

EVIDENCE-BASED NURSING FOR PREVENTION AND MANAGEMENT OF DELIRIUM IN PATIENTS UNDERGOING CARDIAC SURGERY: CASE STUDIES

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ABSTRAK

Penatalaksanaan delirium sangat penting untuk menurunkan risiko bagi pasien serta penyedia layanan kesehatan, seperti perawat yang merawat pasien sepenuhnya dan memainkan peran penting dalam pencegahan delirium dari awal perawatan pasca operasi hingga pasien dipindahkan ke rumah sakit. bangsal dan kemudian dipulangkan. Tujuan dari penelitian ini adalah untuk menguji kegunaan instrumen untuk skrining delirium pada pasien yang menjalani operasi jantung serta efektivitas intervensi keperawatan berbasis bukti untuk pencegahan dan manajemen delirium pada pasien operasi jantung. Penelitian ini menggunakan desain studi kasus dengan lima pasien rawat inap yang menjalani operasi jantung, termasuk pasien yang dirawat 1-2 hari sebelum atau dalam 7 hari prosedur. Berdasarkan pedoman NICE, penulis menyediakan metode pengumpulan data untuk skrining delirium dan intervensi untuk pencegahan dan manajemen delirium pada pasien setelah operasi jantung. Menurut data yang diperoleh dari lima responden, dua pasien pada kelompok usia berisiko tinggi sudah dalam fase delirium, sedangkan tiga pasien lainnya belum menunjukkan delirium pasca operasi. Intervensi yang paling khas dalam semua kasus adalah reorientasi dan imobilitas (gunakan rehabilitasi jantung), serta komunikasi dasar. Studi ini berusaha untuk mengintegrasikan tiga langkah skrining untuk delirium, kemudian dievaluasi dan dibandingkan temuan untuk melihat apakah pasien menerima skor yang sama atau berbeda pada setiap instrumen.

Kata kunci : delirium, manajemen pencegahan, operasi jantung

ABSTRACT

Delirium management is critical to lowering the risk for patients as well as health care providers, such as a nurse who takes complete care of the patient and plays an important role in delirium prevention from the start of post-operative care until the patient is transferred to the ward and then discharged. The purpose of this study was to examine the usefulness of instruments for screening delirium in patients undergoing cardiac surgery as well as the effectiveness of evidence-based nursing interventions for delirium prevention and management in cardiac surgery patients. This study used a case study design with five hospitalized patients who had cardiac surgery, including patients admitted 1-2 days before or within 7 days of the procedure. Based on NICE guidelines, the authors provided data collection methods for screening for delirium and intervention for delirium prevention and management in patients following cardiac surgery. According to data acquired from five responders, two patients in the high-risk age group are already in the delirium phase, while the other three patients have not shown delirium postoperatively. The most typical intervention in all cases is re-orientation and immobility (use cardiac rehabilitation), as well as basic communication. This study attempted to integrate three screening measures for delirium, then evaluated and compared the findings to see if the patient received the same or a different score on each instrument.

Keywords: cardiac surgery, delirium, prevention management

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I. INTRODUCTION

Delirium is defined as an acute cognitive disorder presenting in patients with fluctuation in cognition, apathy, and non-organized thinking and is often associated with changes in sleep pattern (O'Neal, & Shaw, 2016). Postoperative delirium is recognized as the most common surgical complication in older adults, occurring in 5% to 50% of older patients after an operation (Jin, Hu & Ma, 2020). Delirium has been shown to be preventable in up to 40% of cases in some hospitalized older adult populations, a fact that makes delirium a prime candidate for prevention interventions targeted to improve the outcome after surgery (Panel, 2015; Safavynia, Arora, Pryor & Garcia, 2018).

Patients who undergo cardiac surgery have an increased risk of developing delirium. In a previous study, it was reported that the incidence of delirium following cardiac surgery was found 60% cases (Hebert, 2018). Development in operative and anesthetic techniques has enabled older patients to undergo (cardiac) surgery. This could be an important cause of the increase in the frequency of delirium in the foreseeable future (Reddy, Irkal & Srinivasamurthy, 2017).

Delirium is a serious complication for older adults because it can cause other major postoperative complications, such as length of stay in the hospital, increased functional dependence, reduced cognitive function, delayed rehabilitation, and even death (Zenilman, 2017). The probability of developing delirium postoperatively is best described as a link between psychological stressors (determined mostly by the extent of the operation) and predisposing patient risk factors (Oh & Park, 2019). According to a delirium clinical guideline published by the National Institute for Health and Care Excellence (NICE), risk factors for delirium include: 1) age greater than 65 years; 2) chronic cognitive decline or dementia; 3) poor eyesight or hearing; and 4) severe illness. According to the guideline, patients with two or more risk factors should be considered at higher risk than patients with only one risk factor (American Geriatrics Society, 2015).

According to the evidence, screening or diagnosis of delirium could be done by health care professionals, but they should be trained in and utilize the instrument that has been validated (American Geriatrics Society, 2015). Early delirium screening is highly important, and it can deliver benefits including earlier diagnosis and preparation for effective therapy of delirium. Inadequate management of delirium leads to severe hazards for the patients, such as prolonged artificial ventilation due to a lack of patient compliance during the weaning phase or any complication of surgery (Kang, Moyle, Cooke & O'Dwyer, 2017). Management of delirium is very important to reduce the risk for the patients and also for the health care provider, such as a nurse who takes full care of the patient, who has an important role in the prevention of delirium from the beginning of post-operative care until the patient's transfer to the ward and then discharge. Therefore, the aim of this study is to examine the usefulness of instruments for screening delirium in patients undergoing cardiac

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surgery, as well as the effectiveness of evidence-based nursing interventions for delirium prevention and management in cardiac surgery patients.

II. CASE REPORT

The method of this study was a case study design with five hospitalized patients who had cardiac surgery, including patients who had been admitted 1-2 days before the surgery or within 7 days after the surgery. The authors provided the data collection tools for screening for delirium and intervention for prevention and management of delirium in patients post-cardiac surgery based on NICE guidelines. Firstly, tools for demographic data and health-related questionnaires were assessed, such as age, gender, marital status, religion, occupation, admission date, date of approach, diagnosis, type of surgery, and underlying disease. Second, tools for assessing the risk factors of delirium This tool has two types: a) Assessment Tools: Cardiac Pre-operative Delirium Risk Factors; b) Assessment Tools: Cardiac Post-operative Delirium Risk Factors The questionnaire for pre-operative care consists of 9 items, and the questionnaire for post-cardiac surgery consists of 7 items. Each questionnaire has an answer given by a checklist for every item that relates to the patient's conditions (if the patients have 2 or more than 2, they should be considered to be at greater risk than patients with zero or 1 risk factor). Third, tools for assessing the screening of delirium This tool is used in more than one setting, including CAM-ICU, the Delirium Observation Screening Scale (DOS), and the Nursing Delirium Screening Scale (Nu-DESC).

The CAM-ICU developed by Inouye is based on the psychiatric expert and delirium definitions of the Diagnostic and Statistical Manual of Mental Disorders, Third Edition (DSM-III; Inouye, 1994) to assess delirium by non-psychiatrists. The CAM addresses the following four features: a) an acute onset of mental status change or fluctuating course; b) inattention; c) disorganized thinking; and d) an altered level of consciousness (Fan, Guo, & Zhu, 2012).

The Delirium Observation Screening Scale (DOS) is a 13-item observational scale of verbal and nonverbal behavior. DOS has been designed to measure early symptoms of delirium that nurses can assess during regular nursing care. It is based on the DSM-IV criteria for delirium. To optimize recognition of delirium, recording observations per shift is important (Schoormans, Shortridge-Baggett, & Duursma, 2003).

The Nursing Delirium Screening Scale (Nu-DESC), developed by Gaudreau, Gagnon, Harel, Tremblay, and Roy (2005), is a delirium screening instrument that can be easily integrated into routine care and clinical practice. This scoring system is largely based on the Confusion Rating Scale. However, the Nu-DESC is a five-item scale comprising, in addition to the four items of the Confusion Rating Scale, a fifth item. The addition of psychomotor retardation as the fifth major component, as well as several other subcomponents of the Nu-DESC scoring system, gave it some resemblance to the DSM-IV (Fan, Guo, Li,

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& Zhu, 2012).

We cannot use only one tool because we need to consider whether the culture of our research is appropriate for the items in the tool. On that basis, we try to combine three tools for screening delirium. After we assess all tools, we analyze and compare the results to see whether the patient has the same score or a different score in each tool.

Intervention

Intervention in this study has no specific intervention, but we apply the intervention based on the conditions of each patient to prevent delirium. Based on the recommendation in the guideline about prevention of delirium, we divided it into two kinds: a) management for prevention of delirium; and b) management for delirium. Each type has a non-pharmacology treatment and a pharmacology treatment.

Table 1 .The Prevention and management of delirium in patients post cardiac surgery

Component	Activity
Prevention of delirium: non-pharmacology	
1.Re-orientation:	• date, time, and place • calendar visible to patient • talking to the patients about present illness
2. Sleep	• reduce the noise to a minimum during sleep period • avoid the nursing care or medical procedures • give the warm water and massage the back of the patients
3. Activity	• ambulate the patients as soon as possible or twice a day after surgery • encourage the patients to walk • cardiac rehabilitation* • if the patients cannot walk, carry out active by ROM
4. Sensory Impairment	• ensuring glasses, hearing aids • resolve any reversible cause of the impairment: impacted ear wax
5. Pain	• assessment pain • give appropriate pain management such as: depth re-breathing, music relaxation.
6.Simple communications	• communicate with the patients in the simple topic
Treatment of delirium: non-pharmacology	
1. Environment	• create a safe and comfort environment; decrease disturb that appropriate causes
2. Orientation	• provide the calendar and clock which visible by

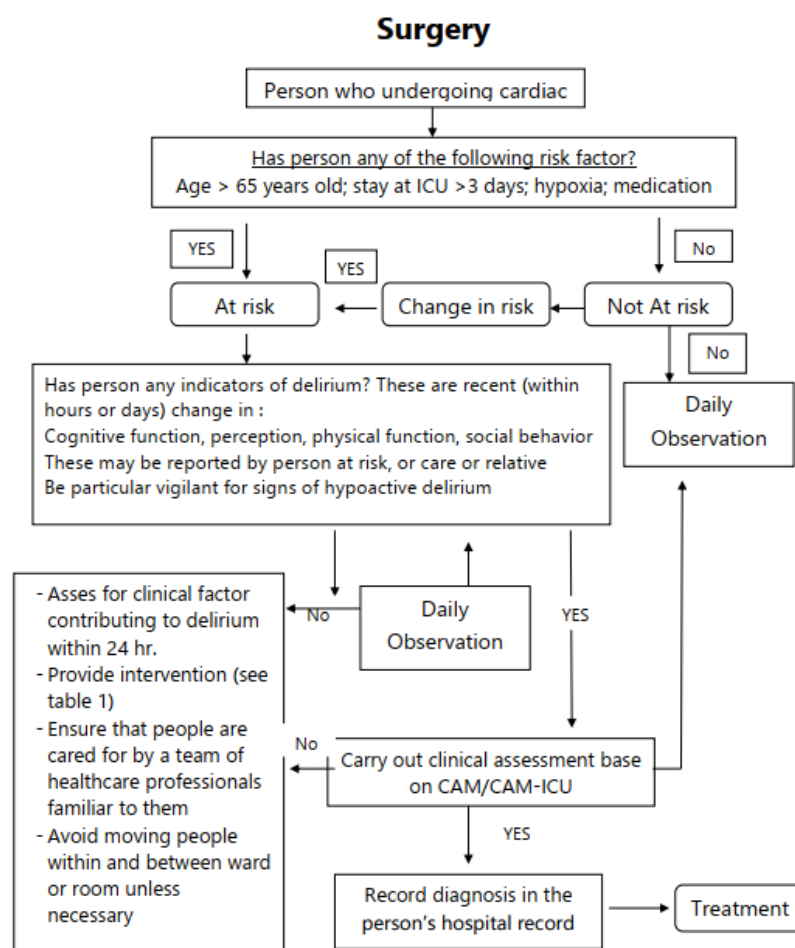
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	patients
3. Familiarity	- provide the family or relatives to communicate with the family - do the intervention by the same nurse in daily
4. Communication	provide the simple, clear, slow communications such as: address patients name
5. Activities	- physical restraint (follow the guide line of restrain**) to reduce the risk of injury - encourage the patient's activity daily live

Prevention and management of delirium in patients post-cardiac surgery

Prevention and management of delirium in patient's post-cardiac surgery based on NICE guidelines are explained in the diagrams at the bottom. Figures 1 and 2.



ดัดแปลงจาก "Delirium: diagnosis prevention and management" โดย National Clinical Guideline Center, 2010

Figure 1. The Prevention of Delirium

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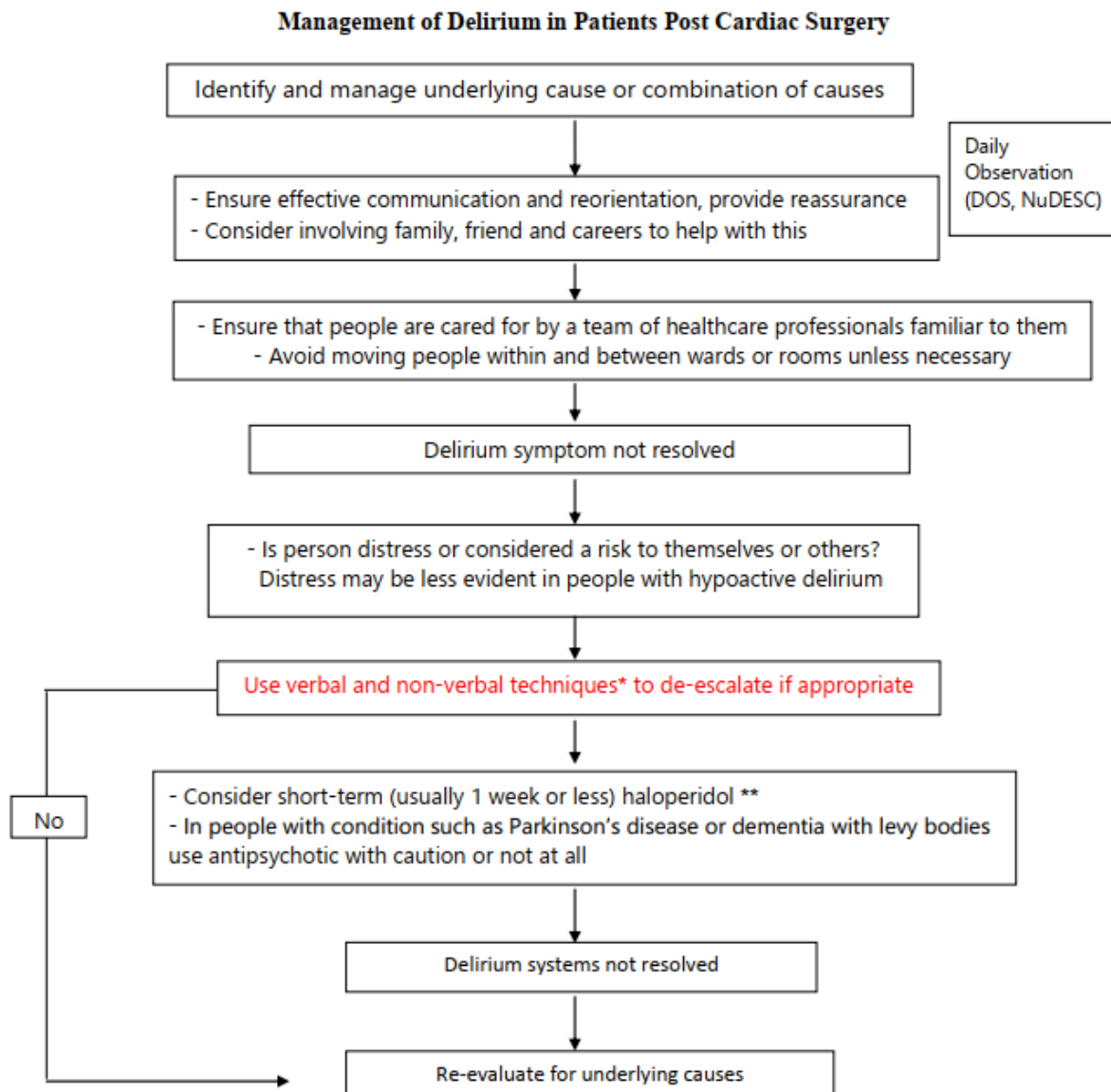


Figure 2. Management of Delirium in Patients Post Cardiac Surgery, National Clinical Guideline Center, 2010

III. RESULT AND DISCUSSION

The results describe the major findings of the study. It should be clear and concise and can be reported in text or graphics.

Table 2. Patient's Characteristic

Data	Patient I	Patient II	Patient III	Patient IV	Patient V
Gender	Male	Male	Male	Male	Female
Age	74	61	21	77	75

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Data	Patient I	Patient II	Patient III	Patient IV	Patient V
Admission date	April 21, 2015	May 4, 2015	May 6 th , 2015	May 5 th , 2015	May 10, 2015
Date of approach	April 30 - May 1 st , 2015	May 6, 2015	May 6-8, 2015	May 7-9, 2015	May 14, 2015
Diagnose	Post CABG TVD	Aortic Dissection Type A Thoracic	Severe Aortic Regurgitation	Post CABG TVD	severe Mitral regurgitation
Type of Surgery	CABG	Aortic dissection type A	AVR	CABG	mitral valve replacement
Date of surgery	April 24, 2015	May 6, 2015	May 7, 2015	May 6, 2015	May 12, 2015
Status	Married	Married	Single	Married	Married
Religion	Buddhist	Buddhist	Buddhist	Buddhist	Buddhist
Underlying disease	DM, HTN, DLP, ischemic heart disease	HTN, Gout, Glaucoma, AF	Seizure, obesity	COPD, DM, HTN, Gout,	20 years ago, she got surgery at trachea

Table 3. Assessment in Cardiac Pre-operative Delirium Risk Factors

Data	Patient III
Cognitive impairment	X
History of depression	X
Sensory impairment (visual, hearing)	X
History medication: antipsychotic, benzodiazepine	X
History of alcohol	X
EF (<30 %)	X
Elimination pattern	1x/day
Sleep pattern	X (22.00-6.00)
History of illness	Seizure

Table 4. Assessment in Cardiac Post-operative Delirium Risk Factors

Data	Patient I	Patient II	Patient III	Patient IV	Patient V
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Data	Patient I	Patient II	Patient III	Patient IV	Patient V
Duration of use CPB (>114 minutes)	118	267	79	112	121
Duration of use aorta clamp (> 68 minutes)	83	144	65	67	78
Durations of surgery	4 hours 40'	7 hours	4 hours	5 hours 30'	6 hours
Length of ETT (>2 days)	2 days	2 days	2 days	2 days	2 days
Length of stay at ICU (> 3 days)	4 days	2 days	2 days	3 days	2 days
Medication					
- Opioid	Fentanyl	Fentanyl	Fentanyl	Fentanyl	Fentanyl
- Anti-psychotic	X	X	X	haloperidol	X
- anti-cholinergic	X	X	X	X	X
- benzodiazepine	Clonazepam	Dormicum	Dormicum	Dormicum	
Urinary retention	√	X	X	X	X
Defecation habit per week	enema 4 constipation	X	X	X	X
Sleep pattern	20.00-5.00	22.00-5.00	22.00-6.00	21.00-6.00	23.00-4.30
Complication					
hypoxia (pO ₂ ; sat O ₂)	√ Dyspnea PO ₂ 65.7; PCO ₂ 35.3	x	x	√ po ₂ 57.6 (8May'15)	x
Laboratory result					
hematocrit < 30%	x	x	x	28.6 %	x
Na+/ K-	x	x	x	K: 3.03	x

Note: x : have no risk factors √ : have risk factors

In this study, there were four men and one woman undergoing cardiac surgery. Three patients aged more than 65 years old and two patients aged 61 and 21 years old participated in this study. These data, supported by the findings from Inouye & Fong (2018) reported that the age-related risk factor for postoperative delirium is greater than 65 years old. The two patients who are included in the high-risk age group already have delirium phases, while the other three patients have not shown delirium postoperatively.

The assessment of risk factors for delirium in patients undergoing cardiac postoperative surgery found that three patients had emergency surgery.

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These included the duration of CPB > 114 minutes, the duration of use of the aorta clamp > 68 minutes, the duration of surgery > 5 hours, and also the length of stay in the ICU > 3 days. These criteria of cardiac preoperative delirium risk factors are appropriate with the Guidelines of the American Geriatrics Society (2015), which present that the patient who has emergency surgery has a high risk of delirium occurring at cardiac post-operative, and also that other factors such as medication have influenced delirium, as with all the patients in this study: five patients have medication of the category opioid, and four patients have medication of the type benzodiazepine. Sharma, Musher, Shukla, Kumar & Atri (2020) reported that opioids are associated with an increased risk of delirium, especially in high doses, and that patients given benzodiazepine before ICU admission are also at high risk of developing delirium postoperatively. Drugs with anticholinergic activity can also cause delirium.

In this study, screening for delirium was used by three tools: 1) CAM/CAM-ICU, 2) DOS, and 3) Nurse-DESC. Not all patients can be assessed by all the tools because it depends on their condition. Patient 1 and 4 cannot be assessed by CAM due to the patient's sleep condition, but when assessed by another tool, the result of screening for delirium shows the same result: no delirium (the score 3 for DOS), and Nu-DESC showed a score similar to that of screening by DOS. Various tools have been developed from standardized delirium testing by ICU nurses (Fan, Guo, Li, & Zhu, 2012). The previous study reported that in a survey of 331 ICU nurses in hospitals where delirium assessment is required, only 47% of nurses reported performing this assessment (De Jour, Yeh, & Ouanes, 2020; Tsai, Wu & Wang, 2018). That result has a similar condition to the place where this study was conducted. According to the American Geriatrics Society (2015), the screening patient for delirium should be assessed by a health care professional such as a nurse who is already trained, and they advise that for optimal delirium detection, the nurse must use a validated delirium screening instrument. So that, the guideline stated that delirium screening cannot focus on one tool but can find the strengths and weaknesses in each tool, such as in this study with CAM-ICU tools used when assessing the patient in an ICU setting and combining them with DOS that can record per shift, which is found to be very important to optimize recognition of delirium (Schuermans, Shortridge-Baggett, & Duursma, 2003; Van Eijk et al, 2011). Other tools, such as the Nursing Delirium Screening Scale (Nu-DESC), are delirium screening instruments that can assess when the patient has already transferred from the ICU into routine care or clinical practice. These tools can be easily and quickly used (De Jour, Yeh & Ouanes, 2020; Fan, Guo, Li, & Zhu, 2012).

In this study, the most common intervention in all cases was re-orientation and immobilization (using cardiac rehabilitation) and also simple communications. The cardiac rehabilitation program has a phase in the hospital (National Institute for Health and Clinical Excellence, 2010). The pharmacology intervention could be given to manage the patient, who probably had delirium like patient no. 4. In this condition, the nurse can combine pharmacology and

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non-pharmacology interventions by collaborating with the doctor to give medication. Recommendation pharmacology to treat delirium reported that haloperidol has become the standard agent for the treatment of delirium (Fosnight, 2011; Shen, et al, 2020), although the evidence-based guidance for haloperidol dosing to treat delirium is weak (devlin et al. 2018; National Institute for Health and Clinical Excellence, 2010).

IV. CONCLUSION

Phenomena for delirium in patients undergoing cardiac surgery can start with assessing risk factors, whether pre-operative or post-operative, and then continue with screening tools for delirium to prepare the appropriate intervention, which could manage the delirium earlier. In the screening of delirium, the best time to do the screening is in each shift (morning, day, and night), like in DOS, because the delirium sign and symptom will change every time and the score will be calculated for the whole day. The Nu-DESC is very helpful to the nurse, too, because this instrument is fast and easy to apply in routine care when the patient has been transferred from the ICU. Overall, for the tools of screening delirium, more study is needed to create a new tool that can provide all the content from CAM-ICU, DOS, and Nu-DESC and also appropriate the condition or culture of the patient, which can then help the health care provider, such as a nurse, prevent the delirium earlier.

The first priority in the management of delirium is to determine its etiology. A variety of signs and symptoms of delirium will influence the interventions given to the patients. One patient has different conditions from another patient, so the interventions given to the patient have variety as well.

Nurses have an important role from the beginning to assess the risk factors of delirium in patients undergoing cardiac surgery, screening for delirium until they implement the intervention or prevent delirium because nurses are health care providers who have taken care of patients for a longer period of time than other health care providers, such as doctors. Furthermore, if nurses understand how to assess and interpret the results of scoring, they can continue to give appropriate interventions for delirium.

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