th>
<th>Citation / Design</th>
<th>Sample characteristics</th>
<th>Intervention</th>
<th>Control</th>
<th>Outcomes (Assessment time)</th>
<th>Effect size (Intervention - Control)</th>
<th>Sample characteristics</th>
</tr>
</thead>
</table>
| De Aguilar-Nascimento et al. (2013) / RCT (+) | Detailed but simple verbal and written perioperative information, including 8 items with corresponding information (n=56) | 59 (80%) Female | Intervention Group (n=56) | No verbal and written perioperative information (n=63) | Pain VAS (0-10) - At 24h after surgery - 2.1 (p<0.01) | 1. Patients under 50 years | **Visual Analog Scale** | 4. 59 (80%) Female | 4. 59 (80%) Female | 4. 59 (80%) Female | 4. 59 (80%) Female
|       |                  |                        |              |         |                           |                                      |                       |                       | 3. Mean age=40yrs    | 3. Mean age=40yrs    | 3. Mean age=40yrs    | 3. Mean age=40yrs
|       |                  |                        |              |         |                           |                                      |                       |                       | 2. Mean age=40yrs    | 2. Mean age=40yrs    | 2. Mean age=40yrs    | 2. Mean age=40yrs
|       |                  |                        |              |         |                           |                                      |                       |                       | 1. Patients under 50 years | 1. Patients under 50 years | 1. Patients under 50 years | 1. Patients under 50 years

**Appendix 2**
The Effect of a Multimedia Health Educational Program on the Postoperative Recovery of Patients undergong Laparoscopic Cholecystectomy

Stergiopoulou et al. (2006) / RCT(+)

<table>
<thead>
<tr>
<th>Effect size</th>
<th>Intervention (Assessment Time)</th>
<th>Control</th>
<th>Intervention</th>
<th>Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>-2.4 (p = 0.021)</td>
<td>Postoperative pain</td>
<td>NRS 4</td>
<td>NRS 4</td>
<td>NRS 4</td>
</tr>
<tr>
<td>0-10</td>
<td>Information structurally given by:</td>
<td>RN</td>
<td>Multimedia CD with visual image</td>
<td>RN</td>
</tr>
<tr>
<td>1. A MHEP (the use of a Multimedia Health Educational Program)</td>
<td>2. A leaflet based on MHEP (n=15)</td>
<td>(n=15)</td>
<td>(n=15)</td>
<td>(n=15)</td>
</tr>
<tr>
<td>3. Verbally from RN</td>
<td>4. Greek patients</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Outcome Analysis:
- Postoperative pain score first 16hr
  - NRS (0-10)
  - 2.4 (p = 0.021)
### Effect of Educational Intervention on the Pain and Rehabilitation Performance of Patients Undergoing Total Knee Replacement

**Chen et al. (2013)**

#### Quasi-experimental Design (+)

**Sample Characteristics**

<table>
<thead>
<tr>
<th>Male (%)</th>
<th>Female (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>37 (47.5%)</td>
<td>63 (68.5%)</td>
</tr>
</tbody>
</table>

**Control Group**
- Mean age = 69.56 years (SD = 9.45)
- 46 (72%) females
- Chinese patients

**Intervention Group**
- Mean age = 68.9 years (SD = 8.59)
- 36 (68.5%) females
- Chinese patients

#### Intervention
- Receiving preoperative cognitive-behavioral education program with a health education CD (contains videos) and pamphlet, verbal instructions by assigned nurses, and review on post-operation day 1 (in addition to routine care (n=42)

#### Control
- Receiving routine care and verbal instructions by case nurse only (n=50)

#### Outcomes

<table>
<thead>
<tr>
<th>Pain Level (%)</th>
<th>Post-operation Day 1, 2, 3, 4 &amp; 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>VNRS (0-10)</td>
<td>D1: 2.894 (p=0.005) D2: 2.829 (p=0.006) D3: 0.124 (p=0.901) D4: 0.342 (p=0.733) D5: 0.106 (p=0.916)</td>
</tr>
</tbody>
</table>

**Assessment Time**

1. Preoperative pain level
2. Pain level in the first 1–2 post-operation days
3. Pain level in the first 1–2 days post-operation
4. Japanese Knee Performance Scale
5. Visual Analog Scale (VNS)
Preoperative Education and Use of Analgesic Before Onset of Pain Routinely for Post-thoracotomy Pain Control Can Reduce Pain Effect and Total Amount of Analgesics Administered Post-thoracotomy Administration of analgesics

Kol et al. (2014) RCT (+)

1. Patients undergo thoracotomy
2. Mean age=51 yrs
3. 21(30%) Female
4. Western patients

Preoperative education on pain management and pharmacological management and education on pain

Preoperative

Postoperative

Effect size

Intervention

Control

Outcomes

Citation / Design (Study quality)

Sample characteristics

- 48 yrs: 0.43
- 24 yrs: 1.49
- 12 yrs: 2.00
- 8 yrs: 2.74
- 4 yrs: 2.80
- 2 yrs: 2.35
- 2 p.m.: 2.35
(10^0.03 p<0.05)

Verbal Category Scale

Behavioral Pain Assessment Scale

- 10^0.13 yrs
- 24 yrs, 48 yrs, 72 yrs
- 2 p.m.:1.70
- 8 p.m.:1.94
- 4 p.m.:1.19
- 2 p.m.:1.48

VCS (0-5)

BPAS (1-4)

Effect size

Intervention - Control

(assessment time)

(1.0°C)

Preoperative

Postoperative

Outcome

Control

Kol et al. (2014) RCT (+)

1. Patients undergo thoracotomy
2. Mean age=51 yrs
3. 21(30%) Female
4. Western patients

Preoperative education on pain management and pharmacological management and education on pain

Preoperative

Postoperative

Effect size

Intervention

Control

Outcomes

Citation / Design (Study quality)

Sample characteristics

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- 12 yrs: 2.00
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- 4 yrs: 2.80
- 2 yrs: 2.35
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(10^0.03 p<0.05)

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Behavioral Pain Assessment Scale

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- 24 yrs, 48 yrs, 72 yrs
- 2 p.m.:1.70
- 8 p.m.:1.94
- 4 p.m.:1.19
- 2 p.m.:1.48

VCS (0-5)

BPAS (1-4)
<table>
<thead>
<tr>
<th>Intervention - Control</th>
<th>Control</th>
<th>Intervention</th>
<th>Sample characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pain intensity (P1)</td>
<td>Immediate postop position</td>
<td>Immediate postop position</td>
<td>63.1% aged between 38-57yrs</td>
</tr>
<tr>
<td>VAS (0-10)</td>
<td>Immediate postop position</td>
<td>Immediate postop position</td>
<td>All women</td>
</tr>
<tr>
<td>Effect size</td>
<td>0.293</td>
<td>0.237</td>
<td>0.563 (p=0.574)</td>
</tr>
<tr>
<td>Outcomes</td>
<td></td>
<td></td>
<td>Hr1: -0.352, p=0.725</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Hr2: -2.309, p=0.021</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Hr3: -2.241, p=0.025</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Hr4: -2.495, p=0.013</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Hr5: -2.569, p=0.010</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Hr6: -3.158, p=0.002</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Before discharge: 24 hours, postop (n=42)</td>
</tr>
<tr>
<td>Citation / Design (Study quality)</td>
<td>Sample characteristics</td>
<td>Intervention</td>
<td>Control</td>
</tr>
<tr>
<td>----------------------------------</td>
<td>------------------------</td>
<td>--------------</td>
<td>---------</td>
</tr>
<tr>
<td>Sadati et al. (2013)/ RCT(+)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Patients undergo laparoscopic cholecystectomy: a randomized clinical trial</td>
<td>4. Iranian patients (n=50), including: - operation room environment - anesthesia process - surgical benefits - postoperative care</td>
<td>Received preoperative nursing visit, 1 day before operation and just before entering operation room (n=50)</td>
<td>Received routine, conventional nursing visit (n=50)</td>
</tr>
</tbody>
</table>
Appendix 3a – SIGN checklists for Level of Evidence (2014)


<table>
<thead>
<tr>
<th>SECTION 1: INTERNAL VALIDITY</th>
<th>Does this study do it?</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>In a well conducted RCT study...</strong></td>
<td></td>
</tr>
<tr>
<td>1.1 The study addresses an appropriate and clearly focused question.</td>
<td>Yes</td>
</tr>
<tr>
<td>1.2 The assignment of subjects to treatment groups is randomised.</td>
<td>Yes</td>
</tr>
<tr>
<td>1.3 An adequate concealment method is used.</td>
<td>Can’t say</td>
</tr>
<tr>
<td>1.4 The design keeps subjects and investigators ‘blind’ about treatment allocation.</td>
<td>No</td>
</tr>
<tr>
<td>1.5 The treatment and control groups are similar at the start of the trial.</td>
<td>Yes</td>
</tr>
<tr>
<td>1.6 The only difference between groups is the treatment under investigation.</td>
<td>Yes</td>
</tr>
<tr>
<td>1.7 All relevant outcomes are measured in a standard, valid and reliable way.</td>
<td>Can’t say</td>
</tr>
</tbody>
</table>
| 1.8 What percentage of the individuals or clusters recruited into each treatment arm of the study dropped out before the study was completed? | Intervention: 39%  
Control: 37% |
| 1.9 All the subjects are analysed in the groups to which they were randomly allocated (often referred to as intention to treat analysis). | Yes |
| 1.10 Where the study is carried out at more than one site, results are comparable for all sites. | Does not apply |

<table>
<thead>
<tr>
<th>SECTION 2: OVERALL ASSESSMENT OF THE STUDY</th>
<th></th>
</tr>
</thead>
</table>
| 2.1 How well was the study done to minimise bias?  
*Code as follows:* | Acceptable (+) |
| 2.2 Taking into account clinical considerations, your evaluation of the methodology used, and the | Sample size is adequate initially, however the drop out |
2.3 Are the results of this study directly applicable to the patient group targeted by this guideline?  Yes

2.4 Notes. Summarise the authors’ conclusions. Add any comments on your own assessment of the study, and the extent to which it answers your question and mention any areas of uncertainty raised above.

Detailed oral and written preoperative education given to patients who undergo elective cholecystectomy surgery are evidenced to improve postoperative pain and nausea.

The mean of various items in the result should also be calculated rather than merely the median as the number can give better comparison.
### Appendix 3b – SIGN checklists for Level of Evidence (2014)


### SECTION 1: INTERNAL VALIDITY

<table>
<thead>
<tr>
<th>In a well conducted RCT study…</th>
<th>Does this study do it?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1 The study addresses an appropriate and clearly focused question.</td>
<td>Can’t say</td>
</tr>
<tr>
<td>1.2 The assignment of subjects to treatment groups is randomised.</td>
<td>Yes</td>
</tr>
<tr>
<td>1.3 An adequate concealment method is used.</td>
<td>Can’t say</td>
</tr>
<tr>
<td>1.4 The design keeps subjects and investigators ‘blind’ about treatment allocation.</td>
<td>No</td>
</tr>
<tr>
<td>1.5 The treatment and control groups are similar at the start of the trial.</td>
<td>Yes</td>
</tr>
<tr>
<td>1.6 The only difference between groups is the treatment under investigation.</td>
<td>Yes</td>
</tr>
<tr>
<td>1.7 All relevant outcomes are measured in a standard, valid and reliable way.</td>
<td>Yes</td>
</tr>
<tr>
<td>1.8 What percentage of the individuals or clusters recruited into each treatment arm of the study dropped out before the study was completed?</td>
<td>0%</td>
</tr>
<tr>
<td>1.9 All the subjects are analysed in the groups to which they were randomly allocated (often referred to as intention to treat analysis).</td>
<td>Yes</td>
</tr>
<tr>
<td>1.10 Where the study is carried out at more than one site, results are comparable for all sites.</td>
<td>Does not apply</td>
</tr>
</tbody>
</table>

### SECTION 2: OVERALL ASSESSMENT OF THE STUDY

| 2.1 How well was the study done to minimise bias? | Acceptable (+) ✔ |

---

54
| Code as follows:                                                                 | Sample sizes are not equal for the comparison groups, ie 15 for control group and 45 for intervention group, in pain score and nausea score Not certain |
|-----|--------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|
| 2.2 Taking into account clinical considerations, your evaluation of the methodology used, and the statistical power of the study, are you certain that the overall effect is due to the study intervention? | Yes |
| 2.3 Are the results of this study directly applicable to the patient group targeted by this guideline? | |

2.4 **Notes.** Summarise the authors’ conclusions. Add any comments on your own assessment of the study, and the extent to which it answers your question and mention any areas of uncertainty raised above.

The multimedia health education program showed statistically significant in reducing postoperative pain score experienced by patients though it was not obvious.

Author should show the effect size and the mean of the results collected for better understanding and comparing the effectiveness of the interventions with the control.

The information on preoperative nursing education can be further explained in detail.
APPENDIX 3C – SIGN CHECKLISTS FOR LEVEL OF EVIDENCE (2014)


**SECTION 1: INTERNAL VALIDITY**

<table>
<thead>
<tr>
<th><strong>In an well conducted case control study:</strong></th>
<th><strong>Does this study do it?</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1.1</strong> The study addresses an appropriate and clearly focused question.</td>
<td>Yes</td>
</tr>
</tbody>
</table>

**SELECTION OF SUBJECTS**

| **1.2** The cases and controls are taken from comparable populations. | Yes |
| **1.3** The same exclusion criteria are used for both cases and controls. | Yes |
| **1.4** What percentage of each group (cases and controls) participated in the study? | Cases: 0%  Controls: 0% |
| **1.5** Comparison is made between participants and non-participants to establish their similarities or differences. | Yes |
| **1.6** Cases are clearly defined and differentiated from controls. | Yes |
| **1.7** *It is clearly established that controls are non-cases* | Can’t say |

**ASSESSMENT**

<p>| <strong>1.8</strong> Measures will have been taken to prevent knowledge of primary exposure influencing case ascertainment. | Can’t say |
| <strong>1.9</strong> Exposure status is measured in a standard, valid and reliable way. | Yes |</p>
<table>
<thead>
<tr>
<th></th>
<th>The main potential confounders are identified and taken into account in the design and analysis.</th>
<th>Can’t say</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.10</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**STATISTICAL ANALYSIS**

<table>
<thead>
<tr>
<th></th>
<th>Confidence intervals are provided.</th>
<th>Yes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.11</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**SECTION 2: OVERALL ASSESSMENT OF THE STUDY**

<table>
<thead>
<tr>
<th></th>
<th>How well was the study done to minimise the risk of bias or confounding?</th>
<th>Acceptable (+)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Taking into account clinical considerations, your evaluation of the methodology used, and the statistical power of the study, do you think there is clear evidence of an association between exposure and outcome?</th>
<th>Yes</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.2</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Are the results of this study directly applicable to the patient group targeted by this guideline?</th>
<th>Yes</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2.4 **Notes.** Summarise the authors conclusions. Add any comments on your own assessment of the study, and the extent to which it answers your question and mention any areas of uncertainty raised above.

The author stated that a cognitive-behavioural education program is beneficial to patients undergo total knee replacement surgery in the purpose of alleviating postoperative pain and better rehabilitation exercise performances. Furthermore, using CD as a form of delivery education messages is thought to be economy.

Nevertheless, the “routine care” of the control group was not clearly mentioned in the article.
Appendix 3d – SIGN checklists for Level of Evidence (2014)


### SECTION 1: INTERNAL VALIDITY

**In a well conducted RCT study…**

<table>
<thead>
<tr>
<th></th>
<th>Does this study do it?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1</td>
<td>The study addresses an appropriate and clearly focused question.</td>
</tr>
<tr>
<td>1.2</td>
<td>The assignment of subjects to treatment groups is randomised.</td>
</tr>
<tr>
<td>1.3</td>
<td>An adequate concealment method is used.</td>
</tr>
<tr>
<td>1.4</td>
<td>The design keeps subjects and investigators 'blind' about treatment allocation.</td>
</tr>
<tr>
<td>1.5</td>
<td>The treatment and control groups are similar at the start of the trial.</td>
</tr>
<tr>
<td>1.6</td>
<td>The only difference between groups is the treatment under investigation.</td>
</tr>
<tr>
<td>1.7</td>
<td>All relevant outcomes are measured in a standard, valid and reliable way.</td>
</tr>
<tr>
<td>1.8</td>
<td>What percentage of the individuals or clusters recruited into each treatment arm of the study dropped out before the study was completed?</td>
</tr>
<tr>
<td>1.9</td>
<td>All the subjects are analysed in the groups to which they were randomly allocated (often referred to as intention to treat analysis).</td>
</tr>
<tr>
<td>1.10</td>
<td>Where the study is carried out at more than one site, results are comparable for all sites.</td>
</tr>
</tbody>
</table>
## SECTION 2: OVERALL ASSESSMENT OF THE STUDY

<table>
<thead>
<tr>
<th>2.1</th>
<th>How well was the study done to minimise bias?</th>
<th>Acceptable (+)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.2</td>
<td>Taking into account clinical considerations, your evaluation of the methodology used, and the statistical power of the study, are you certain that the overall effect is due to the study intervention?</td>
<td>Sample size is enough to yield CI=95%.</td>
</tr>
<tr>
<td>2.3</td>
<td>Are the results of this study directly applicable to the patient group targeted by this guideline?</td>
<td>Yes</td>
</tr>
</tbody>
</table>

### 2.4 Notes. Summarise the authors’ conclusions. Add any comments on your own assessment of the study, and the extent to which it answers your question and mention any areas of uncertainty raised above.

The author suggested that preoperative education of pain management and pharmalogical methods can play an important part on reduction of postoperative pain and over-analgesics consumptions.

Baseline of pain levels may also be included in the demographic data to assure no significant difference in both groups.

Nurses can pinpoint pain management methods and usual pain killers used in postoperative patients in the preoperative education.

### SECTION 1: INTERNAL VALIDITY

**In a well conducted RCT study...**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th>Does this study do it?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1</td>
<td>The study addresses an appropriate and clearly focused question.</td>
<td>Yes</td>
</tr>
<tr>
<td>1.2</td>
<td>The assignment of subjects to treatment groups is randomised.</td>
<td>Can't say</td>
</tr>
<tr>
<td>1.3</td>
<td>An adequate concealment method is used.</td>
<td>Can't say</td>
</tr>
<tr>
<td>1.4</td>
<td>The design keeps subjects and investigators 'blind' about treatment allocation.</td>
<td>Can't say</td>
</tr>
<tr>
<td>1.5</td>
<td>The treatment and control groups are similar at the start of the trial.</td>
<td>No</td>
</tr>
<tr>
<td>1.6</td>
<td>The only difference between groups is the treatment under investigation.</td>
<td>Yes</td>
</tr>
<tr>
<td>1.7</td>
<td>All relevant outcomes are measured in a standard, valid and reliable way.</td>
<td>Yes</td>
</tr>
<tr>
<td>1.8</td>
<td>What percentage of the individuals or clusters recruited into each treatment arm of the study dropped out before the study was completed?</td>
<td>0%</td>
</tr>
<tr>
<td>1.9</td>
<td>All the subjects are analysed in the groups to which they were randomly allocated (often referred to as intention to treat analysis).</td>
<td>Yes</td>
</tr>
<tr>
<td>1.10</td>
<td>Where the study is carried out at more than one site, results are comparable for all sites.</td>
<td>Does not apply</td>
</tr>
</tbody>
</table>
### SECTION 2: OVERALL ASSESSMENT OF THE STUDY

<table>
<thead>
<tr>
<th>2.1</th>
<th>How well was the study done to minimise bias?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><em>Code as follows:</em> [Acceptable (+)]</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>2.2</th>
<th>Taking into account clinical considerations, your evaluation of the methodology used, and the statistical power of the study, are you certain that the overall effect is due to the study intervention?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>The results were evaluated at 95% CI, and the level of significance was set at p &lt; 0.05 where sample size was adequate.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>2.3</th>
<th>Are the results of this study directly applicable to the patient group targeted by this guideline?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>2.4 <strong>Notes.</strong></th>
<th>Summarise the authors’ conclusions. Add any comments on your own assessment of the study, and the extent to which it answers your question and mention any areas of uncertainty raised above.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>The author concluded that detailed analgesics information included in the preoperative nursing education could effectively reduce patients’ postoperative pain and empower early mobilization.</td>
</tr>
<tr>
<td></td>
<td>It is uncertain if the samples were randomized.</td>
</tr>
<tr>
<td></td>
<td>Early mobilization is crucial in postoperative patients.</td>
</tr>
</tbody>
</table>

### Appendix 3f – SIGN checklists for Level of Evidence (2014)

#### In a well conducted RCT study...

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><em>Does this study do it?</em></td>
<td></td>
</tr>
<tr>
<td>1.1</td>
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<td>1.2</td>
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<tr>
<td>1.3</td>
<td>An adequate concealment method is used.</td>
<td>Can't say</td>
</tr>
<tr>
<td>1.4</td>
<td>The design keeps subjects and investigators 'blind' about treatment allocation.</td>
<td>No</td>
</tr>
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<td>The treatment and control groups are similar at the start of the trial.</td>
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<td>The only difference between groups is the treatment under investigation.</td>
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</tr>
<tr>
<td>1.7</td>
<td>All relevant outcomes are measured in a standard, valid and reliable way.</td>
<td>Can't say</td>
</tr>
<tr>
<td>1.8</td>
<td>What percentage of the individuals or clusters recruited into each treatment arm of the study dropped out before the study was completed?</td>
<td>0%</td>
</tr>
<tr>
<td>1.9</td>
<td>All the subjects are analysed in the groups to which they were randomly allocated (often referred to as intention to treat analysis).</td>
<td>Does not apply</td>
</tr>
</tbody>
</table>
1.10 Where the study is carried out at more than one site, results are comparable for all sites.  

<table>
<thead>
<tr>
<th>SECTION 2: OVERALL ASSESSMENT OF THE STUDY</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.1 How well was the study done to minimise bias? Code as follows:</td>
</tr>
<tr>
<td>2.2 Taking into account clinical considerations, your evaluation of the methodology used, and the statistical power of the study, are you certain that the overall effect is due to the study intervention?</td>
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<td>2.3 Are the results of this study directly applicable to the patient group targeted by this guideline?</td>
</tr>
<tr>
<td>2.4 Notes. Summarise the authors’ conclusions. Add any comments on your own assessment of the study, and the extent to which it answers your question and mention any areas of uncertainty raised above.</td>
</tr>
</tbody>
</table>

Author stated that preoperative nursing visits with information about the environment of the operation theatre, surgery team, anaesthesia process, surgical benefits and postoperative care could alleviate patient’s anxiety and postoperative complications like pain, nausea and vomiting.

Baseline pain level before operation could also be obtained for better comparison. It can be more elaborated on the “routine” nursing visit to make it clear for readers the differences.

Was the preoperative nursing visits only verbal education or provided with pamphlets or other visual aids?
Appendix 4 – Evidence-based practice guideline

Preoperative nursing education with the use of multimedia for patients who undergo elective video-assisted thoracotomy surgery

Aim

To effectively reduce the postoperative pain experienced by patients who undergo elective video-assisted thoracotomy surgery (VATS) in the Department of Cardiothoracic Surgery (CTSD).

Objectives

1) To describe evidence-based multimedia approach in preoperative nursing education for reducing postoperative pain in patients who undergo VATS in CTSD.

2) To summarize the clinical studies and formulate recommendations for the evidence-based guidelines.
**Intended users**

The intended users are all the nursing staff in the general wards of the CTSD, particularly the Day-Centre nurses who are responsible mainly for the preoperative nursing education. Other nursing staff is encouraged to understand the education information in order to support themselves to give standardized preoperative information and the logistics of the circulation of tablet.

**Target population**

The evidence-based guideline is designed for all adult patients who admit CTSD general ward for scheduled elective VATS.

**Recommendations**

**Recommendation 1**

Patients undergo elective VATS are eligible. (Grade of recommendation: A)

There are no reported adverse effects in all the clinical studies, which demonstrated the use of multimedia in preoperative education in various types of operations (Kol et al., 2014; Chen et al., 2013; De Aguilar-nascimento et al., 2013; Sadati et al., 2013; Sayin et al., 2011; Stergiopoulou et al., 2006).
Recommendation 2:

Multimedia as a tool is effective in preoperative nursing education. (Grade of recommendation: A)

Multimedia, include videos and pictures, materials are cost-effective and they can repeat to use. In addition, patients with lower education level could easily understand the information (Chen et al., 2013). It was evidently proved that multimedia approach alone could positively reduce postoperative pain (Stergiopoulou et al., 2006).

Recommendation 3:

Preoperative nursing education can be effective as 1 single time before the day of surgery. (Grade of recommendation: B)

Most clinical studies reported to deliver preoperative nursing education before the operation day (Kol et al., 2014; Chen et al., 2013; De Aguilar-nascimento et al., 2013; Sayin et al., 2011; Stergiopoulou et al., 2006); while one study had the last interview education on the operation day before entering the operation theatre (Sadati et al., 2013).
**Recommendation 4:**

Pharmacological pain control methods should be included. (Grade of Recommendation: A)

Pharmacological pain control methods are important components to be included in the education information, in the form of simple texts and pictures, and they are effective in control postoperative pain, early mobilization and well-being (Kol et al., 2014; De Aguilar-nascimento et al.; Sayin et al., 2011).

**Recommendation 5:**

Postoperative pain level is evaluated at 24 hours after operation. Grade of Recommendation: B)

Most of the studies would assess patients’ level of postoperative pain at 24-hours after operation. (Kol et al., 2014; Chen et al., 2013; De Aguilar-nascimento et al., 2013; Sadati et al., 2013).
<table>
<thead>
<tr>
<th>Week</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-2</td>
<td>Data collection</td>
</tr>
<tr>
<td>3-4</td>
<td>Full implementation</td>
</tr>
<tr>
<td>5-6</td>
<td>Announcement of refinement to staff</td>
</tr>
<tr>
<td>7-10</td>
<td>Evaluation and revision of guidelines (pilot test)</td>
</tr>
<tr>
<td>11-16</td>
<td>Pilot test</td>
</tr>
<tr>
<td>17-19</td>
<td>Introduction to all staff and endorsement</td>
</tr>
<tr>
<td>20-22</td>
<td>Materials preparation</td>
</tr>
<tr>
<td>23-26</td>
<td>Formulation of communication team</td>
</tr>
<tr>
<td>27-28</td>
<td>Get approval and support for implementation</td>
</tr>
<tr>
<td>29-30</td>
<td>Event: Final evaluation</td>
</tr>
<tr>
<td>31-36</td>
<td>37-41</td>
</tr>
</tbody>
</table>

**Appendix 5 – Timeline of the new intervention**