An Evaluation of Nursing practices regarding Delirium assessments in adult Critical Care Units.

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Ajoy Sunil Anbu
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Name : Ajoy Sunil Anbu

Student ID number : 10203581

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Signature : Ajoy Sunil Anbu

(Ajoy Sunil Anbu)

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Abstract

**Research Question:** What are the practices and perceptions of nurses in assessing patients with delirium in critical care units in the west of Ireland?

**Aim of this study:** An evaluation of nursing practice regarding delirium assessment in adult Critical care units.

**Background to the study:** There are many international practice guidelines promoting nurses to perform frequent delirium assessments using validated screening tools in critical care units. Lack of data exists in an Irish context regarding nurses’ current sedation and delirium practices and their perceptions towards delirium assessments.

**Method:** A quantitative descriptive survey was carried out among 240 staff nurses working in Critical care units in selected hospitals in the western seaboard of Ireland. A self-reporting questionnaire was used to collect data to answer the research question.

**Sample:** All qualified nursing staff meeting outlined criteria and working in the Critical care clinical areas in the selected hospitals were invited to participate in the study. A response rate of 45.8% (n=110) was achieved.

**Analysis:** Data collected was analysed using a standard statistical package (IBM SPSS, Version 21). Data analysis tests carried out includes descriptive statistics, t tests, chi-square analysis, and Mann-Whitney test as appropriate, in order to determine statistical significance of the findings.

**Findings:** More than half of the nurses reported that they were using validated tools to assess for delirium during their practice. However, critical care clinical practice in the west of Ireland lacks established protocols to screen for delirium resulting in non-adherence to clinical practice guidelines. Barriers and poor perceptions were identified in this survey in relation to delirium screening. This information can inform future care planning and care to be used to improve standards and quality of care in intensive care units.
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Delirium memories from critical care patients.

“I spent a week in ICU 14 years ago with…….. I remember being intubated THEN paralysed THEN sedated... confused and amnesic......... confused for the first 24hrs post-extubation then terrified-confused back on the ward for another five days until discharge. I then suffered flashbacks, memory problems with a touch of dysphasia, nightmares and insomnia…….for over two years …….. I remember being so frightened whilst sedated .... That I wanted to give up” (http://www.icudelirium.co.uk 2014).

40 year old ARDS ICU survivor college graduate states:

“I have been out of hospital and trying to get on with my life for the past 2

Years… I have trouble with people’s names that I have worked with for years…
I can’t remember where I put things at home. I can’t help my children ... with their homework because I can’t remember how to do simple multiplication problems” (ICU delirium.UK, 2013).
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The thesis is arranged as follows: Chapter one gives an introduction, background and significances of the study. The second chapter will address what is known about the topic of delirium and provide a review of the current literature. The gaps in the research to date will be identified and a rationale will be provided for the study. Chapter three will discuss the research paradigms and justify the chosen methodology for the study. The results will be presented in chapter four and chapter five will discuss the findings. Finally, the conclusion and recommendations will be presented in chapter six. References used for the dissertation are listed in chapter seven.
Abbreviations

ABA An Bord Altranais
CABG Coronary artery bypass graft
CAM-ICU Confusion Assessment Method – Intensive care unit
CCU Critical Care Unit
DRS Delirium Rating Scale
DSM-IV Diagnostic Statistical Manual of mental disorders version IV
HSE Health Service Executive
ICDSC Intensive Care Unit- Delirium Screening Checklist
NICE National Institute for Health and Care Excellence
SSCM Society of Critical Care Medicine
PAD Pain Agitation Delirium
RASS Richmond Agitation Sedation and Score
PI Principal Investigator
RCT Randomised controlled trial
SR Systematic review
SCCM Society of Critical Care Medicine
UK United Kingdom
USA United States of America
CHAPTER ONE: INTRODUCTION

2.0 Introduction

This chapter will outline the background and significance of the study, giving an insight into Critical care nurses’ role in identifying delirium from both an Irish and international perspective. The significance of delirium as a problem and justification of the current research in relation to the critical care setting will be provided. The possible benefits of the study will be discussed. The research question and the aims of the study will be identified followed by a definition of key terms; conclusion of the chapter will then be discussed.

1.1 Background to the study

Delirium is a sudden onset of mental confusion among the adults and elderly population in hospitalised individuals (Inouye et al., 2000, Ely et al., 2004, Pisani et al., 2008). Traditionally delirium was considered to be a psychiatric illness. Over the last two decades delirium emerged as a commonly occurring phenomenon especially among the critically ill. Delirium is also known as acute brain dysfunction or organic brain syndrome, an extremely common condition affecting patients of all age groups in critical care units (Pandaharipande et al., 2006, Barr et al., 2013). Delirium is considered a medical emergency especially among the critically ill (Gesin et al., 2012, Guenther et al., 2012), and is a marker of brain dysfunction (Ely, Sige & Inouye, 2001). Delirium has been linked with several negative clinical outcomes for critical care patients (Inouye et al., 2006). The short and long term clinical outcomes
associated with delirium among critically ill patients are well documented (Ely et al., 2004, Pandharipande et al., 2009). The short term negative clinical outcomes documented among critically ill patients include: increased length of both critical care and hospital stay, increased number of days spent on ventilators, and increased risk of mortality (Ely et al., 2001, 2004, Bell, 2011, Baar et al., 2013).

Delirium is one of the serious conditions which poses psychological challenges to patients, families and health care professionals in critical care units (Irving & Foreman, 2006). Delirium research in the last decade has revealed significant findings in multidisciplinary fields such as medicine and neuropsychology: one such finding identifies delirium as a predictor of long-term cognitive decline (Pandharipande et al., 2013, Macullulich et al., 2013). Delirium now is being recognised as an important problem by researchers, professional international organisations, policymakers, educationalists and clinical auditors in the last decade (Teodorczuk et al., 2012, Macullulich et al., 2013).

1.2 Significance of delirium to the society

Delirium in critical care areas is considered a major public health problem (Barr et al., 2013). Delirium is a source of distress for both patients and families (Macullulich et al, 2013) and is reason for financial stress to Health Service Executive (HSE) hospitals in Ireland (Boot, 2012). For instance, the additional cost of caring for complications related to critical care delirium is about 4 billion to 16 billion US dollars annually in United States of America (Milbrandt et al., 2008). The corresponding figures are not available in Ireland due to lack of research in this area.
Irving and Foreman (2008) argued that under-recognition of delirium is common among health care practitioners. In order to effectively manage delirium and to improve this situation, early recognition and use of validated assessment tools plays an important role (Meagher & Leonard, 2008). Several authors have also argued that care of delirious patients in any hospitals should start at the time of admission with effective screening for early identification and prevention of delirium (Ely et al., 2004, Patel et al., 2008, Devlin et al. 2008, Irving and Foreman. 2008, Meagher & Leonard, 2008, Wells, 2012, Boot, 2012). If this area is not prioritised, it will have negative consequences for patients, staff and relatives of those affected with delirium (Irving & Foreman, 2008, Steis and Fick, 2008, Meagher & Leonard, 2008).

Due to the high incidence of delirium among critical care patients, several international guidelines such as Society of Critical Care Medicine (SCCM) and National Institute for Health and Care Excellence (NICE), UK guidelines recommend the use of a validated tool to assess delirium on a routine basis (Ouimet et al., 2007, Devlin et al., 2008, Gesin et al., 2012, Barr et al., 2013). Failure to use a validated tool by health care professionals leads to 65% of cases going undetected (Meagher & Leonard., 2008, Wells, 2012).

Much has been written in the literature in the last decade about under recognition and management of delirium in critical care practice (Mantz et al, 2010, Shehabi et al., 2012). Several researchers are involved in search for optimal strategy to achieve best possible outcomes for patients suffering from delirium (Ely et al., 2012, Shehabi et al., 2012, Pandaharipande et al., 2013, Macullulich et al., 2013). Regular consultations with the critical care journals, expert bodies in the field of critical care and attending conferences indicated that a thorough examination of
literature in this area was necessary to judge the congruency of practice in the western seaboard region of Ireland with that of internationally recognised best practice.

### 1.3.1 Research Question

The research question addressed in this study was: What are the practices and perceptions of nurses in assessing patients with delirium in Critical Care Units in the western seaboard region of Ireland?

### 1.3.2 Aim of the study

This study was aimed to evaluate of nursing practice regarding delirium assessment in adult intensive care units.

### 1.3.3 Specific Objectives

The specific objectives of this study were to:

- Explore practices of critical care nurses in assessing delirium and sedation.
- Identify the use of any validated delirium assessment tools among participating units.
- Examine the nurses’ adherence to Society of Critical Care Medicine (SCCM) guidelines on delirium assessment.

### 1.3.4 Approach to the study

In order to answer the research question the Principal Investigator (PI) conducted a quantitative descriptive survey using a convenience sample 240 Critical care nurses in the western seaboard region of Ireland. The data were collected using a
previously validated 17 item self-administered questionnaire, developed by Devlin et al. (2008). To ensure the research was carried out within the agreed timescale the PI devised a research timescale (see appendix .1) to provide guidance. A budget was also set out for the research study and can be seen in Appendix 2.

In order to facilitate greater understanding of the current study the following key terms will be defined.

**Critical Care Unit**

The Critical Care Unit is referred to in the literature as highly specialised the Intensive care units (ICU), Higher Dependency Unit (HDU), accident and emergency (A/E), recovery room and Cardiac care units (CCU/CVICU). For the purpose of this research the term Critical Care Unit will be used. Critical care Nurse CCN is a registered professional nurse who is responsible for providing optimal nursing care to acutely and critically ill (Urden, Stacy & Lough, 2010).

**1.4 Significance of the study to Nursing**

A study to explore the current practices and perceptions of nurses in delirium screening will help to identify areas of potential change to improve the quality of care in critical care in the west of Ireland (Law et al., 2013). This study was aimed at identifying nurses’ adherence to guidelines issued by the critical care society in caring for patients with delirium. The significance of this research will be to increase the understanding of nurse’s involvement in early identification of delirium. Implications for practice are discussed and directions for further research in this area are recommended.
This study obtained information about critical care nurses’ perceptions and delirium assessment practices in the west of Ireland. However, majority of nurses reported that they are using validated instrument CAM-ICU and few are familiar with ICDSC in their clinical practice. Barriers for delirium screening were identified. Nurses in this survey are poorly engaged in delirium assessment practices. It was evident from this survey that nurses rely on subjective assessment rather than using validated instruments and also there is lack of training for delirium screening.

More research has been required to explore factors influencing the delirium assessment practices among critical care nurses in Ireland. It is imperative to develop innovative and effective educational interventions that will improve critical care nurses’ adherences to practice guidelines in relation to identification and management of delirium. Future nursing research is extremely necessary to improve delirium screening practices in order to improve the quality of psychological care of critically ill clients and prevent long-term complications associated with delirium.

1.5 Summary

Delirium is a common complication affecting patients of all age groups during their stay in critical care units. Delirium is a problem frequently experienced by the elderly, particularly those who are hospitalised (Ely et al., 2004, Baar et al., 2013). Under recognition of delirium is well documented and it is clear from this research that the nurses are poorly engaged in delirium assessment practices. Further to this, nurses have misconceptions about delirium screening and also lack essential knowledge and skills in identifying delirium effectively. Results from this study can
be used to inform future decision making processes in relation to future care planning, and prioritising educational needs.

1.6 Conclusion

There has been no study to date identified on critical care nurses practices in west of Ireland. Therefore, it can be argued that the current study will add to the body of knowledge. By identifying critical care nurses practices, perceptions and perceived barriers to delirium assessment this information can be used to inform service planning and improve to deliver evidence bases nursing care among critical care units.

The next chapter will address what is known about the topic of delirium, critical care nurses’ practices and will provide a review of the current literature. The gaps in the research to date will be identified and a rationale will be provided for the study.
2.0 CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

The purpose of the literature review is to provide a context for the research, to show where the research fits into the existing body of knowledge (Parahoo, 2006). It also illustrates how the subject has been studied previously (Hart, 2008), to highlight flaws and outline gaps in previous research (Boote & Belie, 2005), shows that the work is adding to the understanding and allows the reader to have confidence in the depth and breadth of the literature consulted (Parahoo, 2009, Polit & Beck, 2012). The literature review enabled the researcher to learn from previous concepts and theories on the subject (Hart, 2008).

This literature review aims to examine the definition, types, incidences, prevalence and diagnosis of delirium in critical care. This review examined current critical care nurses’ practices and barriers faced while implementing delirium assessment. The scope of this literature review is to discuss what is known about nurses’ practices and perceptions about delirium assessment and to examine the current evidence on the evaluation of delirium in the critically ill patient. A discussion on management of delirium is beyond the scope of this review. The literature review will present the overview of critical care nurses delirium screening practices nationally and internationally. Nurses ‘role and the implications for practice will be addressed. It will provide analysis of the studies to date and provide discussion of the methodological issues before drawing conclusions. This will be introduced with an outline of the search strategy.
2.2 Search strategy

Literature for this review was sourced through the following databases: CINHAL, PUBMED, SCOPUS, GOOGLE SCHOLAR, COCHRANE, and NURSING OVID from January 2000 to July 2014. Key words used for the search were: *Delirium in intensive care units, nursing assessment, delirium identification; delirium guidelines; nursing assessment; perceptions of delirium assessment in ICU; cognitive assessment; perceptions of nurse’s about delirium; Ireland and delirium.*

A broad brush approach strategy was used to ensure an extensive search of the general topic (Burnard 1993, Knop, 2006). The ancestry strategy was utilised to identify additional material not sourced in the original review. This involves reviewing the reference lists of primary source information and selecting pertinent information to aid in the review process (Schmidt & Brown, 2009). Citation rating tracker in Scopus was used to identify the relevancy and rating of articles. The search criteria includes peer reviewed journals, and articles published within the last ten years (2004-2014) in English language or translated to English were included for review. Non English articles were excluded. Automatic alert system was set up in Scopus to notify the relatively newly published articles on the topics of interest articles when available.

The titles of articles were initially considered to identify relevancy and following this, abstracts of articles were read. Full articles of salient abstracts were then sourced and read (Hart, 2009). A search of the Irish index of University thesis, cited reference search and also author search was done to identify materials that may not have been identified in the electronic search (Boote & Belie, 2005). Relevant study day programmes and conferences were attended in Ireland to gain current information relating to delirium research (Knop, 2006). Literature including primary and
secondary sources that were deemed relevant were read and critiqued in full using American association of critical care nurses for grading of evidence (AACN). An incremental approach was used to identify more relevant materials by reading the reference lists of identified article (Hart, 2008, and Polit & Beck, 2012).

In the next section, the literature already existing about delirium including definition, incidences and prevalence, etiology and risk factors associated with delirium will be discussed in detail.

### 2.2 Delirium definition

In order to understand what is meant by delirium, the emergence of delirium as disease in the field of medicine will be considered. In 1950, staffs working in intensive therapy units became aware of major psychological and psychiatric disturbances in critically ill patients, which resulted in the concept of ‘ICU syndrome’ (Axel, 2005). Mc Kegny (1994) reported that patient’s adaptation to stress had an effect on patient outcomes from their illness and development of ICU syndrome. Critical care units are highly stressful environment to patients due to the complexity of the interventions provided to restore health and recovery leading to high risk unit for occurrences of delirium (Mantz et al, 2010). There are about 25 terms such as acute confusional state, acute brain failure and ICU psychosis, which have been used to express the cognitive impairment in critical care that are consistent with signs and symptoms of delirium (Truman and Ely 2003). This development lead to a neuro psychiatric syndrome with organic pathology termed as delirium (Lipowski, 1990, Axel, 2005).

Diagnosis of delirium is also hindered by confusing nomenclature, with many of these terms expressing acute brain disturbance used differently in different
treatment settings (Macullich et al, 2013). The conceptual definition of delirium is an
important factor which potentially could result in better understanding and
identification of delirium. Lipowski (1990) defined delirium as a mental disorder,
characterised by acute onset of altered level of consciousness, fluctuating course and
disturbances in orientation, memory, thought and behaviour (Axel, 2005). The
American Psychiatric Association defined delirium as

‘a disturbance of consciousness, attention, cognition and perception which develops
over a short period of time (usually hours to days) and tends to fluctuate during the
course of the day’ (APA, DSM-IV, 2000 p 135–147).

The four cardinal signs of delirium includes disturbance of consciousness, change in cognition or perceptual disturbance, with sudden onset, and fluctuating in
nature which are essential components of differentiating and defining delirium from
other confusing nomenclature (Ely et al., 2004, Holly et al., 2012).

2.3 Types of delirium

There are three subtypes of delirium which can be classified based on
psychomotor activity, behaviour and attention (Holly et al,2012) which includes hyper
active, hypo active and a mixture of both (Inouye et al., 2001, Pun & Ely., 2007). Hyper active delirious patients, who exhibit signs such as self extubation, self-removal
of invasive lines, and combative behaviour are easily identified by Critical care nurses
(Girard et al, 2008). In contrast, hypoactive patients may sit quietly, withdrawn,
exhausted and apathetic, which may go unrecognised and warrants a screening tool to
identify early (Holly et al., 2012). Complications associated with hypo active delirium
include increased number of days on mechanical ventilation, aspiration pneumonia,
and pressure ulcers (Truman & Ely, 2003, Balas et al., 2009).
Delirium of mixed type exhibits characteristics and manifestation of signs between hyper active and hypo active (Godfrey et al., 2010). The patient may be calm at one point, agitated and restless sometime later (Holly et al., 2012). Identifying the hypoactive and mixed type delirious patients, remains difficult and challenging among critical care professionals (Holly et al., 2010). If not identified early, hypoactive delirium may go on to develop hyper active and mixed type of delirium, which can be far more difficult to manage (Meagher & Leanord, 2008) and is associated with negative outcomes such as prolonged critical care stay and increased chances of mortality (Ely et al., 2004).

2.4 Incidences and prevalence of delirium

The prevalence of subtypes of delirium in critical care patients were studied in detail by researchers in the past. Peterson et al. (2006) conducted a prospective cohort study among 612 patients in a large tertiary level medical ICU and examined delirium types among ventilated and non-ventilated patients. In this study, patients were classified into two groups depending on age. Delirium was detected among 112 of 156 (71.8%) patients aged 65 and older, and 263 of 458 (57.4%) patients who were younger than 65 years. The occurrence of sub types of delirium in this study showed that hyperactive delirium was rare (1.6%), whereas hypoactive (43.5%) and mixed type (54.1%) were encountered more frequently (Peterson et al., 2006). This study concluded that patients aged above 65 are at greater risk of experiencing delirium and in the absence of delirium screening tools, hypoactive and mixed sub types can be missed. The findings of this research reflects delirium occurrences from critical care unit. It is evident from the literature that delirium occurs at similar rate in other surgical ICU which includes cardiac units or mixed type ICU, other progressive care units
(HDU) and even among wards during the patients stay in hospital (Barr et al., 2013). A subcategory of delirium related to either alcohols or recreational drugs usage can manifest with hyperactive symptoms requires use of different clinical practice guidelines (Baar et al., 2013).

Several authors have highlighted the incidences and prevalence of delirium among different cohorts of patient (Godfrey et al., 2009, Meagher et al., 2009, Jones & Pisani, 2012, Frontera, 2011; Eastwood et al., 2012). Godfrey et al (2009) stated that delirium occurs in 11–42% of general medical inpatients and up to 50% of hospitalised elderly. Delirium affects 80% of intensive care and nursing home patients (Meagher et al., 2009). The prevalence of delirium varies from 13% of young patients to 53% of older patients and up to 88% of patients with terminal cancer (Lindesay, Rockwood, & Rolfson, 2000).

It is estimated that, 70% to 80% of patients experience delirium during their stay in the critical care units (Wells, 2012; Bell, 2012). Among those patients receiving care with mechanical ventilators, 87% experience delirium (Jones & Pisani, 2012, Frontera, 2011, Eastwood et al., 2012). Poor detection results in about 50% of delirium cases being missed in clinical practice (Meagher et al., 2009, Wells, 2012).

This section on incidence and prevalence indicates that delirium is a common phenomenon occurring in all health care institutions especially among the critical care units. The next section will focus on causes of delirium in critically ill patients.

2.5 Pathophysiology of delirium

The pathophysiology of delirium is unclear in the literature (Frontera, 2012). Many researchers have formulated various theories in order to understand what
exactly causes delirium (Girard et al., 2008). The etiology of delirium cannot be confined to a single causative factor as it is believed to be multifactorial (Fong et al., 2009; Miller, 2008; Gunther et al., 2012, Ouimet et al., 2007). The development of delirium in critical care depends on complex interactions of many factors (Bourne, 2008). Most of the patients have multiple causes leading to delirium occurrence which makes it difficult to diagnose with clinical presentation (Trzepacz, 2005).

There are four major factors responsible for development of ICU delirium which are: patients’ previous psychological status, psychological trauma inflicted by illness, environmental stressors in ICU and organic factors affecting central nervous system (Holly et al., 2012). Field et al. (2012) explained important interactions between inflammation and brain chemistry that may contribute to delirium onset.

Neuro transmitters play a vital role in the onset of delirium (Guenther et al., 2012). The cognitive function, behaviour and mood of individuals are influenced by synthesis, release and inactivation of neurotransmitters (Girard et al, 2008). More specifically, acetylcholine and dopamine imbalance generally results in neuronal instability and unpredictable neuro transmitters’ activity (Boot, 2012). Dopamine is responsible for increasing neuronal excitability whereas acetyl choline has the opposite effect (Cunningham et al., 2012). The other neurotransmitters known to be causing delirium includes gamma-aminobutyric acid, nor adrenaline and serotonin. Any imbalance between these mechanisms in brain is associated with delirium (Truman & Ely, 2008).

During the presence of infection caused by trauma or surgery pro-inflammatory cytokines are released which include: tumour necrosis factor (TNF), interleukin 1 (IL-1) and interleukin 6 (IL-6). These increased levels of cytokine in the
brain, disrupts homeostasis and interrupts functioning of neural pathways which is believed to be responsible for delirium onset (Broadhurst & Wilson, 2001; Hshieh et al., 2008). Hence the underlying pathology of delirium is still not clearly understood. However, several risk factors are associated with the onset of delirium (Bourne, 2008, Boot, 2012) which will be discussed in the next section.

2.6 Risk factors

Critical care units are hostile environments to patients and the human brain exhibits exquisite sensitivity to this environment (Holly et al., 2010, Mantz et al., 2012). The brain functions of the critically ill are altered in several patients with conditions such as: stroke, septic encephalopathy, seizures, anoxia, metabolic and inflammatory process, and drug induced neurotoxicity and disturbed circadian rhythms. Environment has a major influence on the functions of the brain in critical care patients (Mantz et al., 2012). Arend and Christensen (2009) suggested that delirium is often caused by environmental stimuli in critical care units and this belief of environmental stimuli in critical care units causing delirium was well supported by Van Rompaey et al (2009). In their prospective study on examining environmental risk factors on manifestation of delirium, it was estimated that 53% of environmental factors were responsible for delirium onset in their study.

The pre-disposing factors identified in the literature include cognitive or sensory impairments, dehydration, specific medication (psychoactive agents), older age, sleep deprivation and underlying medical condition (Agostino, 2006, Inouye et al., 2006). Some of the notable precipitating factors causing delirium are use of sedative drugs, hypnotics, primary neurological diseases, intercurrent illnesses, surgery and environment. Admissions to critical care units, presence of various invasive and monitoring devices such placement of catheters and experiencing painful
interventions acts as precipitating factors of delirium onset (Inouye et al., 2004). A full breakdown of predisposing and precipitating factors is available in Appendix 5.

Exposure to sedatives such as benzodiazepines and hypnotics is one of the strongest modifiable risk factors for developing delirium in medical, surgical and hospitalised patients (Mcpherson et al., 2009). About a third of delirium incidence in hospitals can be reduced through a multi-component intervention targeted at known modifiable risk factors (Godfrey et al., 2013).

Having discussed some of the causative factors responsible for occurrence of delirium, the next section will present clinical outcomes associated with delirium, an international perspective of sedation practice, delirium identification by nurses, limitations of previous research, and implications for future research.

2.7 Delirium and Clinical outcomes

2.7.1 Short term complications

The negative consequences associated with delirium can be categorised into short and long-term outcomes. The short term negative clinical outcomes documented among critically ill patients include: increased length of both ICU and hospital stay, increased number of days spent on ventilators, and increased risk of mortality (Ely et al., 2001, 2004, Bell, 2011, Baar et al., 2013). Delirium is also known as a single predictor of increased mortality (Ely et al., 2004, Holly et al., 2010 Baar et al., 2013,). During the course of patients journey through extremely stressful critical illness with their pre-existing co morbidity, cognitive impairment, and severity of illness, delirious patients are at higher risk of death (Ely et al., 2004). The other short term complications associated with hospitalised critical care patients include persistent cognitive deficits, loss of independence, functional decline, increased costs, and
increased mortality for up to two years (Balas et al., 2009, Macullulich et al 2013). Each additional day spent with delirium in health care facility is associated with a 20% increased risk of prolonged hospitalisation and a 10% increased risk of death (ICU delirium, UK, 2014). Delirium increases hospital cost up to 40%, one of the reason for this is due to increased rate of failed extubation and re-intubation in severely ill patients (Ely et al., 2012).

2.7.2 Long term complications

Delirium was considered to be a short-term disorder of cognition. The long-term sequelae of delirium starts immediately after discharge from hospital. Delirium acts as a key marker to dementia or death which strongly predicts future new-onset dementia, as well as accelerating existing dementia. (Ely et al, 2004, Holly et al, 2012). The long term negative outcomes of delirious patients includes sleep disturbances, anxiety disorders Post traumatic stress disorder (PTSD), depression and severe cognitive impairment (Holly et al, 2012). Delirium acts as a precipitating factor for Long-term cognitive impairment (Pandharipande et al., 2006). The psychological sequelae associated with long-term consequences of delirium affects both the patients and their family members for up to six years post discharge (Hopkins & Jackson, 2006). Neurocognitive impairments among sufferers leads to psychological distress in both individuals and family members and a burden on caregivers (Balas et al., 2009).

In a recent study focusing on prevalence of cognitive impairment, Pandharipande et al. (2013) conducted a multicenter, prospective and cohort research among 821 survivors of critical care illness. In this study, patients who experienced delirium in the hospital were followed up at three and twelve-month intervals. A series of psychological assessment of these patients neuro psychological status was assessed
by trained psychologists who were unaware of patient’s course of delirium while they were hospitalised in critical care. Noticeably, the authors of this study carefully excluded patient with preexisting dementia patients. This study concluded that the patients in medical and surgical ICUs are at a greater risk for cognitive impairment. The severity of cognitive impairment among these cohorts after 12 months were varied, some even worse to the extent of terming them having signs and symptoms consistent with Alzheimer’s like condition. The longer the duration of patients experiencing delirium during their stay in critical care/hospital, the worse the global cognition (individual’s perceptions, memory, thinking, reasoning and awareness,) and executive functions (working memory, reasoning, task flexibility, and problem solving)(Pandharipande et.al. 2013).

The above mentioned study highlights that all the survivors of critical care illnesses are potentially at high risk of developing long term cognitive impairment. Delirium is a predictor of long-term cognitive decline (Girard et al, 2010). Neglecting interventions at early stages and not paying enough attention, leads to development of dementia or Alzheimer’s like syndromes. This potentially increases the chances of those suffering from this dreadful condition, to be discharged to long term care facility (Macullulich et al., 2013). In the next section sedation practices in critical care are discussed.

2.7.3 Sedation in critical care unit

One of the modifiable risk factors in critical care for delirium is the use of sedatives appropriately. Critical care unit is a specialised unit that delivers care to the individuals with life threatening illness (AACN, 2014). A critical care nurse is a licensed general registered nurse who is responsible for providing optimal care to seriously ill clients and their families. These nurses generally work in intensive care units, cardiac
ICUs, telemetry, progressive care units (HDU) and recovery rooms (Urden, Stacy & Lough, 2010). Sedation is one of the most common interventions provided to critical care patients especially those who receive mechanical ventilation (Schweickert & Kress 2008). Many treatments delivered in critical care are uncomfortable and anxiety provoking such as mechanical ventilation, invasive line placement and endotracheal suctioning which requires sedation administration (Puntillo, 1994). There are many dimensions attached to delirium process in critical care (Bourne, 2008). Delirium does not occur as an individual problem but often it is associated with pain, anxiety, discomfort and level of sedation (Barr et al., 2013). Alleviation of pain and anxiety should be the first line of approach to help patients achieve comfort (Jacobi et al., 2012, Barr et al., 2013).

In order to achieve comfort, critical care professionals use sedatives as a commonest intervention in their units (Bourne, 2008). It is evident from literature that delirium is directly proportionate to the level of sedation (Bourne, 2008, Shehabi et al., 2012). Some of the commonly used sedatives in critical care units are propofol, midazolam and lorazepam (Row, 2008). Multiple studies have stated over-sedation leads to negative outcomes in patients such as greater haemodynamic instability and prolonged duration of intubation and ICU stay which contributes to onset of delirium among ICU patients (Kress, 2000, Girard, 2008, Treggiari, 2008, Rowe, 2008). The level of sedation among critically ill patients are assessed using various validated tools such as Ramsey Scale (Ramsey et al, 1978), Sedation Assessment Scale (SAS) (Riker et al., 1994), Richmond Agitation Sedation Score (RASS) (Sessler et al., 2002) and Motoric Activity Assessment Scale (MAAS) (Devlin et al., 1999).
The level of sedation assessment is a very essential step for delirium identification process. For instance, several validated instruments used for delirium screening incorporate sedation assessment as pre-requisite (Bergeron et al., 2001, Ely et al., 2004). Richmond Agitation Sedation Score (RASS) is a 10 point scale scoring system ranging from -5 to +4. At the score of 0 patient is alert and calm. At the +4 patients being combative and at -5 patient are heavily sedated. All the patients with RASS score of -1 and above should only be assessed for presence of delirium as this level of sedation is deemed to be appropriate in evaluating the cardinal features of delirium (Ely et al., 2004, Holly et al, 2012). Please see Appendix 19 for the detailed description of the RASS scoring system. The use of assessment tools like RASS, SAS and MASS helps to provide information about patient’s depth and quality of sedation which enables to render goal directed treatment (Sessler et al., 2002).

Shehabi et al.(2013) argued that evidence for prescribing sedatives are not very clear in critical care and further stated that ten years of delirium research revealed that sedation interruption is an integral component in management of complications related to use of sedatives. The main focus of use of sedatives in critical care area was aimed at improving outcome measures such as decreased ventilation time and ICU stay. However, delirium emerged as new inevitable complication resulting in negative outcomes among patients (Shehabi et al, 2012). Although there were several well designed RCT trials in the last decade designed to evaluate safety and efficacy of prolonged infusion of profofol, midazolam and dexmedeomidine, there are several limitations identified (Mehta et al., 2010, Shehabi et al, 2012). The limitation identified by Shehabi et al. (2012) includes: low quality clinical trials, misalignment with current practice, late randomization, non-reliability of sedation and delirium monitoring practices and long term patient outcomes not being assessed. Hence it could be argued
that these limitations lead to inadequate findings and lacks external validity (Shehabi et al., 2012).

The body of knowledge about sedation practice and sedation drug choice in the literature is limited and there is a big gap in evidence based recommendations for sedation practice (Shehabi et al., 2012). There are no large RCT to guide sedation practices hence translation and interpretation of research is difficult. Also there is uncertainty about relevant outcomes such as long term survival, institutional dependency, and cognitive function (Shehabi et al., 2012). In order to address all the limitations and gaps in the current knowledge of sedation practice and delirium management practice a multicenter, multinational robust designed Randomised Control Trial (RCT) called the SPICE TRIAL is currently being conducted in several phases (Shehabi et al 2012).

A pilot SPICE trial (RCT) was conducted among 712 patients from four different countries involving 43 ICU units. Rigorous inclusion and exclusion criteria were in place such as patients admitted to critical care were followed daily from admission until ICU discharge, death, or 28 days in the ICU. All patient who required less than 48 hours of sedation and ventilation therapy were included in analysis. This study highlighted significant relationship between early sedation depth and major clinical outcomes. Shehabi et al. (2012) emphasised early deep sedation was found to be independent predictor of death and influenced increase in time to extubation. The authors of this RCT suggested that Early Goal Directed Sedation (EGDS) is feasible and effective in providing optimal sedation and had improved patient outcomes such as less ventilation time spent and lesser occurrence of delirium onset (Shehabi et al., 2013).
Early goal directed sedation (EGDS) is the current evidence based, novel sedation strategy which emphasises administering light sedation whenever clinically appropriate (Shehabi et al, 2013). This novel strategy can potentially guide health care intuitions across the globe in successful management of sedation and delirium related complications (Shehabi et al., 2013). The comprehensive nature of PAD guidelines (2013) provides a framework for sedation and delirium practices in tackling the problem of delirium (Barr et al., 2013, Shehabi et al., 2013). The Society of Critical Care Medicine (SCM PAD) guidelines 2013 strongly recommends use of validated tools to titrate adequate level of sedation, preferably light sedation in order to achieve desirable positive outcomes in patient receiving sedation (Barr et al., 2013). Injudicious use of sedation has been shown to cause delirium which is associated with some of the negative outcomes as discussed earlier among critically ill (Kress et al., 2000, Schweickert et al., 2004). Three broad but interrelated areas emerged from the literature which will be discussed.

* Implementation of Delirium Monitoring
* International Delirium identification practices
* Current nursing knowledge and role of nurses in delirium identification.

2.8 Implementation of Delirium Monitoring

Health care professionals working in critical care units give close attention to functions of vital organs such as heart, lungs and kidneys by monitoring parameters such as heart rate, blood pressure, oxygen saturation, and urine output, but employ less attention to an equally vital organ, the brain (Ely et al., 2004, Patel et al., 2009, & Brummel et al., 2013). Having identified the importance of reducing negative outcomes associated with delirium in the earlier section, the need for diagnosing
Delirium in medical practice is an important step towards effectively treating short and long term complications associated with the condition (Brummel et al., 2013). It was evident from the literature that delirium has a significant impact on critical care patient’s clinical outcomes (Ely et al., 2004, Peterson et al., 2006, Holly et al., 2012). The poor level of detection of delirium is a direct consequence of the absence of systematic and formalised approaches to cognitive assessment in routine healthcare (Bourne, 2008, Meagher et al., 2009).

Delirium diagnosis can be difficult and challenging to heath care professionals in both intensive care units and general medical practice (Brummel et al, 2013). There is no biological marker or diagnostic test available to readily identify delirium (Ely et al., 2004). Screening tools for the detection of delirium in critical care remains the gold standard and are helpful to establish diagnosis of delirium (Dhalke & Phinney, 2008). Medical researchers from Ireland are engaged in a project to improve delirium detection using computer diagnostics which could prove to have major clinical implications for treating patients with delirium (Meagher et al., 2012). However, the current standard practice by health care professionals for diagnosing delirium in patients, is by using validated delirium assessment scales (Ely et al., 2012).

Several authors have emphasised the importance of use of validated tools in preventing long term complications of delirium (Ely et al., 2001, Wells, 2010, Devlin et al., 2011, & Brummell et al., 2013). The Pain, Agitation and Delirium (PAD) guidelines of Society of Critical Care Medicine (SSCCM 2013) recommends that all patients must be monitored for level of sedation and delirium at least once per shift using a validated assessment tool (Barr et al., 2013).
A wide variety of screening tools for delirium identification are available to health care professionals. Some of the most commonly used tools among critical care nurses are Confusion Assessment Method tool for Intensive Care Unit (CAM-ICU) (Ely et al., 2001a,b), Intensive Care Delirium Screening Checklist (ICDSC) (Bergeron et al., 2001), Nursing Delirium Screening Scale (Nu-DSC) (Gaudreau et al., 2005), and Delirium Detection Scores (DDS) (Otter et al., 2005), (Boot, 2012). A full list of commonly used tools is available in Appendix 7.

CAM-ICU and ICDSC are the most widely and frequently utilised delirium screening tools throughout the world especially among critical care nurses (Gusamo-Flores et al., 2012, Holly et al., 2010). These two tools can be readily used and easily identifies delirium. There are two steps involved in diagnosis of delirium using CAM-ICU. First step involves assessment of consciousness/arousal using RASS tool. A brief description of the RAAS tool was discussed earlier. Step two involves assessing the alertness of the mental status, inattention and disorganised thinking. A flow chart describing how to conduct the CAM-ICU is available in appendix 17.

Neuroimaging studies may allow for the identification of brain dysfunction (Hopkins & Jackson, 2006). Research has shown that a relationship exists between structural brain abnormalities and delirium detected on computed tomography (CT) or magnetic resonance imaging (MRI) (Soiza et al., 2008). Accurate methods of identifying delirium have relied on expensive imaging diagnostic techniques which are time-consuming, and require intensive bedside assessments including cognitive assessments at frequent intervals (Macullulich et al., 2013). Alternative to the above mentioned method a technique based solely on chart review would simplify the process and markedly improve the feasibility of delirium detection on a wider scale (Law et al., 2013). For example, ICDSC provide a useful addition to the current
available tools for the identification of delirium. The ICDSC evaluates delirium using important symptoms of delirium by using an eight-item checklist over 8 to 24-hour period (Bergeron et al., 2009, Brummel et al., 2013). The eight symptoms based on which the delirium is assessed in this method are: level of consciousness, inattention, disorientation, hallucinations/delusions/psychosis, psychomotor agitation or retardation, inappropriate speech or mood, sleep/wake cycle disturbances, and symptom fluctuation (Bergeron et al., 2009). A score of one point given for each symptom that manifests during the specified time frame and zero points if symptom did not occur. A score of 0 is considered normal, 1-3 is considered Subsyndromal delirium and greater than or equal to 4 indicates a positive ICDSC and the presence of delirium.

The validity and reliability of these two instruments were studied for the use and appropriateness among critical care patients. Gusmao-flores et al. (2012) completed a systematic review using meta-analytical approach to the published research that used CAM-ICU and ICDSC for delirium diagnosis among critically ill patients. Systematic review is considered to be the highest level of grading the evidence as it is statistically precise, identifies and selects particular questions and synthesises high quality research evidence (Gray, 2009). In this review CAM-ICU is deemed to be an excellent tool with pooled values of sensitivity of 80% and specificity of 95.9% when compared to ICDSC which was 74% and 81.9% respectively. The higher specificity of the CAM ICU in this study suggests that CAM-ICU is the best available validated delirium identification tool for critical care units. However, ICDSC can also be readily and routinely used in critical care units.

Due to the high incidence of delirium among critical care patients, several guidelines including Society of Critical Care Medicine (SCCM) PAD guidelines and
National Institute of Clinical Evidence UK (NICE 2010) recommend the use of a validated tool to assess delirium on a routine basis (Ouimet et al., 2007, Devlin et al., 2008, Gesin et al., 2012). Failure to use a validated tool by health care professionals’ leads to 65% of cases going undetected (Wells, 2012, Brummel et al, 2013). To date, CAM-ICU is the more accurate way of predicting outcomes in patents in critical care, but in reality nurses often do not use or implement CAM-ICU in their units (Scott et al., 2013). CAM-ICU and ICDSC both have robust validity and reliability. Implementing these tools have been highly accurate, favours compliance and requires minimal education (Pun et al. 2005, & Bell, 2011). The accuracy of these validated tools becomes irrelevant without adequate training (Cavallazzi et al., 2012). The next section will focus on the international critical care nurses knowledge and practice of delirium assessment.

Professional bodies such as the Irish society of critical care medicine (ICEMED) or Irish Association of Critical care Nurses (IACCN) have no strong recommendations for delirium screening process within critical care units in Ireland. Often critical care professionals derive recommendations in their practice from counterparts in USA and UK. Hence in the absence of definite guidelines, delirium remains the most frequently missed clinical condition in critical care units in Ireland (Meagher et al., 2012). As there are fluctuations of symptoms over minutes and hours, it is necessary to conduct repeat screening within 12- 24 hour periods (Mc Manus, 2010). Given the cost and morbidity associated with delirium, such a validated method of widespread delirium detection is greatly needed. The above mentioned screenings tools such as CAM-ICU and ICDSC will not only help to identify delirium but will also play an important role in expanding for patient safety initiatives and quality-improvement programs (Law et al., 2013).
2.9 Current nursing knowledge and practice of delirium assessment.

Nurses play a vital role in identification of delirium in ICU (Devlin et al., 2008). Flagg. (2010) argued that nurses are in close contact with patients in ICU at all times, hence they can recognise any discrete psychological changes in patients and are the ideal practitioner to identify delirium. The onus of successfully implementing the delirium assessment in critical care units not only depend on nurses but also on physicians, pharmacists and other allied health professional (Devlin et al., 2007). A large, multi-centre survey of knowledge and attitudes of delirium among 784 UK junior medical practitioner revealed that doctors lack basic knowledge of the diagnosis and management of delirium, and leads to its under-recognition (Davis & Macullulich., 2009). However, the literature suggests that doctors and nurses often do not screen adequately for delirium in ICU patients (Ely et al 2004, Devlin et al., 2008, Flagg 2010).

For instance, Ely et al. (2004) conducted a survey (phase I) using convenience sampling among 912 health care professionals which included physicians (n = 753), nurses (n = 113), pharmacists (n = 13), physician assistants (n = 12), respiratory care practitioners (n = 8), and others (n = 13). This survey was carried out during an annual scientific meeting for critical care professionals representing from different geographical regions in USA. This survey concluded that only 40% (n=345) were screening for delirium and more specifically only 16% (n=146) use validated delirium screening tools (Ely et al., 2004, Wells, 2012). Sedation practices and management, which are an integral part of delirium screening practices, are outlined in the clinical practice guidelines published by the Society of Critical Care Medicine (SCCM) (2002) were not addressed in this survey at this stage. However, this area was addressed in their follow up study (Patel et al., 2009).
As a follow up to the previously mentioned study, Patel et al. (2009) conducted a study (phase II) in a wider population which included representatives of 41 North American hospitals, 7 international critical care society meetings, and the American Thoracic Society. In this study, paper based and electronic survey were used. This survey revealed some improvement in delirium screening practices with 59% of participants reporting that they routinely assessed patients for delirium and 33% incorporated validated screening tools. In this survey the authors reported face validity, which is a qualitative measure of validity and is normally considered as the least scientific measure (Parahoo, 2009). The reliability of the survey instrument was not reported. A large sample size was achieved which reduces the margin of error of survey results.

A specific survey among 601 North American intensive care nurses using a paper/web-based survey which exclusively explored practices in relation to delirium assessments found that only 3% (n=30) of nurses thought it was important to routinely screen for delirium. (Devlin et al., 2008). Devlin et al. (2008) reported that only 10% (n=60) of nurses assessed for delirium during their 12 hour shift despite their local units specifying a policy for delirium screening practice.

A descriptive correlational study was conducted among 232 intensive care nurses using a self-report questionnaire in Jordan. This study examined critical care nurses knowledge and nursing practice regarding delirium in critical care units. This study included nurses working in wide range of hospitals including government, private and military. One of the inclusion criteria for this study was nurses with minimum of six months experience in critical care. This study revealed that critical care nurses in Jordan have a low to moderate level of knowledge about ICU delirium. The level of knowledge of nurses about delirium and management had a direct
influence on the nurses’ practice to evaluate it effectively. These findings highlight that critical care nurses have some knowledge, but lack necessary skills and ability to demonstrate evidence based care in their practice (Hamdan-Mansour et al., 2010).

A random sampling of nationwide telephonic survey among Dutch intensive care units head nurses and doctors was carried out. Interestingly, 31% of Dutch ICU’s had a protocol in place to treat ICU-delirium. This survey reported that only 14% (n = 14) out of 103 of all Dutch critical care units, monitored for delirium. Of these, only half (7%) used a tool that is validated with ICU patients despite availability of guidelines on delirium. This survey concluded that critical care units in Dutch ICUs routinely evaluated the presence of delirium with a validated instrument but less than one-third of the participants used a protocol to treat ICU-delirium (Van Eijk et al., 2008).

In Sweden, a postal survey was conducted among 82 head nurses of all intensive care units. This survey was aimed at understanding awareness of delirium observations and interventions provided which included pharmacological and non-pharmacological measures within Swedish critical care units. Response rate of 71% (n=58) was achieved. Written pharmacological guideline was available in about 26% (n=16) units. This survey reported that 62% (n=34) of ICUs in Sweden use some form of regular screening methods, while only one ICU used a validated screening tool (CAM-ICU) to assess delirium regularly (Forsgen and Eriksson, 2010). Interestingly, the authors excluded Cardiac intensive care units, where there is high prevalence of delirium and those undergoing cardiopulmonary bypass procedures who are at higher risk. Shorter length of patient stay and limited experience of staff in cardiac ICUs were the reason given by authors for excluding cardiac surgery patients in survey which
contradicts the literature. McPherson et al. (2013) argued that the increasing age, cerebrovascular and peripheral vascular disease, preoperative cerebral oxygen saturation, smoking, atrial fibrillation, renal dysfunction, metabolic syndrome, low intraoperative perfusion pressure and cardiogenic shock are associated with increased risk of postoperative delirium in Cardiac ICU. There were no report of ethical approval or waiver obtained for this study.

Christensen. (2013) explored knowledge of delirium among 53 staff nurses working in medical ICU in a teaching hospital in south East Asia using a questionnaire, purposive sampling technique was employed. This study highlighted the following concerns: only 39% (n=20) of nurses were aware that a hospital policy existed about delirium assessment, 69% (n=33) had received no formal training on delirium screening and 46% (n=24) were not involved in delirium screening process using a screening tool. Limited knowledge of nurses on signs and symptom and negative outcomes of delirium were evident from this survey. The sample size achieved for this survey was small, hence generalisability of these findings are very limited (Polit and Beck, 2012).

Use of a validated delirium assessment screening tool in critical care units are feasible, and is the very effective way to deliver evidence based nursing care. For example, Scott et al. (2013) conducted a single centered service evaluation in an 18 bedded critical care unit using 78 staff nurses. A pre and post educational questionnaire survey method was used. The authors stated that ethical approval was not deemed necessary for this study which raises the credibility of this evaluative survey (Burns & Grove., 2009). However, a higher response rate 92% (72/78) and 60% (48/72) were reported respectively. In both questionnaire response, nurses considered evaluation of delirium is less important that other possible conditions such
as presence of pain, agitation and altered level of consciousness. The findings of this above mentioned international research among nurses in critical care dealing with delirium cannot be applied to Irish context. A systematic review conducted by Steis and Fick (2008) stated that we cannot assume nurses read and incorporate evidence based findings in their practice. As the information emerging from a recently concluded study in Ireland reported that nurses are poorly engaged even in large teaching hospitals in eastern seaboard region (Unpublished data).

Eastwood et al. (2012) surveyed Australian critical care nurses’ attitudes towards delirium assessment in a large teaching tertiary level care ICU. This survey was carried out in two phases. In the first phase 36% (n=65/174) were encouraged to assess their patients for the presence of delirium. No educational input or interventions were provided. After a month, educational activities were rendered to encourage the nurses to use evidence based approach in identification and management of delirium. A survey was carried out at this stage and after extensive learning activity in their units. After introduction of CAM –ICU in their units a month later the same questionnaire was used to collect the data (Wells, 2012). CAM-ICU was well received by most participants and nurses felt it was important to do a delirium assessment (Eastwood et al, 2012). Some of the limitations identified in this study include low response rate i.e. 36% (n=65/174) and 26% (n=45/174) potentially leads to response bias. Noticeably evaluating CAM-ICU implementation process was carried over a short period (one month after introduction), only 5% (n=9) took part in both the surveys which has implications for interpreting and generalising of the findings (Gray, 2009).
Glynn and Corry (2014) conducted a descriptive, quantitative survey using a self-reporting questionnaire exploring Irish nurses’ opinions and current practices in relation to delirium in ICU in Dublin Academic Teaching Hospital settings (DATHS) (n=151). In this survey less than half of the participants (38% n=57) believed that delirium is experienced by 26-50% of mechanically ventilated patients. Delirium was recognised as a very serious problem by 94% (n=143) of the participants, but only 10% (n=15) of nurses considered delirium monitoring was important in ICU. A response rate of 70% was reported in this study. It is also evident from this research that a majority of critical care nurses in DATHs believe that delirium is a serious problem but are not engaged in screening practices regularly. This study concluded that there is a disparity between current evidence based research and critical care nurses practices about delirium (unpublished data). The absence of empirical data, warrants further studies to evaluate how nurses in the western sea board region of Ireland are performing screening practice for delirium.

Several authors have identified that nurses lack necessary knowledge and skills to identify delirium effectively and are poorly engaged in delirium screening practices (Inouye et al., 2000, Ely et al., 2004, Van Eijk et al., 2008, Macullulich et al., 2013). It is evident from the literature that nursing staff working in critical care units internationally, are inconsistent and poorly engaged in recognition of delirium. It is essential to examine the literature for what nurses perceive about delirium assessments and the potential barriers faced during their clinical practice.
2.10 Barriers and perception to delirium assessments

2.10.1 Potential barriers to delirium screening

A research study conducted outside of the critical care setting used a qualitative approach among medical and surgical nurses and explored practices of delirium management and barriers faced during the care of patients (Dhalke and Phinney, 2008). This research highlighted some questionable practices with nurses performing rapid, informal assessments due to time constraints, low staffing levels impeded thorough examination and staff also received little formal education on delirium. Hence, this resulted in inappropriate and ineffective interventions provided by nurses. Identified barriers to delirium assessments include patient being intubated, complexity of screening tools, difficulty in assessing sedated patient (Devlin et al., 2008), lack of time, physician’s neglect of nurses’ assessment findings (Law et al., 2013) and lack of training about use of screening tools (Flagg, 2012). The reason for critical care nurses not engaging in delirium screening are unclear. Some of the barriers faced by nurses in non-adherence to guidelines on use of validated tools in screening for delirium in critical care are, due to lack of knowledge and understanding of health care providers about delirium, considering delirium as a less significant problem, and lack of clear guidance on treatment and prevention of delirium (Boot, 2012).

2.10.2 Perceptions to delirium screening

Perception is a subjective process of acquiring, interpreting and organising sensory information (Lavarkas, 2008). It also indicates reality of situations or individual’s understandings. In a survey, the researcher is interested in how people perceive matters with regard to effectiveness of concepts or programs (Fink, 2013). Nurses’ perception on delirium assessment differ depending on various factors. There
is very little research in literature that has used qualitative approach to study the perceptions of nurses in delirium. However, survey methodology has been frequently used in studying nurses’ attitudes, knowledge, practices and perceptions. Nurses’ lack of knowledge and skills required in caring for delirious patients in critical care are due to lack of specific education programmes (Hamadan-Mansour et al., 2010). Preconceived ideas developed by nursing and medical students at undergraduate level along with superficial teaching at university can be reason for under recognition of delirium (Teodorczuk et al., 2012).

Furthermore the nurses are not aware of the local or institutional policies for delirium screening. Barriers for delirium screening were identified and poor perception of nurses regarding screening tools were revealed (Devlin et al., 2008). Despite providing educational interventions, nurses are reluctant to take up this important task of recognising delirium at an early stage, which has several implications for the outcomes in patients.

2.11. Methodological Issues

The literature review revealed nurses in critical care are poorly engaged in delirium identification process (Boot, 2012, Bell, 2012, Glynn & Corry., 2014). This area of evidence based care practice is in its infancy stage in Ireland. There is a paucity of national empirical research in the literature. To date, only one Irish study has examined critical care nurses delirium practice (Glynn & Corry, 2014). This has provided useful information on delirium screening practice by nurses.

This study has certainly added to the body of knowledge from an Irish perspective. However, as it was conducted in a different region, caution should be exercised in interpreting these studies as they were conducted in teaching hospital
settings. The majority of the research found was from a U.S.A. perspective, apart from the three studies in UK, three from Europe, one from Australia and one from Asia. The dearth of international empirical research attention can be attributed to stakeholders in health care, who are considering delirium as a serious problem.

Research conducted among critical care nurses were from mainly quantitative paradigms. A very few number of studies used qualitative approach (Dhalke & Phinney, 2008). Self-administered questionnaires and focus groups were the main methods used to gather data. While all these studies have provided information on nursing assessments of delirium, methodological weakness was identified in the majority of them, ranging from single research sites, smaller sample sizes, lack of ethical approval and low response rates. Consequently, the findings of these studies must be viewed with caution. Majority of these studies used convenience and non-random sampling which are the weakest forms of sampling (Burns & Grove, 2009). No research could be found on critical care nurses expansion of role into specialist in delirium practice.

2.12 Benefits of delirium screening

Nurses play an important role in early identification and can provide interventions in successfully managing the delirious patient (Devlin et al., 2008, Boot, 2012). Nurses involvement in early identification of delirium will help to effectively manage all complications related to delirium (Wells, 2012). Delirium has implications for increasing cost to the Health Service Executive as it is linked with longer duration of clients stay in ICU (Ely et al., 2004). Early identification of delirium using a validated screening tool will help nurses to employ early interventions to prevent complications, and thereby will be cost effective to both patients and health service
management. Comprehensive nature of PAD guidelines (2013) provides framework for sedation and delirium practices in tackling the problem of delirium in critical care units in the west of Ireland (Shehabi et al., 2013).

In a recent study reports by experts in delirium on how to improve recognition of delirium in clinical practice the barriers that prevent recognition of delirium are at due to individual and organisational and cultural barriers (Teodorczuk et al., 2012). Lack of education, ignorance and failure to perceive benefits of delirium detection are possibly leading factors that prevents recognition of delirium at individual levels (Balas et al., 2009, Teodorczuk et al., 2012).

Review of the literature indicated that there is a big gap exists between the knowledge of nurses and their performance on delirium assessments practices in eastern region of Ireland. Similar data was missing for western seaboard region of Ireland. Therefore a replication of the study by Devin et al. (2008) was deemed to be relevant and more important to the present context in the west of Ireland. This study was aimed at identifying nurses’ adherence to guidelines issued by the critical care society in caring for patients with delirium. The significance of this research was to increase the understanding of nurse’s involvement in early identification of delirium. Implications for practice were discussed and directions for further research in this area are discussed

2.13 Conclusion:

Delirium is an important complication among the critically ill. It is one of the under recognised medical condition and neglected by health care professionals. Review of the literature indicates that the several practice guidelines recommend regular screening for delirium using a validated tool in critical care units and growing
body of literature indicated delirium remains underdiagnosed even among critical care nurses. Exploring the assessment and management of delirium in acute care areas will provide the opportunity for a deeper understanding and awareness of the impact of delirium on this group of patients. Delirium is a predictor of new-onset dementia and accelerates existing dementia hence delirium prevention is effective but implementation in clinical practice is still lacking (Macullich et al., 2013). Nurses screening for delirium has been shown internationally to have many benefits to patients, nurses’ and services. The current study will highlight critical care nurses practices and perceptions towards delirium assessments. This study will also identify barriers for nursing practice in this area and will help to develop strategies that can be planned to overcome these issues. The following chapter will address the methodological issues to be borne in mind when conducting this study.
Chapter 3. RESEARCH DESIGN

3.1 Introduction

A research design is a systematic plan to study a scientific problem. It is a detailed plan of collecting, measuring, and analysing data (Gray, 2009). This chapter provides a comprehensive overview of this study’s methodology that was implemented in evaluating nursing practices regarding delirium assessment in adult critical care units. The study’s research design and rationale for its choice are discussed here. In this chapter, research paradigms and methodologies are described in general, and survey method are discussed in detail. In addition, a discussion on the data collection method, pilot process, the study population, sample selection, ethical considerations and data analysis are presented.

3.2 Nursing Research

The Nursing profession is central to effective health care delivery system (Parahoo, 2006, Burns & Grove, 2009). The fundamental aim of the nursing profession is to promote health and to provide excellent and sensitive care to individuals and families (Gray, 2009). Nursing research is essential to the nursing profession by providing necessary changes to be incorporated into the system of practice in order to deliver effective evidence based nursing care (Parahoo, 2006, Burns & Grove, 2009). In order to be relevant for both short and long term, research must be rooted in understanding and analysis of contemporary relevance factor (Robinson, 2011, & Fink, 2013).

Research is needed to identify teaching and learning strategies which promotes nurses’ understanding and management of nursing practice (Burns & Grove,
Nursing research validates and refines existing knowledge which influences the promotion of evidence-based nursing practice (Burns & Grove, 2009). Research can be defined as a systematic enquiry of questions or exploring phenomenon using scientific methods (Parahoo, 2006). There are many research methods available to researchers (Gray, 2009), which can be understood at many different levels with the most fundamental level being a philosophical one (Clarke, 1998). In the next section the philosophical approaches used in nursing research are discussed.

3.3 Research Paradigms

Paradigm is a way of looking at natural phenomenon (world view) which circumscribes a set of philosophical beliefs that guides research inquiry (Guba, 1990, Polit & Beck, 2012). Denzin and Lincoln (2001) classified paradigm based on beliefs into three: Ontology, Epistemology and Methodology. Ontology deals with the question of what is real. Epistemology is study about knowledge and the process it acquires and validates. Methodology deals with how we know the world or gain knowledge about it (Gray, 2009, Welford et al., 2011, 2012).

The philosophical approaches used in nursing research are positivist, post positivist, interpretive and critical social theory (Weaver & Olson, 2006). Positivism school of thought believes that anything worth knowing can be measured objectively (Polit & Beck, 2010). Positivists derive information using logical mathematical treatments and reports of sensory experiences otherwise known as empirical evidence (Macinonis, 2012). Post positivist use universal law to explain social phenomenon and oppose positivists view. Post- positivists give importance to subjective experience, perceptions and language in order to understand the social phenomenon (Gray, 2009).
Interpretivism ascertains that behaviours can be understood only in the context and it asserts that natural reality (laws of science) and social reality are two different entities and therefore different methods are required to the study (Gray, 2009). Interpretivism research uses understanding of words from individual perspective and data obtained can be used to change society. Interpretive approaches used in research includes interactionism, phenomenology, hermeneutics and naturalistic inquiry. Ethnography is study of peoples and culture of groups from the individuals’ point of view (Parahoo, 2006). Phenomenology deals with the study of the lived experience of the individuals which believes human behaviour is influenced by the culture in which it takes place. Grounded theory research develops new theory about a phenomenon based on the data (Polit and Beck, 2012).

Critical social theory is a process which questions the currently held values and assumptions, and challenges conventional social structures (Gray, 2009). Qualitative research is useful when a subject is too complex to answer by a hypothesis. Qualitative design generates useful information which is not dependent upon sample size or others. Qualitative data are difficult to analyse using mathematical techniques there by providing personal opinions and beliefs. On the other hand quantitative research investigates phenomena that lend to precise measurement and quantification which often involves a rigorous and controlled design (Polit & Beck, 2012). A quantitative approach is considered an effective method of generating an abundance of information. A limitation of this approach is that it does not provide in-depth knowledge (LoBiondo-Wood & Haber 2006). The various approached for the current study was considered.
3.4 Research Methodology

The research question seeks to understand the practices of nurses in relation to delirium assessment in their current clinical practice. This is congruent with the tenets of quantitative inquiry, which emphasis on scientific and objective measurements (Burns & Grove 2005). The methodological approach taken by the researcher is governed by the research question and guides him or her in choosing the method most suited to research the phenomenon under study (Treacy & Hyde., 1999). Hence the research methodology chosen for this study was the quantitative approach based on post-positivism (post empiricism). This approach permits quantitative measurement of the variables associated with the phenomena under investigation (Parahoo, 2006).

Quantitative research is classified into two types: Experimental and Non-experimental types (Burns & Grove, 2009). Experimental design seeks to provide evidence of cause and effect relationship in a phenomena which includes randomised controlled trial (RCT) and quasi-experimental types (Robson, 2011). An experimental design particularly a RCT is regarded as the most scientifically vigorous study design and more robust than Quasi or non-experimental designs because RCT maximises statistical power, minimises selection and allocation bias (Mc Burney, 1998, Gray 2009). Experimental designs aim to predict phenomenon or explain the causation effect. In experimental design, the researcher has control over the experiment. There are two main groups: one acts as a control group and the other one as the experimental group (Robson, 2011). The researcher randomly assigns the subjects to particular groups and tests one effect at a time. Fink (2013) describes that one of the difficulties of the experimental designs is randomisation and control, which is an expensive affair. Ethically, control group will be denied intervention or treatment. Hence it is not always possible to replicate social, organisational or behavioural conditions in laboratory
settings (Robson, 2011). Observation in the field setting might be preferable to experimentation as the reality can yield results easily (Fink, 2013).

3.5 Non-experimental design

In non-experimental designs, the researcher constructs a picture or explores events as they naturally occur (Polit and Beck, 2012). In non-experimental design, an intact group is taken and no attempts will be made to manipulate an independent variable because they are naturally occurring attributes (Fink, 2013). Non experimental design provides results with worthiness and interesting information of value to an organization, which is very common in nursing discipline (Gray, 2009). Non experimental design of quantitative research includes: survey method, observational research and analysing existing data sets (Muijs, 2004, Bowling, 2006).

Noticeably, researchers are not in agreement on how to classify non-experimental studies (LoBiondo-Wood & Haber., 1998p.196). According to Johnson (2001), non-experimental design is classified into two broad classes: descriptive and correlational research. In the next section these two main types of non-experimental research will be discussed.

3.5.1 Descriptive research

The main purpose of descriptive research is to observe, describe and document aspects of a situation (Johnson, 2001). It is often referred to as exploratory or survey studies. Detailed description of existing variables use data to justify and assess current situations. This information can then be used as a means of planning for improvement (Robinson, 2011). Descriptive research collects data directly from the subjects/participants (Parahoo, 2006). This is obtained usually by questionnaire or
interview (personal or telephone) methods. It is designed to obtain information from populations regarding the prevalence, distribution and interrelations between variables (Gray, 2009).

3.5.2 Correlational research

Correlational research design allows the researcher to potentially explore the relationship between variables that inherently cannot be manipulated (Polit and Beck, 2012). This is useful to researchers as it is employed easily in clinical settings and provides increased flexibility when investigating complex relationships among variables (Gray, 2009). This design has a realistic quality as it can highlight practical solutions to clinical problems (Johnson, 2001). Data collection method can be used across the previously mentioned designs to collect detailed descriptions of existing variables (Johnson, 2001). This type of research provides a picture of situations as they naturally happen hence there is no manipulation of variables. The commonly explored variables of interest usually involve opinions, attitudes or facts (Gray, 2009, Polit and Beck, 2012, & Fink 2013).

Studies that include descriptive and correlational characteristics can explore variables and the relationships between them (Polit and Beck, 2012). Although correlational and descriptive research are weaker than experimental studies, they provide different degree of evidence depending on the nature of research enquiry (Polit & Beck, 2012).

The main aim of this study is to evaluate critical care nurse’s delirium assessment practices. A quantitative descriptive survey approach was used to answer the research question. The variables identified were studied under perceptions, barriers faced and practices of sedation and delirium assessments. As this study aims to answer
the research question among a large population, survey method was deemed to be the most appropriate way to collect data (Gray, 2009, Parahoo, 2006). Descriptive survey is an efficient method of gaining an abundant information. However, it does not provide the in-depth knowledge that would be obtained using a qualitative approach, (Robson, 2011, Polit and Beck, 2012). In the next section the design plan will be discussed and several survey methods will be considered.

3.6 Design plan

Surveys have been used with human beings in social research for a long time (Fink, 2013). Surveys are one of the most widely and popularly used methodologies around the world (Gray, 2009). In social research, surveys generally involve a fixed design and normally occur cross sectionaly (Gray, 2009). Survey gathers information about individual or groups’ knowledge, values, feelings, preferences and behaviour (Fink, 2013). Surveys in research collect a wide range of quantitative data from a large geographically diverse population which can be employed on small or large scale depending upon the nature of the project (Gray, 2009). Large scale surveys are usually used in big business, they are time consuming and need a range of personnel effort to implement (Robson, 2011, Fink, 2013).

Survey helps novice researchers to generate the necessary data in small scale for their projects (Fink, 2013). A detailed statistical analysis on survey data can be performed that permits comparison of results with similar populations or association between factors and behaviours (Robson, 2011). Obtaining information directly from people is a very effective way of evaluating a programmes or make decisions (Polit & Beck, 2012, & Fink, 2013). The data that people provide are descriptions of their feelings, perceptions, values, habits and personal background (Gray, 2009). Hence
surveys can provide necessary details of information from a particular group, which can be analysed using scientific methods (Polit & Beck, 2012, Fink, 2013).

Surveys are categorised into two main types: analytical and descriptive (Gray, 2009). Analytical survey uses a deductive approach in arriving to conclusions, whereas descriptive survey uses an inductive reasoning approach which provides a broad description of events applied to particular situations and groups (Gray, 2009, Robson, 2011, & Fink, 2013). Both these approaches are widely used in research to understand concepts scientifically, which provides vital information about a given population either cross sectionaly or longitudinally. The advantages and disadvantages of survey method will be discussed in the next section.

3.6.1 Advantages of survey

Surveys provides simple and straight forward approach to the study of attitudes, values and beliefs (Fink, 2013). This approach can be adopted to collect general information from almost any population (Robson, 2011). Large amount of data can be obtained using standardized survey. Surveys are relatively low cost technique, which can be used to gather larger and efficient data in shorter periods, when compared to other forms of data collection (Gray, 2009, Robson, 2011, and Fink, 2013). The greatest advantages of the survey approach are flexibility and broadness of scope (Robson, 2011). Information retrieved is usually relatively superficial, more suitable to extensive rather than intensive analysis (Gray, 2009). Surveys can be useful as a research method when planning a programme, evaluating a service or establishing a policy (Fink, 2013).

Survey has been the most widely used method to retrieve information about current practices and perceptions of nurses, and barriers to delirium assessments in the
past (Ely et al., 2004, Devlin et al., 2008, Scott et al., 2012). With the use of survey software, advanced statistical techniques can be employed to analyse multiple variables, and validity and reliability of the findings can be established (Gray, 2009, Fink, 2013). The reliability and validity of a survey depends on technical construction and proficiency of those running the survey (Parahoo, 2009). The disadvantages of survey method includes inflexibility of design and, the questions that bear controversy cannot be answered precisely, thus leading to possible inappropriateness of the study among the population surveyed (Polit & Beck, 2012). Added to this, several challenges are encountered while using this design. In the next section, the challenges faced in conducting this survey and how these challenges are addressed will be discussed.

3.6.2 Challenges of survey

One of the main challenges of the survey method involves reaching out to the respondents (Parahoo, 2006). Also characteristics of the respondents may directly influence the data collected. Respondents may not necessarily report their beliefs and attitudes (Polit & Beck, 2012). Often respondents may not provide accurate or honest answers which leads to respondent bias and data error. Data error in a survey is mainly contributed due to non-response of the participants (Gray, 2009).

Ambiguity is another area of concern in a survey, as respondents may misunderstand some of the survey questions and this may elicit different responses by different individuals to same questions which leads to unclear data (Polit & Beck, 2012). The data obtained through surveys are usually the participants’ response to a particular question. The data does not reflect the characteristics of non-respondents. Respondents may not treat the exercise seriously or they may complete the survey out
of boredom or compulsion which creates bias in the survey results. Hence low response rate remains the most common challenge in a survey (Bowling, 2004).

### 3.7 DATA COLLECTION

Data collection is a systematic gathering of information or data for a particular purpose from different sources (Bowling, 2004). The data collection was obtained using self-reporting questionnaire survey. The various types of commonly used methods of survey are mail (questionnaire) surveys, self-reporting questionnaire, telephone surveys, face to face interviews, and drop off survey (Salant & Dillman, 1994). The questionnaire method best suits the aims and objectives of this study. Questionnaires have the ability to gather information which is easy to count and avoids ambiguous answers (Polit & Beck, 2012).

Questionnaires are the most widely used technique in surveys, in which the respondents fill out the questionnaires and returns it to the researcher (Fink, 2013). Questionnaires are a highly structured data collection technique, in which the respondent provides information and thereby the researcher can create variables, by case matrix for large samples (De Vaus, 1996 P 83, Fink, 2013). Questionnaire survey allows large sample size without major expense to generate quantitative data (Burns & Grove, 2005).

A descriptive survey was carried out using self-reporting questionnaires to obtain information on the current status of critical care nurses’ perceptions and barriers faced during their practices of sedation and delirium assessment (Burns & Grove 2005, Parahoo, 2009). An extensive review of available validated tools were undertaken to identify the questionnaire that would most effectively meet the study objectives. In this study a pre-validated tool designed by Devlin et al (2008) was used as this was found to be most appropriate to the study topic, aims, objectives and target population.
The survey instrument was developed by Devlin et al. (2008) in the United States of America. Permission was obtained from the author to use this questionnaire (See Appendix 11).

An expert panel consisting of personnel who had extensive experience with regard to assessment of delirium in critical care were consulted during the original instrument development. These included critical care nurse educators, intensivists, critical care pharmacist and nursing faculty members. The questionnaire consists of three main sections which includes: 1) sedation and delirium assessment process, 2) current opinions about delirium and delirium assessments including potential barriers to delirium assessment and 3) demographic data. Piloting process of the survey instrument was carried out and the intrarater reliability of the survey instrument was reported to be 86% (Devlin et al., 2008). Intrarater reliability is the extent to which the researcher obtains the same results when measuring same behaviour on different occasions (Robson, 2009). Since its original development, the survey instruments has been widely used in many countries (Hamadan et al., 2010). In addition the cronbach alpha value for scale items in the questionnaires were calculated by the Principal Investigator (PI) of the current study and reported it to be 0.742, 0.73 and 0.719. The normal range of value is between .00 and +1.00 (Pallant, 2013). Higher value reflects higher internal consistently (Polit & Beck, 2012). These values suggest that the scale items used in the questionnaires were reliable. However, if the researcher uses an established instrument then instrument testing is not necessary (Sproull, 2004).

There were several steps taken by researcher to overcome the challenges in this survey. The steps included: distribution of questionnaires in person, simple designing and wording of questions, pilot testing of questionnaire and timely reminders. Each of these steps will be discussed detailed in the next section.
As discussed earlier the anticipated main challenges for this research were measurement error and low response rate (Gray, 2009). In order to overcome low response rate, the researcher preferred to distribute the questionnaires to participants in person, through use of key contacts in each study site rather than sending it out by post (Bowling, 2006). Questionnaires were designed attractively, and printed on a pink coloured paper. The questions were easy to answer, as the respondents were expected to give their responses by numerical answers or tick marks rather than long sentences, thereby reducing time consumption, which in turn increases response rate. (Salant & Dillman, 1994). Wording of the question is essential to address these challenges which will be discussed in the next section.

3.7.1 Wording of questions

Wording of questionnaires is fundamental and the most essential step in avoiding obvious data error (Bowling, 2006). In this survey the wording of the questions were kept simple and use of jargons and technical terms were avoided (Pallant, 2013). Double barrelled questions were avoided as they elicit different response to same question by different persons (Fink, 2013). Negative questions were also avoided in order to overcome confusion and difficulty in understanding by participants. Simple questions were constructed with clear structuring to avoid ambiguity (Salant and Dillman, 1994). A Likert item generally measure attitudes, knowledge, perceptions, values, and behavioral changes of individuals or groups. A Likert item involves a series of statements that respondents may choose from in order to rate their responses to evaluative questions (Vogt, 1999). Hence using Likert scale will provide comprehensive view of different aspect of users’ experience of delirium screening process.
A reminder letter and a poster was sent to all the participants in advance, before the end of data collection. And also face to face contact with the potential participants was established to explain the aims and objectives of the study, there by encouraging the nurses’ participation (Salant & Dillman, 1994, Bowling, 2006). According to Bowling, (2006) the measurement errors will be reduced when non-response rate is minimized. The pilot testing of questionnaire was done to ensure appropriate data collection process as the survey instrument was constructed in different jurisdiction (Polit and Beck, 2012). In the next section the details of piloting process involved in this research are discussed.

3.7.2 Pilot test

Piloting is administering questionnaires to a small sample of total population of intended study (Polit and Beck, 2005). It is important to conduct a mini version of the study before conducting the actual one, which will help to sort out technical matters (Robson, 2011). Pilot process was carried out in this study in order to ensure that the questions and scale items were clear, and for the identification of any questions that may offend potential respondents (Salant 2013). The piloting process tests the questions of the questionnaires relevancy, its appropriateness and also ensures the researcher on the right lines conceptually (Robson, 2011). The pilot process also provides information on the time required to complete questionnaires. This information indicates whether the length and structure of the questionnaire are problematic as completion time and response rates are interrelated (Parahoo, 2006, Robson, 2011).

A pilot study was carried out using a small sample of subjects from the main study using random sampling of eight participants from the identified population.
(Bowling, 2006). The pilot participants were informed that the purpose of their participation was to provide an evaluation of the questionnaire and advised that they would not be part of the main study (Polit & Beck, 2012). The pilot participants were also debriefed to check for problems with the questionnaire and issues concerning it (Parahoo, 2006). The questionnaire was previously validated and used in different cultural contexts, therefore a pilot was undertaken here for the purpose of testing the process of data collection, identifying any ambiguity around question structure and to check for clarity of instructions (Gray, 2009). The validity and reliability of the questionnaire was not checked during the pilot study, as the tool used was pre validated (Jones & Rattray 2010).

Pilot participants were encouraged to use the feedback form provided along with the questionnaire and notify the researcher any issues pertaining to use of the survey tool. The feedback form provided information about the time taken to fill out the questionnaire, if any questions were confusing or difficult to understand and relevancy of the questions to their current practices. The data obtained from the pilot study were excluded from the statistical analysis of the main study (Polit and Beck, 2012).

3.8 Population and Sampling

3.8.1 Population

Population can be defined as the total number of units from which data can potentially be collected (Parahoo, 2006). A sample is a proportion or subset of the target population (Bowling, 2006). In this study the target population were all staff nurses working from five different critical care units within the western seaboard region of Ireland.
3.8.2 The setting

Critical care is a multidisciplinary health care specialty that deals with care of the patient with acute life threatening illness. Critical care health professionals comprises of doctors, anesthesiologists, nurses, physiotherapists, occupational therapists and other allied health care professionals. Intensive care nurses provide highly specialised nursing skills which includes hemodynamic monitoring such as cardiac monitoring (12 lead ECG, Cardiac output monitoring), invasive lines monitoring (Central Venous Pressure, Arterial Blood Pressure) and advanced airway managements (Invasive and non-invasive such as mechanical ventilators CPAP and BIPAP therapy). On the other hand, Higher dependency unit (HDU) is a progressive critical care unit which delivers level of care falls between critical care unit and ward which supports patients undergoing major elective and emergency surgery from varying specialties (AACCN, 2010). HDU are also known as recovery intensive care unit. The higher incidence and prevalence of delirium among these units was most appropriate to recruit participants to study the aims and objectives of this project.

This study took place in critical care units among selected hospitals in the west of Ireland. There are six major hospitals within the western seaboard region which includes two major teaching, two general (public), and two private hospitals. These hospitals have intensive care and high dependency units. One of the private hospital was excluded from the study as there was no intensive care unit in that facility. The researcher choose the critical care units in this region as they were convenient for conducting the study.

3.8.3 Sampling

Sampling of the population is a process by which the subset of subjects are chosen for data collection to estimate characteristics of the entire population. It is an
essential step in obtaining reliable and valid data which yields accurate results (Gray, 2009). A sampling plan helps to increase representativeness, decrease systematic bias, decrease sample error, saves time, money and effort (Burns & Grove, 2009). The two main types of sampling techniques are probability and non-probability. Probability samples provides most valid and credible results as they are representative of the population (Gray, 2009). The various types of probability sampling are simple random sampling, systematic sampling, stratified sampling and cluster sampling (Burns & Grove, 2009). The two main characteristics of this types of sampling are every subset chosen have non-zero probability of being sampled and involves random selection. The limitations of probability sampling designs in research are expensive and time consuming. On the other hand, non-probability sampling are easy to recruit, provides faster analysis of results and helps researcher to focus on important aspect of the design despite this technique being criticised as weaker technique (Bowling, 2006).

The five common non-probability sampling design described are: convenience, quota sampling, purposive, network and theoretical sampling (Burns & Grove, 2009). Convenience sampling method successfully gathers data from a true cross section of the population, and participants were selected on the basis that they are considered to be typical of a wider population (Gray, 2009). The main goal of selecting convenience sampling in this survey was that it would provide data on the issue being studied. Convenient sampling has been criticized for causing sampling bias, systematic bias and limitation of the findings (Robson, 2011). Systematic bias refers to differences between sample results and the theoretical results of the population (Robson, 2011). According to Kerlinger and Lee (2000) convenience sampling is a valuable technique when used with reasonable knowledge and care in implementing a research. The criticism can be addressed by carefully selecting the target population and using
systematic inclusion and exclusion criteria thereby decreasing potential bias and increases representativeness of population (Burns & Grove, 2009).

3.8.4 Inclusion Criteria

The Inclusion criteria for this study was registered general nurses currently working a minimum of six months in ICU, HDU, Cardiac ICU or mixed type ICU in western seaboard region of Ireland at the time of recruitment for the study.

3.8.5 Exclusion criteria

The exclusion criteria for this study was all registered nurses who were on extended leave such as Career breaks, maternity leave and long-term illness at the time of the study in selected critical care units.

3.8.6 Sample Size

A convenience sampling of registered nurses (RN) working in critical care units in western seaboard of Ireland were recruited with their voluntary consent to participate in this survey. All eligible RNs working on these units were invited to take part in this survey regardless of education, ethnicity, or gender. The estimated sample size for this study was 272 registered nurses working in critical care units which included General ICU, Cardiac ICU and HDU units on the western seaboard of Ireland. The total number of nurses working in the critical care units in the Health Service Executive nationally is approximately 1204. Therefore the sample for this study represent about 15% of critical care nurses in Ireland. Study sample was determined following calculation of staffing levels in targeted units using a sample size calculator (Burns & Grove, 2009)., the confidence level is 95% and confidence interval is at 5%. Therefore the sample size required would be 159.
3.8.7 Type I and Type II errors

A type I error occurs when the null hypothesis is rejected when it is true while a type II error is converse and sees the acceptance of the null hypothesis when it is false (Polit and Beck, 2012). The risk of committing a type I error was controlled by the significance level \( p \) set at \( < 0.05 \) for statistical test on the data collected (Gray, 2009, Burns and Grove, 2009). A power analysis can performed to assess the study has the sufficient power to reduce the risk of committing Type II error (Pallant, 2013). A power value of 0.8 is standard in a research. Larger sample sizes reduces the standard error (Parahoo, 2009, Pallant, 2013). Hence the researcher aimed to recruit larger sample size which ensures heterogeneity and increases the external validity of study (Polit & Beck, 2012). The issues of reliability and validity will now be explored.

3.8.8 Issues of Reliability and Validity

In any research, validity and reliability of the survey tools are essential for obtaining appropriate data from the group (Gray, 2009, & Polit & Beck, 2012). Pallant (2013) states that validity of the scale refers to degree to which the scale measures what it is supposed to measure. Content validity, construct validity and criterion validity are the three main types of validity discussed in research (Palant, 2013). Reliability refers to the scale and its freeness from random error (Kline, 2005). Two common indicators of scale validity are test-retest reliability and internal consistency. The intrarater reliability of the survey instrument was reported to be 86% (Devlin et al, 2008). The selection of research instrument must measure what exactly is needed to provide data in order to arrive at a conclusion of hypothesis or solution to a problem (Pallant, 2013). Hence validity is the key for any research process (Polit & Beck, 2012, Palant, 2013). Rigour in this study was maintained by using validated questionnaires, pilot process, calculating Cronbach’s alpha and setting inclusion and exclusion criteria.
In the next section the recruitment strategies employed by the researcher for this survey are discussed.

### 3.8.9 Recruitment strategy

Ethical approval was obtained from the hospitals Research Ethics Committee in February 2014 (see appendix 15). Following ethical approval, a letter was written to the Director of Nursing seeking permission to access the nursing staff (see appendix 12), permission was granted from the Director of Nursing in February 2014 (see appendix 13). Letters were also written to the Assistant Director of Nursing, and Clinical Nurse Manager 3 and the see appendix 20). Prior to commencing data collection a poster was displayed for two weeks in the units, informing that a research study would be taking place and all were welcomed to participate in the study (see appendix 8).

The key contacts were those staff of the local targeted units who were directly involved in recruitment and data collection process. After two weeks, envelopes addressed to the specific staff, which were enclosed with questionnaires and information letter regarding the project were left in the staff’s internal mailing systems. The nurses were invited to fill the questionnaires and return it to the collection boxes left in their units. Spare questionnaires were also left with key contacts in each unit for those who had lost or misplaced their questionnaires. The collection boxes for completed questionnaires were left in the participating units of each hospital for a period of 30 days. A reminder was sent, one week before the completion of the study to encourage participants to take part in the survey. The data collection was extended by one week considering the business of the units. The ethical consideration will now be explored.
3.9 Ethics in nursing research

In this section the ethical principles that guided the researcher and the steps that were taken to ensure that the study was carried out with the utmost regard for the participant’s safety and integrity of the research project are discussed.

3.9.1 Professional practice and ethical standards.

When human beings or animals are used in research, ethical issues arise. Ethics can be challenging because ethical requirements may conflict the desire to produce rigorous evidence (Newel & Burnard, 2005). There are various code of ethics pertaining to various professional bodies. For example, in America the American Nursing Association ANA published code of ethics for nurses involved in research (ANA, 2000). Similarly in Ireland, An Bord Altranais the highest governing nursing council has set of code of conduct for those nurses engaged in research. This code of conduct primarily safeguards the participants and patients and also ensures that the research undertaken by nurses adhere to the rules of human rights protection (ABA, 2007d). The goal of these set of rules is to develop high quality evidence using best available methods.

Sarantakos (2005) stated that ethical standards are essential to the researcher in order to maintain objectivity in social research and uphold professional integrity. Researcher should also take responsibility, must be competent, and employ accurate methods of data obtaining and analysis (Parahoo, 2009). Researcher has to choose appropriate interpretation of the data and report accurately (Fink, 2013). Falsification and fabrication of data is viewed as a misconduct. Fabrication is use of data never collected by researcher used in publication. Falsification refers to changing the
contents of the findings. A genuine researcher must avoid the above mentioned misconduct in their research (Sarantakos, 2005).

3.9.2 Ethical standards in nursing research

Ethics in nursing research involves principles that govern to ensure participants rights and safety (Parahoo 2006). The main ethical principles that were considered in conducting this research study were respect for persons, confidentiality, beneficence/non-maleficence, justice and veracity (Polit and Beck, 2012). Beneficence principle advocates doing good for the participants (Parahoo, 2009). Non maleficence refers to research should do no harm. Ethical researcher must use strategies to minimise all types of harms and discomforts even the ones that are temporary (Parahoo, 2009). Confidentiality refers to all the participants have right to protect all the data on them to be protected (Polit and Beck, 2012). In this research anonymity was maintained through administering self-reporting questionnaires.

3.9.3 Physical, Mental, Legal harm.

Researchers are expected to exclude any harmful or invasive procedures that would potentially lead to injury to the participants. In this study there is no risk of physical injury as the research method primarily uses questionnaires to gather information from the participants (Gray, 2009). However questionnaire surveys are sometimes likely to produce discomfort in individuals either directly or indirectly (Fink, 2013). Questions used in the survey were carefully constructed and designed to ensure that there was no or least possible risks to participants (Fink, 2103). Personal questions regarding participants were avoided and they were treated with respect (Sarantakos, 2005). Implied consent was sought from research participants (Parahoo 2009). Before consent was sought the researcher provided written details of the nature and purpose of the study through participant information sheet. Participants were
given adequate time to consider their participation (Polit & Beck, 2012). Completion of the questionnaire by participants was taken as their giving consent to participate in the study. The subjects did not have to reveal their name or any other identity while filling the questionnaire (Amador & Goodwin, 2005, Gray, 2009).

Participants could have experienced minor inconvenience in relation to the time taken to complete the questionnaire. The estimated time to fill out the questionnaire was 10-15 minutes. The risk from participating in this study are not more than would be encountered in everyday life (Parahoo, 2009).

The possible benefits of participating in the study may possibly increases awareness among nurses about delirium assessments. Results from this study identify current perceptions and practice of nurses in relation to delirium assessment. This information was provided to the participants and can inform future care planning to improve standards and quality of psychological care in critical care units. Participants were made aware of their valuable contribution in relation to this outcome. The study also provides information for follow up research to be carried out at a national level.

The researcher will gain academic qualifications towards Masters of Health Sciences programme at XXX, XXX.

3.9.4 Data Storage

Questionnaires completed by the participants were stored in a locked cabinet in a locked room accessed only by the researcher. All data on returned questionnaires were anonymised and coded. Only coded data was used in the analysis stages. Computerised data were pass coded and analysed. Analysed data was stored in researcher’s personal laptop with password protection. This information was provided to the study participants through information leaflets. The data collected for this study will be kept for seven years in a secured cabinet. The information obtained in
connection with this study will be used for the sole purpose of the research and will adhere to Data Protection Act 1998 and Data Amendment Act 2003. Feedback will be provided to the participating units regarding the findings.

The researcher is enrolled as post graduate student at University and was covered by XXX University clinical indemnity scheme. Minimal ethical issues were encountered/anticipated in this study. However, if any issues arises, that was in breach with the An Bord Altranais Code of Professional Conduct (2000) and the Data Protection Act (1988, 2003), the researcher will be obliged to report the issue and take appropriate action.

3.9.5 Data Analysis

Data collected were analysed using a standard statistical package (IBM SPSS, Version 20). Alpha and power level was set at the traditional values for social science research (0.05; 0.8) aimed at maintaining good statistical power and statistical significance (Pallant, 2013). Data was statistically analysed and summarised for central tendencies and levels of dispersion (standard deviation and range). The data analysis strategies used includes t tests, chi-square analysis, and Mann -Whitney test as appropriate, in order to ensure stastical accuracy. The t-test analysis examines if there is any differences to demographic and practice variable. The chi square test for independence was used to determine relationship between two variables that are not normally distribution (Pallant, 2013). The Mann-Whitney test, which is a non-parametric test was used to compare differences between two independent groups when the dependent variable is either ordinal or continuous, but not normally distributed (Pallant, 2013). A p value less than 0.05 was deemed significant. Missing data occurred due to participants failing to answer an item or incorrectly answering
them. Missing data from cases wise were excluded only if a missing data for particular analysis.

One open-ended question was included at the end of the questionnaire for the participant to comment on delirium assessment in their units. Content analysis was performed to identify common themes among the participants' responses. The primary focus in analysing text data is to identify the content, evaluating attitudes and represents individuals or groups shared ideas (Parahoo, 2006). Characteristics refers to smallest unit of analysis, single item or event in a text, similar to an individual response to a variable or indicator in quantitative research. Content analysis is a process by which verbal or behavioural data are categorised into classification, summarisation and tabulated. Content analysis is a method that can be used with either qualitative or quantitative data and it can also use in an inductive or deductive way (Elo & Kyngas, 2008). The peer debriefing method (comparing themes and categories identified by a peer colleague) was used to establish credibility of the qualitative findings. Credibility is one of the requisites to establish trustworthiness as proposed by Lincoln and Guba (1985). The PI conducted content analysis individually and then sent the participants’ answers to a Masters prepared nurse who is employed at HSE west with experience in conducting qualitative nursing research.

3.10 Conclusion

This study evaluated the nurses’ assessment of delirium in western seaboard region of Ireland using non-experimental quantitative survey method. Self-reporting questionnaires were utilised to collect data to study the participants from multiple centres. Convenience sampling technique were used to recruit participants. Details of pilot survey and recruitment strategies for the actual research were reported. Issues of rigour, reliability and validity addressed in the research were discussed. The study was
conducted in accordance with guidelines issued by the ABA (2007), which address ethical considerations for participants. Data analysis was performed using IBM, SPSS package version 21.0.
4.0 CHAPTER FOUR: FINDINGS

4.1 Introduction

This chapter illustrates the findings of the study which set out to evaluate the nursing practice regarding delirium assessment in adult intensive care units. The research question addressed by this study was: What are the practices and perceptions of nurses in assessing patients with delirium in Critical Care Units in the west of Ireland? The specific objectives of this study were to explore practices of critical care nurses in assessing delirium and sedation. Identify use of any validated delirium assessment tools among the participating units. To examine the nurses’ adherence to Society of Critical Care Medicine (SCCM) guidelines on delirium assessment.

In order to answer the research question, a quantitative descriptive survey was carried out using a non-random convenience sample of critical care nurses from the identified centres. The questionnaire had 17 items including one open-ended question. The questionnaire was adapted from a North American study conducted by Devlin et al (2008).

The findings are divided into four sections. The first section provides an overview of the respondents’ demographic characteristics. The next section presents the study findings about the use of validated screening tools by nurses and the barriers faced during delirium assessment. The third section reports the critical care nurses’ perceptions of delirium assessment. The final section presents the content analysis of the one open ended question about participants’ opinion on delirium assessment in their units followed by the conclusion of the findings.
4.2 Data Analysis

Statistical Package for Social Sciences (SPSS), version 21.0 was used to conduct statistical analysis. Data were stratified into a number of demographic variables which included age, years of experience, type of critical care units, shift and type of hospitals where the nurses worked. Multiple responses were collapsed into two categories in order to compare with practice variables. Data were excluded only if there was a missing data for particular analysis (exclude case pair wise) (Pallant, 2013).

Descriptive statistics were reported as follows: categorical variable as frequency (%), and for continuous variable using mean, median and standard deviation (SD). The distribution of sample for normality of variables were checked. If distribution was normal parametric such as t-test independent sample t-test, ANOVA were used respectively. For variable that are not normally distributed chi-square and Maan-whiney test was used respectively. (SPSS version 21.0, SPSS Inc., Chicago, Illinois). P value less than 0.05 was deemed significant. The qualitative comments provided in response to open ended questions were analysed using basic thematic content analysis.

4.3 Characteristics of the participants

Questionnaires were sent out to eligible 240 nurses working in critical care units in the western sea board region of Ireland. A response rate of 45% (n= 110) was achieved. All participants were qualified as Registered General Nurses (99.1% n=100). A few of them were employed as Nurse Managers (6.4% n=7) and only one was occupied as Clinical facilitator (0.9% n=1). Many participants (46%, n=51) had a higher diploma qualification and were primarily employed as staff nurses working in
medical or surgical ICUs at teaching hospitals. The descriptive characteristics of the entire sample (n=110) are presented in Table 1.

**Table 1. Demographic characteristics of respondents.**

<table>
<thead>
<tr>
<th>Demographics</th>
<th>Frequency</th>
<th>% of respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Qualification</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diploma</td>
<td>(n=13)</td>
<td>12.3%</td>
</tr>
<tr>
<td>Bachelors</td>
<td>(n=31)</td>
<td>28.3%</td>
</tr>
<tr>
<td>Higher diploma</td>
<td>(n=51)</td>
<td>48.1%</td>
</tr>
<tr>
<td>Masters</td>
<td>(n=12)</td>
<td>11.3%</td>
</tr>
<tr>
<td><strong>Current position</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Staff Nurse</td>
<td>(n=100)</td>
<td>90.9%</td>
</tr>
<tr>
<td>Nurse managers</td>
<td>(n=7)</td>
<td>6.4%</td>
</tr>
<tr>
<td>Clinical facilitator</td>
<td>(n=1)</td>
<td>0.9%</td>
</tr>
<tr>
<td><strong>Hospital type</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Teaching</td>
<td>(n=88)</td>
<td>80%</td>
</tr>
<tr>
<td>Non –teaching</td>
<td>(n=28)</td>
<td>20%</td>
</tr>
<tr>
<td><strong>Type of critical care facility.</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ICU</td>
<td>(n=62)</td>
<td>57.4%</td>
</tr>
<tr>
<td>HDU</td>
<td>(n=21)</td>
<td>19.4%</td>
</tr>
<tr>
<td>Cardiac ICU</td>
<td>(n=14)</td>
<td>13.0%</td>
</tr>
<tr>
<td>Mixed type</td>
<td>(n=11)</td>
<td>10.2%</td>
</tr>
</tbody>
</table>

*Indicates the highest qualification achieved

Academic qualifications of the participants ranged from Diploma to Master’s Degree. The majority of the sample (48% n=51) held a post graduate higher diploma. Only 11.3% (n=12) were educated to Masters Level. Of the remaining sample, 28.3% (n=31) held Bachelors and 12.3% (n=13) held Diploma and none were educated to Doctorate level. The average age of the participants was 39.03 years (SD: 7.09). Few respondent (10.9% n=12) chose not to answer this question. Similarly, a small percentage of nurses did not provide information of other demographic details about their age. Nurses at the time of this survey reported that they were currently working at an average of 35.77 hours (SD: 6.23) per week. The majority of participants worked predominantly day and night shifts (92.5% n=99) rather than day shifts only (6.5% n=76)
7) and only one nurse reported as working on permanent night shift (0.9%). Out of the 110 respondents, 94.5% (n=104) worked in the public sector, while 5.45% (n=6) were employed at a private hospital. Those who worked in public sector hospitals 80% (n=88) were employed at teaching hospitals while 20% (n=28) were employees from non-teaching hospitals.

4.4 Practices for sedation and delirium assessments

Participants were asked to indicate if the facility they worked in, had a protocol/policy for either sedation or delirium assessments by placing a tick mark appropriately beside ‘Yes’ ‘No’ or ‘Not sure’. The majority of the respondents (67.9 %, n=74) reported that sedation/delirium assessment protocol/policy were available in their units, whereas 20.2% (n=22) reported the absence of a policy on sedation/delirium assessment in their units. Interestingly, 11.9% (n=13) were unsure if a policy existed in their units. Participants were asked if their hospital policy specified a frequency by which delirium should be assessed. In response to this aspect, 44.2% (n=46) of nurses stated that their local units’ sedation protocol specified the frequency for delirium assessment, while 31.7% (n=33) reported that their policy does not state the frequency of delirium assessment, 22.1% (n=25) remained unsure. See table.2.
Table 2. Current sedation and delirium assessment practices (total N=110)

<table>
<thead>
<tr>
<th>CCU* has a sedation protocol/guideline</th>
<th>Frequency</th>
<th>% of respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>(n=74)</td>
<td>67.9%</td>
</tr>
<tr>
<td>No</td>
<td>(n=22)</td>
<td>20.2%</td>
</tr>
<tr>
<td>Not Sure</td>
<td>(n=13)</td>
<td>11.9%</td>
</tr>
<tr>
<td>Missing</td>
<td>(n=1)</td>
<td>0.9%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CCU* sedation protocol specify a frequency by which delirium assessed</th>
<th>Frequency</th>
<th>% of respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>(n=46)</td>
<td>44.2%</td>
</tr>
<tr>
<td>No</td>
<td>(n=33)</td>
<td>31.7%</td>
</tr>
<tr>
<td>Not Sure</td>
<td>(n=25)</td>
<td>24.1%</td>
</tr>
<tr>
<td>Missing</td>
<td>(n=6)</td>
<td>5.5%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Frequency with which level of sedation assessed</th>
<th>Frequency</th>
<th>% of respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Never /Rarely</td>
<td>(n=5)</td>
<td>4.5%</td>
</tr>
<tr>
<td>Frequently/ Always</td>
<td>(n=105)</td>
<td>95.5%</td>
</tr>
<tr>
<td>Missing</td>
<td>(n=0)</td>
<td>0%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Frequency with which presence of delirium assessed</th>
<th>Frequency</th>
<th>% of respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Never /rarely</td>
<td>(n=35)</td>
<td>32.1%</td>
</tr>
<tr>
<td>Frequently/ Always</td>
<td>(n=74)</td>
<td>67.9%</td>
</tr>
<tr>
<td>Missing</td>
<td>(n=1)</td>
<td>0.9%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sedation assessment per 12 hours shift</th>
<th>Frequency</th>
<th>% of respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Never</td>
<td>(n=5)</td>
<td>4.5%</td>
</tr>
<tr>
<td>One time only</td>
<td>(n=5)</td>
<td>4.8%</td>
</tr>
<tr>
<td>Two-three times</td>
<td>(n=39)</td>
<td>37.1%</td>
</tr>
<tr>
<td>More than 4 times</td>
<td>(n=61)</td>
<td>58.4%</td>
</tr>
<tr>
<td>Missing</td>
<td>(n=0)</td>
<td>0%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Delirium assessment per 12 hours shift</th>
<th>Frequency</th>
<th>% of respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>One time only</td>
<td>(n=20)</td>
<td>20.4%</td>
</tr>
<tr>
<td>Two-three times</td>
<td>(n=41)</td>
<td>41.8%</td>
</tr>
<tr>
<td>More than 4 times</td>
<td>(n=37)</td>
<td>37.8%</td>
</tr>
<tr>
<td>Missing</td>
<td>(n=2)</td>
<td>1.8%</td>
</tr>
</tbody>
</table>

CCU* includes all critical care units surveyed.

Participants were asked to indicate how often they evaluated for level of sedation and presence of delirium by placing a tick mark beside ‘Never’ ‘Rarely’ ‘Frequently’ and ‘Always’. The number of nurses who always assessed for sedation were 46.4% (n=54), while 49.1% (n=51) checked frequently for sedation. Furthermore, 3.6 % (n= 6) stated that they rarely assessed for sedation levels and one respondent (0.9% n=1) had never assessed for sedation. When comparing delirium
assessment to the above data, 48.1% (n=52) of nurses frequently assessed for delirium and 20.4% (n=22) always performed delirium assessments. However, 25.9% (n= 28) reported that they rarely assessed for delirium, and a few respondents (5.6 % n=6) had never performed delirium assessments during their tenure.

The frequency of assessment of delirium by nurses who ‘never’ or ‘rarely’ assessed for delirium are combined into ‘non-assessing group’. Similarly, nurses who assessed delirium ‘frequently’ and ‘always’ were grouped into ‘assessing group’. A chi-square test for independence was used to examine whether distribution between those who assessed for sedation and delirium differ from one another. The chi-square test for independence explores relationship between two categorical variables which compares the observed frequency or proportions of cases that occurs in each category (Pallant, 2013). The criteria for significance was set at α = .05. This analysis indicated that significant difference existed between nurses’ sedation and delirium assessment practices $\chi^2 (1, n=109) = .284, p =.009$ (2 tailed) 67.9% vs 32.1%. More nurses routinely assessed the level of sedation than the presence of delirium.

Participants who evaluated the level of sedation and presence of delirium were asked to indicate the frequency of assessment per 12 hour shift by placing a tick mark appropriately. For example, if they evaluated presence of delirium once per shift, then they were asked to place tick mark beside X1 in the ‘Presence of delirium’ column. If they assessed twice or thrice then they were encouraged to tick X2-3 column, similarly four or five times X4-6 and more than six times X>6. The nurses who assessed for sedation once during their 12 hours shift were 4.8% (n= 5), while 37% (n=39) evaluated two to three times. Furthermore, 32.4 % (n= 34) stated that they assessed four to five times and 25.7% (n=37) assessed more than 6 times for sedation. When comparing delirium assessment to the above data, 20.4 % (n=20) of nurses assessed
once per shift, 41.8% (n=41) performed delirium assessments twice or thrice. However, 19.4% (n=19) reported that they assessed four to five times and 18.4% (n=18) assessed more than 6 times during their 12 hour shift.

The frequency of assessment of delirium during participants’ 12 hour shift, who assessed more than twice for delirium are combined into ‘frequently assessing group’ and compared with those who evaluated once per shift as ‘less frequently’ group. Similarly, nurses who assessed for sedation were collapsed into ‘more frequently’ and ‘less frequently ‘assessing group. A chi-square test for independence was used to examine whether distribution between those who assessed for sedation and delirium (nominal variables) differ from one another. The criteria for significance was set at $\alpha =.05$. This analysis indicated that no significant difference existed between nurses’ sedation and delirium assessment practices $\chi^2(1, n=95) = .225, p =.61$ (2 tailed) phi=.225. 78.9% vs 21.1%. The Phi and Cramer's V are adjusting chi-square significance to factor out sample size (Pallant, 2013).

4.5 Importance of Delirium screening

Of these following potential conditions: altered level of consciousness, improper placement of invasive devices, presence of agitation, presence of delirium, and presence of pain that occurs in a critical care, participants were asked to rank (1 to 5) in the order of importance in which they felt should be evaluated by nurses over the average shift by placing a ‘1’ beside the factor that they thought is most important to evaluate and a ‘5’ beside the factor that they thought least important to evaluate. Majority of the nurses (57.5% n=61) stated that altered level of consciousness was the most important condition to be assessed. This was followed by improper placement of invasive devices (22.6% n= 24), presence of pain (17% n=18) and presence of
agitation (2.8% n=3). None of the respondents identified delirium as a significant condition to be assessed in critical care patients. See Figure 1.

**Figure 1.** Conditions to be assessed by nurses in critical care units

![Bar chart showing the percentage of nurses assessing various conditions in critical care units.](chart)

4.6 Methods of screening for delirium

Participants were asked to indicate the primary means by which they assessed for delirium during their 12 hour shift and how frequently they used the tools. The options provided for this question was: ability to follow commands, agitated related events, Confusion Assessment Method-ICU (CAM_ICU), CIWAr- scales, Intensive care delirium screening check list (ICDSC) and psychiatric consult. Ability to follow commands was the most frequent method used by nurses to assess delirium (98.1% n=102) at least once per 12 hours shift or more which was followed by evaluation of agitated related events (82.8% n= 82). Use of CAM ICU and ICDSC were 60.6% (n=63) and 19.2% (n= 19) respectively. 11.1% (n=11) of nurses utilised psychiatric consultation to evaluate delirium and use of CIWA-AR scales 4.1% (n= 4) was reported. See table 3 regarding use of validated screening tools. Figure 2. is graphical representation of frequency of methods used.
Table 3. Use of validated screening tools for delirium

<table>
<thead>
<tr>
<th>Centres</th>
<th>Eligible Nurses</th>
<th>Total N</th>
<th>CAM-ICU</th>
<th>ICDSC use.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>&gt; once</td>
<td>never</td>
</tr>
<tr>
<td>Centre1</td>
<td>95</td>
<td>57</td>
<td>47.1%</td>
<td>7.7%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(n=49)</td>
<td>(n=8)</td>
</tr>
<tr>
<td>Centre2</td>
<td>65</td>
<td>19</td>
<td>8.7%</td>
<td>9.6%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(n=9)</td>
<td>(n=10)</td>
</tr>
<tr>
<td>Centre3</td>
<td>24</td>
<td>13</td>
<td>3.8%</td>
<td>8.7%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(n=4)</td>
<td>(n=9)</td>
</tr>
<tr>
<td>Centre4</td>
<td>24</td>
<td>19</td>
<td>1.0%</td>
<td>7.7%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(n=1)</td>
<td>(n=8)</td>
</tr>
<tr>
<td>Centre5</td>
<td>22</td>
<td>6</td>
<td>0.0%</td>
<td>5.8%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(n=0)</td>
<td>(n=6)</td>
</tr>
<tr>
<td>Total</td>
<td>240</td>
<td>110</td>
<td>60.6%</td>
<td>39.4%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(n=63)</td>
<td>(n=41)</td>
</tr>
</tbody>
</table>

Figure 2. Frequency of use of various methods to evaluate patients for delirium.
A subgroup analysis of participating centres indicated overall 37.3% (n=41) never used CAM-ICU, while 57.3% (n=63) used it once or more during their 12 hour shift. With regard to the use of ICDSC, 80.8% (n=80) of nurses had never heard about or had never used ICDSC, only 19.2% (n=20) used it once or more during their 12 hour shift. They were also asked to specify if they employed any other delirium screening tools other than CAM-ICU and ICDSC. No other screening tools for delirium were reported. Only one participant stated that Glasgow Coma Scale was employed to identify delirium.

A chi-square analysis indicated that there was a significant difference in nurses’ use of CAM-ICU among the participating hospitals i.e., 80.8% vs 19.2% ($\chi^2=37.88$, df=1, $p<0.01$) respectively. Similarly, there existed a statistically significant difference for the use of ICDSC among the participating centres i.e., 60.6% vs 39.4% ($\chi^2=9.21$ df=1, $p=0.02$) respectively.

Participants were grouped into teaching hospital and non-teaching hospital staff and their use of CAM-ICU and ICDS were compared. Chi-square analysis indicated that there was significant difference between the nurses in teaching and non-teaching hospitals and with regard to use of CAM_ICU. Participants who worked at teaching hospitals favoured using CAM-ICU more than participants who worked at non-teaching hospitals which was 70% vs 20% ($\chi^2=17.07$ & p-value<0.001, two tailed) respectively. There was no significant difference between the nurses working in teaching and non-teaching hospitals with regard to use of ICDSC $\chi^2 = (1, n=99) = 2.21$, $p=1.37$ (2 tailed) phi=-181. 22.8% vs 5% respectively.
4.6.1 Influence of Demographics on CAM-ICU

Box plot and normality of the curve suggest that demographic variables age and years of experience were normally distributed. A t-test for independent samples was conducted to compare whether the age had any influence on CAM-ICU usage. There was no significant difference in CAM-ICU ((M = 38.71, SD = 7.09) and age (M = 39.27, SD = .7.29); t (96) =, p= .714 two tailed).

A t-test for independent samples was conducted to compare whether the years of experience had any influence on CAM-ICU usage. There was no significant difference in CAM-ICU (M = 12.49, SD = 6.88) and age (M =12.35, SD = 7.429); t (96) =, p=.814(two tailed).

Further analysis was conducted using the ANOVA one-way test to determine if any of the participants’ demographic characteristics influenced their overall usage of CAM-ICU respectively. This analysis is useful when comparing scale variable and variables such as ordinal, nominal. Test was used to determine whether there were any significant differences between the means of two or more independent unrelated groups (Pallant, 2013).

A one-way between group analysis of Variance was conducted to explore the impact of demographic characteristics such as highest nursing qualifications, type of shift worked, unit worked or current position of nurses had any influence on CAM-ICU usage. The level of significance was set at p<0.05. There was no statistical difference at the p <0.05 influence on CAM- ICU usage for type of shift F (1, 101) =0.284 p=0.263, for area of work F (1,101) =0.284 p=0.595, current position F (1,101) =0.103 p=0.945, respectively. However, there was a statistically significant influence on CAM-ICU usage by hours worked by nurses F (1,102) =6.571 p=0.02 category of
hospital (public or private), $F(1, 101) = 10.58 \ p=0.002$, hospital where they worked and type of facility (teaching or non-teaching) $F(1, 102) = 20.03 \ p=0.001$.

4.7. Training for sedation and delirium assessments.

Participants were asked to identify means by which training was received for sedation and delirium assessments in the last year. The choices provided were: never received education, live out of hospital CE lectures, in hospital lectures or in service education sessions, teaching at bed side tools improves outcome, inability to complete assessment in the sedated patients and other sources of education received. They were asked to insert tick marks in all applicable boxes. Figure 3. Illustrates graphical representation of the sources of training received by the respondents in the last year.

Figure 3. Means of education for sedation and delirium assessment
Table 4. Sources of training for sedation and delirium assessment.

<table>
<thead>
<tr>
<th></th>
<th>Sedation</th>
<th>Delirium</th>
<th>Pearson chi-square</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Have never received education</td>
<td>26.6%(n=26)</td>
<td>32.7%(n=36)</td>
<td>61.5</td>
<td>0.001</td>
</tr>
<tr>
<td>Live, Out of hospital CE lecture</td>
<td>25.5%(n=28)</td>
<td>25.5%(n=28)</td>
<td>54.5</td>
<td>0.001</td>
</tr>
<tr>
<td>Live, In hospital lecture/In-service assessment tool</td>
<td>50% (n=55)</td>
<td>47.3%(n=52)</td>
<td>42.27</td>
<td>0.001</td>
</tr>
<tr>
<td>Teaching at the bed side tool</td>
<td>33.6% n=37)</td>
<td>19.1%(n=21)</td>
<td>31.35</td>
<td>0.001</td>
</tr>
<tr>
<td>Inability to complete the assessment in sedated patients</td>
<td>4.5% (n=5)</td>
<td>7.3% (n=8)</td>
<td>21.59</td>
<td>0.001</td>
</tr>
</tbody>
</table>

Chi-square analysis to examine if there is a significant difference

More nurses received training for delirium assessment through live, in hospital lecture/in-service education (n=52) than live, out of hospital CE lectures (n=28). More than one fourth of nurses reported that they had never received training for delirium assessment. Many nurses reported that the teaching at the bed side tool improves delirium outcome (n=21) and few nurses reported that they were unable to complete the delirium assessment in sedated patients (n=8). See Table 4 Depicts sources of training received by nurses for sedation and delirium assessment in the last year.

For those who reported that they received training in the last one year for delirium assessment through live out of hospital CE lectures, it was examined if the training received influenced use of CAM–ICU. A chi-square analysis indicated there was no significant difference between training received and its use of CAM-ICU $\chi^2 = (1, n=104) = 0.485$, $p =0.486$ (2 tailed) phi=-.68 19.5 % vs 25.4 % respectively. Similarly, a chi-square analysis indicated nurses who received training in the last one year for delirium assessment through live in hospital CE lectures showed no
significant influence on ICDSC usage. \( \chi^2 = (1, n=104) = 4565, p = .33 \) (2 tailed) phi=.210 13.5 % vs 33.7 % respectively.

The training received either in hospital or out of hospital CE lecturers did not have any significant influence on the usage of ICDSC by nurses in assessment of delirium. A chi-square analysis indicated \( \chi^2 = (1, n=99) = .419, p = .756 \) (2 tailed) phi=.065 (18.5 % vs 3 %) respectively for out of hospital training CE lectures. Similarly a chi-square analysis for in hospital training CE lectures, were \( \chi^2 = (1, n=99) = 1.76, p = .185 \) (2 tailed) phi=.133 37.4 % vs 12.1 % respectively.

4.8 Barriers to delirium assessments

Figure 4. Barriers to the evaluation of delirium in critical care units.

Participants were asked to rank only top three factors preventing them from carrying out regular delirium assessments. Some of the barriers identified are listed as follows: 1) Delirium assessment tools are too complex to use, 2) Difficult to interpret
in intubated patients, 3) Do not feel confident in my ability to use delirium assessment tools, 4) Do not feel that using delirium assessment tool improves outcome, 5) Inability to adequately document delirium assessments, 6) Inability to complete assessment in the sedated patients, 7) Not enough time to perform assessment (too time consuming), 8) Nurses are not required to screen for delirium in my unit, 9) Physicians already complete delirium assessments, 10) Physicians do not use my assessment in their decision-making and 11) Other (please specify).

Participants were instructed to write ‘1’ beside the factor they thought was most significant, ‘2’ besides second most important and ‘3’ besides the third most important factor. Figure 4 depicts graphical representation of the most common or significant (i.e. ‘1’) barriers that was hindering nurses delirium assessment during their clinical practice. In this study, the most commonly reported top three barriers of delirium assessment by nurses were: 1) Difficult to interpret in intubated patients 48% (n=52), 2) Inability to complete assessment in the sedated patient 11% (n=12), and 3) Delirium assessment tools are too complex to use, 9% (n=10). Figure 4 graphically represents barriers to delirium assessments.

4.9 Critical care nurses perceptions to delirium assessments

Nine questions on perceptions about delirium and management were administered in this survey. Participants were asked to indicate by placing a tick (√) in the column that most closely aligns agreement with the statements that pertains to delirium in the critical care. Nurses perceptions on delirium were based on level of agreement on five point Likert item (5=strongly agree, 4= moderately agree, 3=strongly disagree, 2= moderately disagree and 1= neither agree nor disagree). In
this survey, perception ratings a maximum responses of (108/110) were received. See Table.5 regarding overall perceptions of the nurses to delirium screening.

The majority of the respondent strongly agree that delirium is an underdiagnosed problem, and occurs as a common response to the critical care environment, and is associated with higher patient mortality. They also strongly agreed that delirium requires active interventions on the part of caregivers and was challenging to assess in critical care. However less than half of the nurses disagreed that patients with delirium are rarely agitated, have symptoms that are consistent during the entire shift and initiation of haloperidol therapy is important.

Table 5: Critical care nurses perceptions to delirium assessments

<table>
<thead>
<tr>
<th>Perceptions to delirium assessment</th>
<th>Strongly agree</th>
<th>Moderately agree</th>
<th>Strongly disagree</th>
<th>Moderately disagree</th>
<th>No agreement</th>
<th>missing</th>
<th>total</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) Underdiagnosed problem.</td>
<td>60% (n=66)</td>
<td>31.8% (n=35)</td>
<td>0.9% (n=1)</td>
<td>3.6% (n=4)</td>
<td>2.7% (n=3)</td>
<td>0.9% (n=1)</td>
<td>100% (n=110)</td>
</tr>
<tr>
<td>b) Common response to the ICU environment.</td>
<td>76.4% (n=84)</td>
<td>20.9% (n=23)</td>
<td>1.8% (n=2)</td>
<td>0.9% (n=1)</td>
<td>0% (n=0)</td>
<td>0% (n=)</td>
<td>100% (n=110)</td>
</tr>
<tr>
<td>c) Problem that requires active interventions on the part of caregivers.</td>
<td>74.5% (n=82)</td>
<td>20.9% (n=23)</td>
<td>1.8% (n=2)</td>
<td>0% (n=0)</td>
<td>0.9% (n=1)</td>
<td>0.9% (n=1)</td>
<td>100% (n=110)</td>
</tr>
<tr>
<td>d) Associated with higher patient mortality.</td>
<td>36.4% (n=40)</td>
<td>26.4% (n=29)</td>
<td>10% (n=11)</td>
<td>4.5% (n=5)</td>
<td>20.9% (n=23)</td>
<td>1.8% (n=2)</td>
<td>100% (n=110)</td>
</tr>
<tr>
<td>e) ICU patients with delirium are rarely agitated.</td>
<td>1.8% (n=2)</td>
<td>13.6% (n=15)</td>
<td>47.3% (n=52)</td>
<td>27.3% (n=30)</td>
<td>7.3% (n=8)</td>
<td>2.3% (n=3)</td>
<td>100% (n=110)</td>
</tr>
<tr>
<td>f) Initiation of antipsychotic therapy (e.g., Haloperidol) should be the initial intervention for all patients</td>
<td>25.5% (n=28)</td>
<td>30.9% (n=34)</td>
<td>16.4% (n=18)</td>
<td>9.1% (n=10)</td>
<td>16.4% (n=18)</td>
<td>1.8% (n=2)</td>
<td>100% (n=110)</td>
</tr>
<tr>
<td>g) Challenging to assess in ICU patients.</td>
<td>41.8% (n=46)</td>
<td>44.5% (n=49)</td>
<td>2.7% (n=3)</td>
<td>8.2% (n=9)</td>
<td>1.8% (n=2)</td>
<td>0.9% (n=1)</td>
<td>100% (n=110)</td>
</tr>
<tr>
<td>h) Usually have symptoms that are consistent over the entire nursing shift.</td>
<td>14.5% (n=16)</td>
<td>23.6% (n=26)</td>
<td>19.1% (n=21)</td>
<td>20.5% (n=27)</td>
<td>16.4% (n=18)</td>
<td>1.8% (n=26)</td>
<td>100% (n=110)</td>
</tr>
</tbody>
</table>
Nurses’ perception of delirium assessments were stratified into two groups: agree and disagree in order to make comparisons. For those neither agree nor disagree were excluded from this regrouping. Figure 5 represents nurses’ perceptions regarding screening for delirium in summative form. The data were not normally distributed hence chi-square analysis indicated that nurses level of educations (qualification) does not have significant influence on their perceptions (see table 6). Table 5 depicts nurses’ perceptions about delirium and their level of education. Higher level of educated nurses did not differ from less qualified in critical care unit about their perception about delirium assessment and management.

Figure 5. Nurses perceptions about delirium in summative form

<table>
<thead>
<tr>
<th>Perception</th>
<th>Agree (moderate or strongly)</th>
<th>Disagree (moderate or strongly)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patients with delirium usually have symptoms that are</td>
<td>7</td>
<td>24</td>
</tr>
<tr>
<td>Delirium is challenging to assess in ICU patients</td>
<td>16</td>
<td>6</td>
</tr>
<tr>
<td>Initiation of antipsychotic therapy should be the initial</td>
<td>10</td>
<td>14</td>
</tr>
<tr>
<td>ICU patients with delirium are rarely agitated</td>
<td>3</td>
<td>42</td>
</tr>
<tr>
<td>Delirium is associated with higher patient mortality</td>
<td>12</td>
<td>8</td>
</tr>
<tr>
<td>Delirium requires active interventions on the part of</td>
<td>18</td>
<td>1</td>
</tr>
<tr>
<td>Delirium is a common response to the ICU environment.</td>
<td>18</td>
<td>2</td>
</tr>
<tr>
<td>Delirium is an underdiagnosed problem.</td>
<td>17</td>
<td>3</td>
</tr>
</tbody>
</table>
Table 6. Perceptions to delirium and level of education

<table>
<thead>
<tr>
<th>Nurses perceptions about delirium</th>
<th>Agree</th>
<th>Disagree</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Degree</td>
<td>Post grad</td>
<td>Degree</td>
</tr>
<tr>
<td>a) Underdiagnosed problem.</td>
<td>2.9%</td>
<td>37.3%</td>
<td>2%</td>
</tr>
<tr>
<td></td>
<td>(n=3)</td>
<td>(n=38)</td>
<td>(n=2)</td>
</tr>
<tr>
<td>b) Common response to the ICU environment.</td>
<td>0.9%</td>
<td>1.9%</td>
<td>39.6%</td>
</tr>
<tr>
<td></td>
<td>(n=1)</td>
<td>(n=2)</td>
<td>(n=42)</td>
</tr>
<tr>
<td>c) Problem that requires active interventions on the part of caregivers.</td>
<td>1.9%</td>
<td>0%</td>
<td>37.9%</td>
</tr>
<tr>
<td></td>
<td>(n=2)</td>
<td>(n=0)</td>
<td>(n=41)</td>
</tr>
<tr>
<td>d) Associated with higher patient mortality.</td>
<td>8.5%</td>
<td>9.9%</td>
<td>29.6%</td>
</tr>
<tr>
<td></td>
<td>(n=7)</td>
<td>(n=8)</td>
<td>(n=24)</td>
</tr>
<tr>
<td>e) ICU patients with delirium are rarely agitated.</td>
<td>35.8%</td>
<td>48.4%</td>
<td>4.2%</td>
</tr>
<tr>
<td></td>
<td>(n=34)</td>
<td>(n=46)</td>
<td>(n=4)</td>
</tr>
<tr>
<td>f) Initiation of antipsychotic therapy (e.g., Haloperidol) should be the initial intervention for all patients</td>
<td>12.6%</td>
<td>18.4%</td>
<td>25.3%</td>
</tr>
<tr>
<td></td>
<td>(n=11)</td>
<td>(n=16)</td>
<td>(n=22)</td>
</tr>
<tr>
<td>g) Challenging to assess in ICU patients.</td>
<td>5.8%</td>
<td>5.8%</td>
<td>33%</td>
</tr>
<tr>
<td></td>
<td>(n=6)</td>
<td>(n=6)</td>
<td>(n=34)</td>
</tr>
<tr>
<td>h) Usually have symptoms that are consistent over the entire shift.</td>
<td>21.8%</td>
<td>31.0%</td>
<td>13.8%</td>
</tr>
<tr>
<td></td>
<td>(n=19)</td>
<td>(n=27)</td>
<td>(n=12)</td>
</tr>
</tbody>
</table>

Non parametric test: Chi-square analysis
4.10 **Qualitative data**

One open ended question was included at the end of the questionnaire, for the participants to express their views or comments about delirium assessments in their units. Qualitative descriptive comments were received from 26 respondents. The pattern of response were descriptive and limited to less than twenty words. There were no particular demographic characteristics associated with the responses. Due to low response rate to this question, quantitative analysis was not possible. Content analysis which is a research technique for systematically analysing written communication, was performed by the principal investigator. The responses were analysed using simple thematic content analysis using Straus and Corbin (1998) framework. A text can be subjective to quantitative or qualitative analysis or mixture of both (Parahoo, 2009). The steps involved in this analysis were that the texts were read repeatedly until the researcher identified the content and categorised them into themes. This process helped to understand particular phenomenon. The following themes emerged: Delirium and assessments, nurses favouring CAM_ICU, and nurses not in favour of CAM-ICU, need for further education for implementing delirium assessments. Appendix 3 represents qualitative comments from participants. The qualitative comments are grouped as according to the theme

4.10.1 **Theme: 1 Delirium**

Few participants identified delirium as follows occurs as consequences of medications and over sedation. The consequences associated with delirium are misunderstood by nurses. Participants felt that sleep and alcohol plays a major role for delirium onset in their units. Some participants indicated that there were no uniformity of treatment
provided for patients in their practice. The comment made by participants relating to this theme are as follows.

“Consequences of delirium is misunderstood”
“Medications causes’ delirium”
“Over sedation if delirium evident”
“Needs education management of patient with delirium”
“Sleep and alcohol influences delirium”
“Very controversial advice and management”
“No uniformity of treatment for delirium”
“Need clear guidelines to manage patients with delirium”

4.10.2 Theme: 2 Delirium assessment

Some participants indicated that delirium assessments were difficult and were not performed consistently in their units. And also expressed opinion about assessments for delirium needs to be consistently performed. Some of the participants informed that validated tools are not in place to monitor for delirium. The comments pertaining to this theme are as follows:

“Delirium assessment is difficult,”
“Delirium assessments needs to be consistent”
“Delirium assessment varies with staff”
“We have no delirium assessments tool”
“We have no delirium assessments tool.”
“Not enough attention paid”
“Different tools used by doctors and nurses”
“No delirium assessments tool in unit”
4.10.3 **Theme: 3 Nurses for CAM ICU tool:**

A few nurses expressed that that CAM-ICU is underutilised by their peers and needs stated that nurses needs to perform consistently. They need further education with regard to proper use of the same.

*Base line status not known.*

*CAM ICU underutilised tool*

*Needs to be consistent*

*No uniformity of treatment for delirium.*

*Not enough attention paid*

*Further teaching needed regarding CAM- ICU*

.

4.10.4 **Theme 4 Nurses against CAM ICU tool:**

Few participants voiced that there was no need for using CAM-ICU as the tool was being viewed as difficult to use and inconsistent. They felt that Glasgow coma scale (GCS) was sufficient to identify delirium.

*Nurse Interaction with patient is enough for delirium*

*CAM ICU tool inconsistent.*

*Assessment is difficult.*

*Varies with staff.*

*Glasgow Coma Scale*

4.10.5 **Theme 5 Educational needs**

Many participants identified educational efforts are needed for both delirium and sedation assessment. Also indicated need for promotion of care bundles in prevention of delirium.

*Education on sedation assessment needed.*

*Needs more training on delirium assessments and management.*
“Education on sedation assessment needed; medications causes delirium”
“Need formal training."
“Need to promote delirium bundles”
“Needs education on management of patient”
“Needs more training on delirium assessments”
“Need to promote delirium bundles”

Qualitative data is very useful to identify the felt needs of the study population. In a quantitative research qualitative data is not a statistical representation of population’s opinions but needs to be interpreted cautiously. This qualitative data provides supplementation of this study findings. Descriptive and Inferential statistics provides statistical certainty to the direction in answering the research question (Parahoo, 2006).

4.11 Summary

The results from the analysis of the data collected in a sample of critical care nurses were presented in this chapter. Nurses in western seaboard region are involved in regular screening for sedation and delirium. However, a sample of CAM –ICU (39.4% n=38) and ICDSC (80.2% n=80) did not achieve the minimal recommendation by NICE, UK. (2010) and SCCM, PAD guidelines (2013) for delirium assessment. The exploratory data analysis demonstrated that only few critical care nurses are engaged in delirium assessment especially those employed at teaching hospitals. Delirium assessment practices were comparatively lower than sedation practices. Barriers in relation to delirium practices were identified and poor perceptions regarding delirium assessments exists. The findings from the current study indicates that more than half of the respondents are engaged in delirium screening practice. However, many reported that their local units does not have a policy or guidelines
available in their local units. It was evident that nurses are using CAM-ICU and ICDSC as tools for delirium screening. No other screening tools were identified in their practice. The nurses in general did not receive training in relation to use of assessments tools for delirium. Barriers in relation to screening practice were identified. However, in order to successfully implement the barriers identified need to be addressed.

4.5 Conclusion

This chapter has presented the findings of the data using descriptive and inferential Statistics. The process of data analysis including scoring methods and statistical analysis was outlined. The findings have implications for education, practice and service planning. Content analysis of the open ended indicated that there is substantial amount of work need to improve the practice. The next chapter will provide a detailed discussion of these findings.
5.0 CHAPTER FIVE DISCUSSION

5.1 Introduction

This chapter will discuss the findings of the study in relation to previous research literature. The specific aim of the research was to evaluate the nurses’ practice of delirium assessment in adult critical care units in western seaboard region of Ireland. Chapter two focused on literature review on the screening for delirium which indicated a research enquiry among critical care nurses in west of Ireland was deemed relevant and more important. In chapter three, methodology employed for this survey was discussed. The main findings from this survey were discussed in chapter four. The findings suggest that overall nurses’ practices on delirium assessment are not satisfactory. Furthermore, poor perceptions and barriers to identification of delirium existed. This chapter will discuss the key findings and is organised according to the principal study concepts of practices, barriers faced and perceptions of nurses towards delirium assessment in adult critical care units. Explorative (quantitative) and qualitative findings were also included throughout the discussion.

5.2.1 Demographic characteristics

As previously stated, this research adopted a questionnaire developed by Devlin et al. (2008). The study by Devlin et al (2008) reported a response rate of 55% (n=331/601), while this study achieved a response rate of 48 % (n=110/240). However, the sample size in the current study was smaller and the population differed. Therefore, direct comparisons cannot be made. Therefore comparisons can be added in addition to the previous results in literature and used with caution. The demographic characteristics of the present study are similar to that of Devlin et al (2008) except for the educational qualifications and types of shift worked. Majority of the nurses in this
study held Post graduate higher diploma or masters level qualifications and most nurses worked day and night shift. In comparison to Devlin et al (2008) study, majority of respondents had bachelor’s degree and worked predominantly day shift. Interestingly, the other characteristics such as respondents mean age (39.03 vs 40.2), hours worked in units (12.3 vs 13.6) and years of experience (35.7 vs 35) were similar to the findings of Devlin et al (2008). This difference in the educational qualification between these studies may be due to critical care being considered as a specialist area of practice, where staff in western seaboard region are encouraged to pursue specialist education. The impact of education will be discussed later on this chapter.

This main difference between these two studies is that Devlin et al. (2008) surveyed Critical care nurses who had delirium screening protocol already well-established in their units whereas, the participants in this survey had none. In the next section the main findings of the study will be discussed beginning with delirium screening practices and participants knowledge of their local unit policy.

5.3 Delirium Screening practices

Delirium occurs commonly in critical care, screening for delirium by all staff is a pre request for effectively dealing with this costly and highly prevalent disorder (Teodoorezuk et al., 2012, Barr et al., 2013). According to Barr et al. (2013) delirium is considered as a major public health problem which is predictable, preventable, detectable and treatable. The timely identification process not only helps successful management of delirium but also prevents the severity of the illness and decreases occurrences in critical care (Macullich et al., 2013). It was evident from the literature that delirium monitoring measures are indicative of high quality nursing care, risk
identification process, and also improves clinical outcomes in critical care patients (NICE, UK, 2010, Baar et al., 2013).

### 5.3.1 Local policies on delirium screening

During the data collection process the researcher met with the head of the participating units (Clinical Nurse Managers). A verbal enquiry was made in relation to extract information about the availability of specific delirium screening policy or a protocol that was in place in participating centres. This enquiry revealed that all the participating centres had a local policy was available only in relation to assessment of sedation. It should be noted that none of the participating units had specific delirium assessment protocol or policy. Furthermore, only one public teaching hospital reported that delirium assessment guidelines were in drafting process. Interestingly, majority of the participants who reported that they were screening for delirium using validated instruments were representative of this particular unit. The details of the subgroup analysis will be discussed later in detail.

It is evident from this survey there was no specific policy or a guidelines in relation to delirium available for the staffs working in their units. However, more than half of the respondents reported that they are screening regularly for delirium despite the non-existence or local institutional guidelines for assessment of delirium. It is an encouraging sign that nurses’ especially from the public teaching hospitals in western seaboard region are proactively screening for delirium. Qualitative comments from nurses in this survey indicated that it was not a standard practice among all the nursing staff. Therefore a greater deal of standardisation of these practices needs to be improved (NICE, UK, 2010, Baar et al., 2013).
The implementation and improvisation of a local policy or guidelines are key step to address the magnanimity of problems caused due to delirium (Bell, 2012, Teodorczuk, et al., 2012). Guidelines provide a series of evidence based recommendations to guide professionals in critical care during their clinical assessment and management of patients with delirium (NICE UK, 2010). A policy on the other hand enhances a course of action agreed by individuals that are necessarily incorporated into practice by all the members of the organisation (NICE UK, 2010). A policy and guidelines have proven to help standardise patient care, but this depends on varying degrees to which staff of different grades and disciplines adhere to guidelines (Manias & Street, 2000, Flynn & Sinclair, 2005).

Less than one fourth of nurses stated that there was no sedation protocol available in their units. A small number of nurses also said that they were not sure if a policy existed. This shows the lack of knowledge among the nurses about the existing policies regarding sedation which warrants further education of critical care nurses in this regard (Boot, 2012). These findings about awareness of local policy from this survey were consistent with several authors (Devlin et al., 2008, Christensen, 2013, Scot et al, 2013 and Elfeky & Shoeib Ali.2013) who have identified that more than half of the critical care nurses were unaware of their local policies regarding sedation and delirium assessments. It is therefore necessary to incorporate local policy or protocol and national level consensus or guidelines in order to achieve the best practice of critical care delirium assessment in health care institutions in west of Ireland (NICE, UK, 2010, Wells, 2012, Baar et al., 2013 and Law et al, 2013).
5.3.2 Importance of delirium screening

Delirium is overlooked by the health care professionals in critical care, who consider delirium as an expected event that cannot be prevented (Boot 2012). In this survey when asked to identify the most important conditions to be assessed by nurses in their practice, none of the respondents stated that delirium was a significant condition to be assessed, which is a cause for great concern. These findings are consistent with several international studies which show lack of awareness of delirium and its consequences among critical care nurses (Devlin et al., 2008, Truman & Ely, 2003, Eastwood et al., 2012, Christensen, 2013) This could be one of the reasons for delirium going unrecognised by nurses and doctors in approximately half of the patients (Inouye et al., 2004, Steis & Fick., 2008, Devlin et al., 2008, Truman & Ely, 2003, Eastwood et al. 2012, Christensen, 2013 and Scot et al., 2013). Delirium assessment plays a significant role in enabling nurses to reassure and comfort patients during their critical care practice (Devlin et al., 2012). This survey identified there is a gap in the practice for delirium screening among critical care nurses in western seaboard region of Ireland. Qualitative comments made by the participants supplements these findings that critical care nurses lack knowledge and skills about use of validated instrument related to delirium and its management.

Educational programmes would help to increase the knowledge and necessary skills to be acquired by nurses in effectively dealing with identification and management of delirium (Wells, 2012, Devlin et al., 2012, & Guenther et al., 2012). The higher importance that nurses give to assessing altered level of consciousness or determining presence of pain and agitation, and improper placement of invasive lines over delirium suggests that the nurses also may be unaware of patient’s psychological needs and preferences (Puntillo et al., 1997, Devlin et al., 2008, Scott et al., 2013).
Many symptoms occurring among critical care patients are the result of ongoing delirium process which itself is the cause for agitation episodes (Meagher & Leonard, 2008, & Macullich et al., 2013). Nurses in this study ranked altered level of consciousness as the most important conditions to be evaluated in critical care, which itself is a criteria for detecting delirium listed in the Diagnostic and Statistical Manual of Mental Disorders DSM-IV (APA,2000 ,& Devlin et al.,2008).

5.3.3 Methods for screening for delirium

This survey explored about the possible methods employed by nurses for delirium screening in the western seaboard region of Ireland. Ability to follow commands was the most frequent method used by nurses to assess delirium at least once per 12 hours shift or more, which was followed by evaluation of agitation related events. The use of validated tools such as CAM- ICU and ICDSC were utilised less frequently which also shows these findings are consistent with previous research findings in literature (Puntillo et al.,1997, Inouye et al., 2000, Devlin et al., 2008, Scot,Mc Ilveney & Mallice., 2013,Christensen 2012). Use of no other screening tools were evident among the participants.

Use of CIWA-AR scale and psychiatric consultation to evaluate delirium were almost non-existent in the participating units. It can be argued that nurses can effectively screen for delirium with the use of validated tools, however psychiatric consultation still has a role in identifying complex cases, to offer advice, collaborate with multidisciplinary team and device individual care plan (Siddique et al., 2006, Meagher & Leonard, 2008). The importance of multidisciplinary team approach to effectively tackle delirium across the health care institutions has been illuminated by researchers (Meagher & Leonard, 2008 and Macullich et al., 2013). Assessment
methods such as: orientation, observation of behaviour, appearance, alert, awake, obeying commands, engaging in meaningful conversation, pupillary checks or even checking for Glasgow coma Scale (GCS) cannot be equated to or accepted as a method of assessing for delirium (Flagg et al., 2012, Macullich et al., 2013).

According to Inouye et al. (2001) identification of delirium by nurses based on their observation without formal cognitive assessments does not justify the methods employed as acceptable professional behaviour. This reveals that the less importance given by nurses to cognitive assessment as lower priority in critical care (Inouye et al., 2001). Having discussed the nurses’ delirium assessment practice in general the next section will closely examine the practice in terms of frequency of assessment.

5.3.4 Frequency of Assessments

Critical care has been criticised for not implementing and evaluating evidence based care consistently both at national and international levels (Dawson & Endacott, 2011). Similarity strikes with the present study and the literature review which indicates that nurses in critical care are poorly engaged in screening for delirium in their practice (Baar et al., 2013). Nurses in this study reported much lower frequency of delirium assessment when compared to sedation assessment. Several reasons may contribute for the low frequency of assessment of delirium identified by the study participants. The Society of Critical Care Medicine PAD guidelines (2013) and National Institute for Health and Care (NICE, UK) (2010) recommends frequent assessment of delirium in the ICU. Screening has not yet been made mandatory either by regulatory agencies such as the Critical Care society of Ireland, An Bord Altranais or even by local institutional policies (Law et al., 2013).
One area of concern according to Devlin et al. (2008) is that the low frequency of assessment of delirium in critical care is due to focus on the technical aspects of care like relying on data from equipment’s such as monitors, ventilator and other screens for monitoring patients rather than subjective data assessment of patients and their needs. It should be noted that participants those who worked among teaching hospitals had a reasonably higher frequency of delirium assessments.

The greater frequency of delirium screening that occurs in teaching hospitals in this survey is an encouraging phenomenon possibly due to the greater efforts put forth by practice development units and also increasing attendance of critical care nurses in Continuing Nurse Education CNE, seminars and conferences either live, bedside teachings or out of hospitals lectures. For example, an informal service clinical governance (risk assessment) module was undertaken in one of the critical care units in a primary teaching hospital. Lack of delirium screening process during general nursing assessments were identified as a greater risk for both patients and nursing staff. Hence delirium assessments using CAM-ICU method was incorporated into daily nursing assessments (Mc Dermot, 2014). Similar to this initiatives are essential to all the participating units in future.

A one-time evaluation for delirium is usually ineffective due to the fluctuating nature of delirium (Boot, 2012). The far lower frequency of delirium assessment at non-teaching hospitals compared with teaching hospitals may also be a result of lack of local guidelines and policies and procedures not being standardised in non-teaching institutions (Scott et al., 2013).
5.4 Barriers to delirium assessments

The survey highlights three major barriers to assessment of delirium: (1) the difficulty in evaluating delirium in patients who are intubated, (2) the inability to complete a delirium assessment in sedated patients, and (3) the use of delirium assessment tools being too complex. All of the above reported barriers contrasts with the literature showing that screening tools are quick, easy to use even among intubated patients (Boot, 2012, Gusamo-Flores et al., 2012). More nurses reported that they are performing sedation assessments frequently or always, while less frequency was reported with regard to delirium identification. It is evident from literature that it may require additional two minutes to complete delirium assessments using CAM-ICU or ICDSC tool (Ely et al., 2004, Devlin et al., 2008, Wells, 2012, & Boot, 2012). Hence the barriers reported by the nurses in this study shows variance to the literature.

Sedation assessment is a pre-requisite for delirium screening using CAM-ICU (Ely et al., 2004). Delirium assessments with these scales among heavily sedated patients becomes irrelevant if the target Richmond Assessment Sedation Score (RASS) is less than -1. (-1 Drowsy not fully alert, but has sustained awakening). The level of sedation (severity) are measured using RASS scoring system (Sessler et al., 2002). A detailed description of this validated scoring instrument for sedation is explained in the appendix 19. A RASS score below -2 (Light sedation briefly awakens with eye contact to voice <10 seconds) is not an indication for delirium assessment (Ely et al., 2004, Boot, 2012). Delirium screening tools are relatively simple and can be used with lightly sedated patients. The limitations identified in literature for using CAM-ICU includes: patients with blindness, deafness, inability to speak English, substance dependence and psychiatric illness remains delirium cannot be readily recognised (Pandharipande et al., 2013). If only the above mentioned cohorts of
patients are normally encountered during their clinical practice it can be argued that CAM-ICU is difficult tool to use in critical care.

A few nurses surveyed in this study reported that performing delirium assessments were time-consuming. A wide range of validated screening tools has been developed to aid the clinician in this process (Woodford and George, 2007). As stated earlier, CAM-ICU and ICDSC normally take between two to five minutes to complete (Ely, et al., 2004, Bergeron et al., 2008 and Boot, 2012). However, it is unclear at this time whether increase in ratio of nurse patients, or acuity of care in some critical care units in western seaboard region is compromising the ability of nurses to screen for delirium and possibly leading to in deeper sedation practices and lesser frequency of assessments for sedation (Park et al., 2001, Devlin et al., 2008).

5.5 **Nurses perceptions of delirium in critical care units.**

Nurses’ perceptions, when categorised by level of agreement provide some helpful clues about the low frequency of delirium assessments. Nurses in this survey agree that delirium is an underdiagnosed problem, occurs as a common response to the ICU environment, and is a problem that requires active interventions on the part of caregivers. These findings are consistent with other research carried out in similar cohorts in the past (Devlin et al., 2008, Gesin et al., 2012). However nurses in this study differ in their agreement to the previous mentioned research about delirium being associated with higher patient mortality which is in contrast to current evidence on this regard.

Nurses have a strong notion that delirium is challenging to assess in the ICU. They also believe that patients with delirium usually have symptoms that are consistent over the entire nursing shift. Furthermore, they perceive that patients with
delirium are rarely agitated, and initiation of antipsychotic therapy (e.g., Haloperidol) should be the initial intervention for all patients with delirium. Contrasting, it is documented in literature delirium can occur with sudden onset and has fluctuating nature (Girard et al., 2008). The use of haloperidol to initiate psychoactive therapy is not widely recommended unless patients are clearly monitored for prolonged QT interval (Gesin et al., 2012, Eastwood et al., 2012). These survey results show that nurses have poor perceptions regarding the delirium process and this could potentially influence nurses for not assessing delirium and less frequent use of CAM-ICU and ICDSC screening tools.

5.6 Education and Training

The higher educational achievements of participants in the current study does not have any influence on the assessments practices of delirium. It must be borne in mind that these participants were mainly practicing at staff level and half of them were educated to Masters Level. Participants did not feel adequately trained and lacked ability to competently screen for delirium. They felt that they were not adequately trained for performing cognitive assessments. For those who reported to have received training in the last one year, more nurses had received training for sedation than delirium. Some of participants indicated that they were not competent to use the validated tools.

A higher percentage of participants reported that they were not adequately trained to identify delirium and these findings are similar to the previously carried out in the literature (Devlin et al., 2008, and Hamadan-Mansur et al., 2010). It could be argued that participating in delirium identification training would rectify this deficit and findings from this survey must be considered. In order for nurses to successfully
diagnose delirium, the education must be incorporated at undergraduate level (Boot, 2012, Tedoorczuk et al., 2012). Davis and Macullich (2009) argued that the superficial teaching received during medical and nursing studies at undergraduate level lead to development of preconceived ideas about delirium. This results in ignoring, the benefits of early recognition and treatment of delirium at a later stage in their carrier (Teodorczuk et al., 2012).

There is a dearth of research regarding educational preparation of nurses and the impact it has on assessment practices. From an international perspective a number of studies have found that there is a lack of training of nurses for delirium assements (Devlin et al., 2008, Hamadan-Mansur et al., 2010, Flagg et al., 2012, Gesin et al., 2012) Similarly, the evaluation of delirium practice in Ireland, conducted by Glynn and Corry (2014), found that majority of critical care nurses had never attended a lecture (79%) or read an article (68%) pertaining to delirium.

Similar findings from the UK literature showed that there was a rise in the number of critical care practioners who were not completing delirium screening due to lack of training (Davis & Macullich, 2009; Scott et al, 2013). It is understood that every university should develop their educational programme based on the guidelines provided by the Irish Nursing Board (An Bord Altranais 2007b). However, the universities should consider these findings and encourage student nurses to undertake various projects such as clinical audits, risk assessment (Clinical governances) and research in the future.

Many researchers have highlighted that the use of novel educational strategies have helped to improve the level of nurse’s knowledge and understanding, thereby increasing the nurses’ involvement in standardising practice for delirium monitoring
(Gesin et al., 2012, Guenther et al., 2012, Eastwood et al., 2012). Similar strategy can be considered in addressing the short fall of nursing practice among the participating centres. Assessment skills are incorporated into the education programme and nurses must complete competency with their nursing mentor to consolidate this area of learning (An Bord Altranais 2007b).

5.7 Developing specialist role of nurses for delirium

Nurses play an important role in effectively leading the care of delirium in critical care (Boot, 2012). Concepts from other areas of health care are applied and development of a new roles for nurses will prevent the incidences and severity of delirium occurrences in health care setting (Meagher & Leonard, 2008). For example, Infection control nurse, using this model delirium specialist nurse’s role can be developed and applied in health care settings especially among critical care units. The importance of developing Link role for nurses was illuminated by several authors in the literature (Meagher & Leonard, 2008, Boot, 2012, Wells, 2012). The link nurses in critical care play a key role in delirium assessment and management. As nurses are the first line of contact for implementing evidence base nursing care among their units (Balas et al., 2009). Part of their role is to integrate all the recent research findings, critically appraise them and incorporated in their daily practise. This role can be further developed into a delirium nurse specialist within the scope of practice for nurses as guided by An Bord altranais (ABA, 2007b). Delirium nurse specialist will identify risk factors, improve cognitive assessment and encourage standards for psychological care in critical care units in the western region of Ireland (Teodorczuk et al., 2012).
5.8 Support for Nursing education and training

Educational approaches should focus on promoting awareness on delirium, clearer training of nurses for prevention and treatment at individuals and organisational level (Teodorczuk et al., 2012). Research conducted in the UK found that physicians lacked clinical delirium identification examination skills (Davis & Macullich et al., 2009, Teodorczuk et al., 2012). If a highly qualified and experienced doctors who may be aware of delirium found it difficult to diagnose and treat delirium was challenging it is reasonable to assume that nurses with less training may find the even more difficult. The large percentage of participants in the current study and did not receive training for delirium assessment practices.

Less than half of the participants in the current study demonstrated variance in their practices, perceptions and barriers to towards delirium screening. Lack of managerial support could have acted as a barrier to screening for delirium. For the nurse attending courses and conferences for a better understanding of delirium needs to be funded by the HSE. The lack of funding for the research in this area may lead to delirium being neglected among health care professionals hence a support for staffs and students is vital. The granting of study leave is at the discretion of the employing organisation and the majority of organisations have reduced or increased the provision of study leave. Therefore, students may have to attend the course on their own time which may involve the use of annual leave, which in itself represents a significant cost to the individual.
The qualitative data analysis revealed that some of the respondents are lacking required skills and knowledge required to effectively care for delirious patients in their normal practice. Training of nurses is an urgent requirement among the participating units. This training should emphasize the rationale for delirium assessment, the fluctuating and transient nature of delirium, the effect that screening for delirium may have on improving patients’ outcomes, and the importance of using a validated tool for screening (Devlin et al. 2008, Boot 2012, and Christensen, 2013). Interventions to help nurses to assess delirium and integrate this into everyday nursing practice in critical care must be developed and tested (law et al., 2013).

The results from this study highlight the need for improvement of delirium screening practices particularly in the context of the critical care nursing population. Therefore, it is recommended that delirium, its identification and management must be integrated more aggressively into critical care areas. This education should aim to provide broader knowledge and development of skills relating to cognitive assessment, so that the critical care nurse is able to accurately assess a patient’s level of cognitive function. And this will help nurses to interpret changes in cognition to distinguish between delirium and other conditions which can have similar signs and symptoms. Educational strategies such as multifaceted interventions, didactic and pedagogical strategies improves the ability of nurses to effectively screen for delirium (Gesin et al., 2012). In addition, educational interventions will increase the confidence of nurses in management of delirium.
5.9 Conclusion

The nurses in this study demonstrated variances in their delirium and sedation assessment practices. The practices for delirium assessment are below the recommended by the practice guidelines. Some of the participants were not using validated instruments to delirium assessments. In this survey research higher level of education was not a significant factor promoting delirium detection. As more nurses were not engaged in assessments practices for delirium, the under recognition of delirium continues in west of Ireland. It has highlighted the potential barriers, as perceived by the participants and this has allowed for deeper understanding to meet patient and service need, it is vital to have an understanding of critical care nurses’ perceptions towards delirium. Nurse involvement in screening for delirium has been shown internationally to have many benefits to patients, nurses’ and services. Role expansion among critical care nurses provides nurses the opportunity to broaden their scope of practice and in turn increase clinical outcomes in patients. For this to occur, support systems must is vital. The following chapter will provide the recommendations for practice and draw conclusions.
6.0 CHAPTER SIX CONCLUSION

6.1 Introduction

This study’s strengths as well as its limitations will be discussed. The implications for nursing practice, education and management will be addressed and recommendations for future research will be outlined. Dissemination of the findings will be presented and conclusion will be drawn. In the next section the aims and objectives of the study will be restated and findings from this study will be reflected.

6.2 Aim of the study

An evaluation of nursing practice regarding delirium assessment in adult critical care units.

6.2.1 The Specific Objectives were to

- Explore practices of critical care nurses in assessing delirium and sedation.
- Identify use of any validated delirium assessment tools among the participating units.
- Examine the nurses’ adherence to Society of Critical Care Medicine (SCCM) guidelines on delirium assessment.

6.2.2 Main findings

The findings suggest that nurses are using validated screening tools during their clinical practice. However, this was not a standardised practice through the participating centers. All the participating centers do not have a policy or protocol
towards delirium assessments and management. Less than half of the nurses’ delirium assessment practices were not in compliance with the clinical practice guidelines issued by National Institute for Health and clinical Evidence NICE, UK (2010) and Society of Critical Care Medicine (SSCM) Pain, Agitation, and Delirium (PAD) (NICE, UK, Baar et al., 2013). All of the participating centers are in need of introduction and implementation of validated tools to improve clinical practice. In the next chapter the strength and limitations of the study will be discussed.

6.3 Strengths and limitations of the study

6.3.1 Strengths

The findings of the current study can be viewed as one of the studies strengths. To date, there was no research carried out among nurses in western seaboard region of Ireland. A moderate response rate of 45% was achieved. The inclusion and exclusion criteria were employed makes the findings of the study more robust. Though the study sample size was relatively high, the study was completed within a short time frame to answer the research question. The findings of the study will be presented to the head of the participating units. Implications for future nursing practice and recommendations from this study will be highlighted. The findings of this research will be published in academic journals which reduces the time delay between conducting the research and dissemination of the findings. Although the current study has provided important data, the limitations of the study were identified and will be highlighted in the next section.
6.3.2 Limitations of the study.

In this survey a response rate of 45% (n=110) was achieved. The estimated time to complete the survey questions was 15 minutes. In some responses participant stated that the units they worked in were too busy to complete the questionnaires. This led to missing data to certain questions. For missing data, no assumptions were made and these data were excluded from the analysis. Limitation of data accuracy could have been contributed by respondent burden such as issue of tiredness, feeling rushed and anxiety. Data was collected by the key contacts in each units. However the researcher was employed at one of the participating centers where the highest response rate was achieved. This could have influenced recruitment of participants at one of the participating centers and at the same time limited recruitment of participants from other centers. However, every effort was made to encourage response rates and the participants were never forced or coerced and the standards recommended by An Bord altranais (ABA, 2007d) by framework for the nurse researcher were adhered as detailed in the methodology chapter.

This study uncovered critical care nurses’ practices, barriers faced and perceptions towards delirium screening. Sample size used within the current study precludes generalisation of the study’s findings beyond the study population. The findings does not represent nurses from Accident and Emergency, Recovery room nurses or any other specialty nor indeed do they relate to any other clinicians in critical care. However, these findings are comparable to those identified in other specialties such as physician’s anesthetics, and allied health care staff within critical care. The main reason for limiting the scale of the study was due to financial reasons and time constraints of the investigators. The PI felt that conducting a large scale study was outside the scope of a novice researcher. However this study findings provide a basis
for future research on a large scale among critical care nurses and other allied health care practitioners nationally.

All data was self-reported, there was no triangulation or evaluation of medical and nursing records. This study indicated educative need for critical care nurses in west of Ireland. The survey did not include other critical care health professionals who have a strong voice in making decision and assessment of treatment of delirium. The survey results only represents western seaboard region of Ireland, however multiple sites were included in the sampling frame. Despite these limitations the study findings reveal the current practices and perceptions of critical care nurses working in west of Ireland.

6.4 Recommendations for future nursing practice and research

A number of implications arise as a result of this research and discussed under three aspect: Implications for Nursing practice, Nursing management and Nursing Education.

6.4.1 Implications for Nursing Practice

The findings suggest that critical care nurses were performing delirium assessments using validated tools CAM-ICU and ICDSC. In-service education should be developed at the hospitals that were studied as a matter of urgency to address the identified evidence based practice shortfalls in relation to delirium. This education should reinforce the use of existing validated instruments, to identify common risk factors and interventions to reduce the risks for delirium. Cognitive assessment and risk stratification should be incorporated into clinical practice guidelines for delirium. These skills in cognitive assessment need to include the ability to consider possible causes and contributing factors.
6.4.2 Implications for Nursing Management

The current study suggests that support is central to the implementation of delirium screening practices. Support from nursing colleagues nursing management, medical and are essential. Collaborative liaison between teaching and non-teaching hospitals is required to establish a standard method of assessment tools to facilitate commonality and consistency of assessment standards and approach throughout the western seaboard health care system. In order to act as a role models in promoting best practice for delirium in critical care, nurses need to be encouraged in performing specialist roles.

Based on the findings from this study, it is recommended every unit in Western seaboard region of Ireland to ensure that they have a policy for delirium assessment. Strategies to increase perceived benefits of screening and misconceptions around delirium needs to addressed. Guidance needed for critical care nurses to develop skills recognising delirium at the earliest, use of validated delirium tools during their clinical practice and provide evidence based care. In order to address the magnanimity of challenge of delirium in multidisciplinary team approach is vital. Therefore, critical care, practitioners such as anaesthetics, medical team members, physiotherapist and occupational therapist need to be studied about their practices, beliefs and perceptions regarding delirium and its management.

6.4.3 Implications for Education

Enormous opportunity exists to educate registered nurses working in critical care to understand the importance of routine assessment of delirium with the use of validated screening tools. Post-graduate nursing education should be reinforced and supplemented by in-service education and also include the use of existing formal
assessment tools to assess for the presence, type and possible causes of delirium. Specific educational strategy should be developed at both Under-graduate and Post-graduate levels which will enable nurses to gain necessary knowledge and skills, to perform, document and communicate delirium assessments.

6.5 Recommendations for practice and research

The findings from this study indicate that nursing assessment of delirium remains a neglected area of nursing care in the western seaboard region of Ireland. There is a huge gap in practice related to delirium among critical care nurses from an Irish perspective. Nurse involvement in delirium screening and management practices are well established in the USA and Canada. The author used the international literature pertaining to delirium assessment practices. A nationwide study is needed to ascertain nurses’ on sedation and delirium assessment practices in Ireland. The information yielded from a larger study would allow the findings to be generalised to critical care nurses throughout Ireland. The findings from the current study would inform the development screening practices initiatives for critical care nurses in the western region of Ireland. More in-depth research is needed to ascertain why educational achievements are not reflected in better screening practice for delirium. The findings of the current study suggest that critical care nurses lack training and educational support. Research among critical care nurses needs to be conducted using both qualitative and quantitative methodologies.
6.6 Dissemination of Findings

The dissemination of findings from a research study is cannot be overlooked. This is a very essential component of the research process. Findings from the current study will be presented at local level within the critical care units where the research took place. A copy of the report of the study findings will be provided to the research ethics committee. The findings will also be disseminated at local, and national critical care conferences. A copy of the Dissertations will be placed in the library of the university affiliated with this Masters programme and in the library HSE west where the researcher is employed. The writer also hopes to publish the findings of the current study in an international nursing journal.

6.7 Personal Reflection

Reflecting on practice is to stimulate personal and professional growth, with an aim to bridge the theory practice gap (Kinsella 2007). A journal was maintained throught the research process and journey of writing the dissertation. Topic of the research interest posed challenges for the researcher and their colleagues during their critical care practice. This lead to conduct a systematic research in this area. Initially, there was no data uncovered from Irish perspective on the topic. But due to budgetary and time constraints selection centres was limited. Selection of multiple centres leads to maximum time consumption in conducting research leading to added pressure on reporting process. This allowed the researcher to concentrate on the research process as a whole. Overall, the thesis process was a positive educational experience and this experience will be instrumental in career development and continue to help the nursing peers at the work.
6.8 Conclusions

The study has evaluated nurses’ practices about delirium screening practices in critical care units and their adherences to critical care society of medicine (PAD) practice guidelines. Findings from this research highlighted practice gap of critical care nurses in early recognition of delirium through the use of validated tools. Low screening practices and poor perceptions about the delirium screening exists among critical care nurses in western seaboard region of Ireland. Specifically, there continues to be more number of nurses who have never used a validated delirium screening tool, a significant number who still do not use a protocol for sedation and delirium, and a majority of nurses did not implement delirium specific guidelines. This current survey showed that delirium practices among adult critical care nurses were not according to the standards set by SSCM PAD and NICE, UK guidelines. Use of evidenced base practice for delirium assessment are the ideal way of dealing with delirium and preventing the short and long-term negative consequences associated with it. The outcome from the research is used as study implication for practice, management and education.
7.0 CHAPTER SEVEN REFERENCES


Boote, N. & Belie, P., (2005) Scholars before researchers: On the centrality of the


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Appendix 18. ICDSC flow sheet
Appendix 19. RAAS flow sheet
Appendix 20. Letter to ADON/CNM
# Appendix 1: Time Scale

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Appendix 2: Research budget

Research Budget

Postages  €30.00
Paper x 2 boxes  €25.00
Envelopes x 300  €30.00
Ink x 3  €100.00
Travel expenses  €250.00
Nursing Conference  €160.00
Thesis binding  €70.00
Total Costs  €665.00

Please note: The research was self financed. The researcher used personal computer and printer. Library and printer facility (limited) were also used from researchers work place.
Appendix 3. Qualitative comments for question 10.

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<td>2</td>
<td>base line status not known</td>
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<tr>
<td>3</td>
<td>cam icu inconsistent</td>
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<tr>
<td>4</td>
<td>CAM ICU underutilises tool</td>
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<td>9</td>
<td>consequences of delirium is misunderstood</td>
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<td>15</td>
<td>delirium assessment is difficult</td>
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<td>21</td>
<td>delirium assessment needs to be consistent</td>
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<tr>
<td>27</td>
<td>delirium assessment varies with staff</td>
</tr>
<tr>
<td>29</td>
<td>different tools used by doctors and nurses</td>
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<td>30</td>
<td>education on sedation assessments needed; medications causes delirium</td>
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<td>no uniformity of treatment for delirium</td>
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<td>nurse interaction with patient is enough for delirium management</td>
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<tr>
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<td>very controversial advice and management</td>
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<tr>
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<td>we have no delirium assessments tool</td>
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Is there anything else you would like to tell us about delirium assessment in the ICU setting?
Appendix 4: Questionnaire

Please fill out this questionnaire only if you are working at least 6 months in ICU/HDU or CT–ICU. Please answer all the questions.

Nursing Practices and Perceptions towards Delirium* in the Intensive Care Unit.

Delirium = acutely changing or fluctuating mental status, inattention, disorganized thinking, and an altered level of consciousness.

1. Of the following potential conditions that may occur in an ICU/HDU patient, please RANK (1-5) the order of importance in which you feel they should be evaluated by nurses over the average shift by placing a ‘1’ beside the factor that you think is most important to evaluate and a ‘5’ beside the factor that you think is LEAST important to evaluate.

<table>
<thead>
<tr>
<th>Condition</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Altered level of consciousness</td>
<td></td>
</tr>
<tr>
<td>Improper placement of invasive devices</td>
<td></td>
</tr>
<tr>
<td>Presence of agitation</td>
<td></td>
</tr>
<tr>
<td>Presence of delirium</td>
<td></td>
</tr>
<tr>
<td>Presence of pain</td>
<td></td>
</tr>
</tbody>
</table>

2. My ICU/HDU has a sedation protocol/guideline. (Please tick √) Yes □ No □ not sure □

3. Does your ICU/HDU sedation protocol specify a frequency by which delirium should be assessed? (Please tick √) Yes □ No □ Not sure □

4. For the ICU/HDU patients whom you care for, how often do you evaluate patients for level of sedation and presence of delirium?

   For example if you usually evaluate for the presence of delirium frequently then place a √ beside “presence of delirium” in the “frequently” column.

<table>
<thead>
<tr>
<th>Level of sedation</th>
<th>Never</th>
<th>Rarely</th>
<th>Frequently</th>
<th>Always</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Presence of Delirium</th>
<th>Never</th>
<th>Rarely</th>
<th>Frequently</th>
<th>Always</th>
</tr>
</thead>
</table>

5. For the ICU/HDU patients, for whom you DO evaluate level of sedation and/or for the presence of delirium, please indicate the frequency per every 12-hour shift that you conduct each evaluation. For example if you usually evaluate for the presence of delirium twice per shift then place a √ beside “x 2-3” in the “Presence of Delirium column.”

<table>
<thead>
<tr>
<th>Per 12-hour shift</th>
<th>Level of sedation</th>
<th>Presence of Delirium</th>
</tr>
</thead>
<tbody>
<tr>
<td>X1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>X2-3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
6. For the ICU/HDU patients, for whom you evaluate the presence of delirium, please indicate how frequently you use each of the following in your delirium assessment. Note: Please indicate frequency per every 12-hour shift. If you do not assess for delirium in your ICU patients, please indicate “never use” under each column.

<table>
<thead>
<tr>
<th>Per 12 hour shift</th>
<th>Ability to follow commands</th>
<th>Agitated related event</th>
<th>Confusion Assessment method – ICU (CAM-ICU)</th>
<th>CIWA-Ar scales</th>
<th>Intensive care Delirium Screening checklist</th>
<th>Psychiatry consult</th>
<th>Others (please specify)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Never heard of</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Never use</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rarely</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 time</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2-3 times</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4-6 times</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;6 times</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

7. From the following list of factors that might prevent you from evaluating your patient for the presence of delirium, please RANK the TOP 3 only in order of importance by placing a ‘1’ beside the factor that you think is MOST common or significant and a ‘3’ beside the factor that is third most important.

<table>
<thead>
<tr>
<th>Rank</th>
<th>Delirium assessment tools are too complex to use</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Difficult to interpret in intubated patients</td>
</tr>
<tr>
<td></td>
<td>Do not feel confident in my ability to use delirium assessment tools</td>
</tr>
<tr>
<td></td>
<td>Do not feel that using delirium assessment tool improves outcome</td>
</tr>
<tr>
<td></td>
<td>Inability to adequately document delirium assessments</td>
</tr>
<tr>
<td></td>
<td>Inability to complete assessment in the sedated patient</td>
</tr>
<tr>
<td></td>
<td>Not enough time to perform assessment (too time consuming)</td>
</tr>
<tr>
<td></td>
<td>Nurses are not required to screen for delirium in my ICU</td>
</tr>
<tr>
<td></td>
<td>Physicians already complete delirium assessments</td>
</tr>
<tr>
<td></td>
<td>Physicians do not use my assessment in their decision-making</td>
</tr>
<tr>
<td></td>
<td>Other: (please specify)______________________________</td>
</tr>
</tbody>
</table>
8. I have received education regarding ICU sedation assessment and ICU delirium assessment by the following means: (Please insert √ in ALL applicable boxes below)

<table>
<thead>
<tr>
<th>Have never received education</th>
<th>Sedation assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Live, out-of-hospital CE lecture</td>
<td>Delirium Assessment</td>
</tr>
<tr>
<td>Live, in-hospital lecture or in service delirium assessment tools</td>
<td></td>
</tr>
<tr>
<td>Teaching at the bedside tool improves outcome</td>
<td></td>
</tr>
<tr>
<td>Inability to complete assessment in the sedated patient</td>
<td></td>
</tr>
<tr>
<td>Other_____________________________</td>
<td></td>
</tr>
</tbody>
</table>

9. Please indicate your agreement with the following statements that pertain to delirium in the ICU by placing a√ in the column that most closely aligns with your agreement.

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly agree</th>
<th>Moderately agree</th>
<th>Strongly disagree</th>
<th>Moderately disagree</th>
<th>Neither agree nor disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) Delirium is an underdiagnosed problem.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b) Delirium is a common response to the ICU environment.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c) Delirium is a problem that requires active interventions on the part of caregivers.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>d) Delirium is associated with higher patient mortality.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>e) ICU patients with delirium are rarely agitated.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>f) Initiation of antipsychotic therapy (e.g., Haloperidol) should be the initial intervention for all patients with delirium.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>g) Delirium is challenging to assess in ICU patients.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>h) Patients with delirium usually have symptoms that are consistent over the entire nursing shift.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
10. Is there anything else you would like to tell us about delirium assessment in the ICU/HDU setting?

Thank you for your response to these questions. Now that we have this information, we would like to know something about you. Please complete the following questions:


12. Highest Nursing Qualification: (please select one only) Diploma □ Bachelors □ Higher Diploma □ Masters □ Doctorate □ Others □ (Please Specify) ________________

13. Number of Years of Experience in ICU/HDU: ______________ years.

14. How many hours per week do you work on average in your unit? ________ Hours.

15. Please indicate the type of shifts you work.
Day only □ Night only □ Day and nights □

16. Please select your area of work: (please select one only) ICU □ HDU □ Cardiac □ Others: □ (please specify) ________________

17. Your current Position: (please select one only) Staff nurse □ Nurse Manager □ Clinical educator □ Advanced Nurse practitioner □ Clinical nurse specialist □ Others □ (Please Specify) ________________________

THANK YOU FOR COMPLETING THE SURVEY!

Please return the questionnaires in sealed envelopes provided, to the collection unit. Returning of completed questionnaires will be considered as consent given to take part in this survey.

Permission has been obtained from the author to use this survey tool (Devilin.et.al, 2008).
Appendix 5: List of risk factors for delirium

### TABLE 1: Risk Factors for Delirium

<table>
<thead>
<tr>
<th>Predisposing Factors</th>
<th>Precipitating Factors</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Demographic characteristics</strong></td>
<td><strong>Drugs Sedative hypnotics</strong></td>
</tr>
<tr>
<td>Age of 65 years or older. Male sex.</td>
<td>Narcotics. Anticholinergic drugs. Treatment with multiple drugs and Alcohol or drug withdrawal.</td>
</tr>
<tr>
<td><strong>Cognitive status</strong></td>
<td><strong>Primary neurologic diseases</strong></td>
</tr>
<tr>
<td>Dementia, Cognitive impairment, History of delirium and Depression</td>
<td>Stroke, Intracranial bleeding, Meningitis or encephalitis</td>
</tr>
<tr>
<td><strong>Functional status</strong></td>
<td><strong>Intercurrent illnesses</strong></td>
</tr>
<tr>
<td>Functional dependence, Immobility, Low level of activity, History of falls</td>
<td>Infections, Iatrogenic complications, Severe acute illness, Hypoxia, Shock, Fever or hypothermia. Anaemia Dehydration Poor nutritional status Low serum albumin level Metabolic derangements (e.g., electrolyte, glucose, acid–base)</td>
</tr>
<tr>
<td><strong>Sensory impairment</strong></td>
<td><strong>Surgery</strong></td>
</tr>
<tr>
<td><strong>Decreased oral intake</strong></td>
<td><strong>Environmental</strong></td>
</tr>
<tr>
<td>Dehydration and Malnutrition</td>
<td>Admission to an intensive care unit. Use of physical restraints. Use of bladder catheter, Use of multiple procedures, Pain and Emotional stress.</td>
</tr>
<tr>
<td><strong>Drugs Treatment</strong> with multiple psychoactive drugs**</td>
<td><strong>Prolonged sleep deprivation.</strong></td>
</tr>
<tr>
<td>Treatment with many drugs Alcohol abuse.</td>
<td></td>
</tr>
<tr>
<td><strong>Coexisting medical conditions</strong></td>
<td></td>
</tr>
<tr>
<td>Severe multiple coexisting conditions. Chronic renal or hepatic disease. History of stroke Neurologic disease Metabolic derangements. Fracture or trauma. Terminal illness. Infection with human immunodeficiency virus</td>
<td></td>
</tr>
</tbody>
</table>
### Appendix 6: literature Matrix

<table>
<thead>
<tr>
<th>Author</th>
<th>Date of publication</th>
<th>Country</th>
<th>Aim/objective</th>
<th>Research perspective</th>
<th>Sample strategy</th>
<th>Size</th>
<th>Results</th>
<th>Key findings</th>
<th>Recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ely et al 2004</td>
<td>USA</td>
<td>Medical communities belief and practices</td>
<td>Quantitative Questionnaire survey</td>
<td>Convenience Health care professionals large survey in 41 hospitals n=735 nurses(113)</td>
<td>40% routinely screen foe delirium only 16% use validated tools</td>
<td>Delirium underdiagnosed.</td>
<td>More education needed to Delirium specific practice</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Devlin et al 2008</td>
<td>USA</td>
<td>Practices and perceptions of Nurses delirium assessments in ICU.</td>
<td>Quantitative Web based survey</td>
<td>n=601 convenience sampling</td>
<td>Delirium assessment less common</td>
<td>Less use of delirium screening tools</td>
<td>Educating nurses for use of delirium screening tools.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dhalke and Phinney 2008</td>
<td></td>
<td>How nurses care for delirious hospitalised elder adults and barriers face</td>
<td>Qualitative Interview</td>
<td>(n=12 convenience Thematic analysis</td>
<td>Variety of strategy to identify delirium</td>
<td>Nurses lack knowledge for caring for patients with delirium</td>
<td>Education of nurses needed to improve patient care.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Patel et al 2009</td>
<td>USA</td>
<td>Follow up to Ely et al 2004.</td>
<td>Quantitative Questionnaire Survey (Multi-phase)</td>
<td>All critical care professionals n=1384</td>
<td>59% routinely screen foe delirium only 33% use validated tools</td>
<td>Delirium remains underdiagnosed</td>
<td>More education needed to Delirium specific practice</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flagg 2010.</td>
<td>USA.</td>
<td>Nursing identification of delirium.</td>
<td>Quantitative Questionnaire survey</td>
<td>Convenience Sampling n=61</td>
<td>Great Educational needs barriers identified</td>
<td>Providing nurses with educational resources will improve delirium management</td>
<td>Further testing of barrier Assessment in larger settings</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scott et al 2018</td>
<td>UK</td>
<td>Service evaluation Among ICU nurses</td>
<td>Quantitative Questionnaire survey</td>
<td>Convenience Sampling n=78</td>
<td>54% nurses agreed delirium Underdiagnosed problem6% considered evaluating their patients</td>
<td>.69% felt the need for routine monitoring is unnecessary.</td>
<td>Service evaluation Implementation Of delirium screening tool</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Author</td>
<td>Date of publication</td>
<td>Country</td>
<td>Aim/objective Research question.</td>
<td>Research perspective</td>
<td>Sample strategy Size</td>
<td>Results</td>
<td>Key findings</td>
<td>Recommendations</td>
<td></td>
</tr>
<tr>
<td>-----------------------</td>
<td>---------------------</td>
<td>---------</td>
<td>---------------------------------</td>
<td>----------------------</td>
<td>----------------------</td>
<td>---------</td>
<td>--------------</td>
<td>-----------------</td>
<td></td>
</tr>
<tr>
<td>Gesin et al</td>
<td>2012</td>
<td>USA</td>
<td>Impact of screening tool ICDSC nursing knowledge of delirium and evaluation</td>
<td>Quantitative Prospective study Quantitative Three phase study.</td>
<td>n=20 Pre and post intervention</td>
<td>Nurses evaluate delirium effectively using ICDSC</td>
<td>Use of multifaceted education improves nurses Screening</td>
<td>Impact of implementation ICDSC and education needs further research</td>
<td></td>
</tr>
<tr>
<td>Brummel et al</td>
<td>2013</td>
<td>USA</td>
<td>Review Of delirium screening tools</td>
<td>Review article --</td>
<td>--</td>
<td>Implementation Of effective delirium screening is possible</td>
<td>Implementation Of screening tools vital</td>
<td>Multifaceted training Is emphasised</td>
<td></td>
</tr>
<tr>
<td>Eastwood et al</td>
<td>2012</td>
<td></td>
<td>ICU nurses Attitudes to delirium assessment</td>
<td>Quantitative questionnaire survey</td>
<td>Pre and post intervention</td>
<td>CAM-ICU was well received.</td>
<td>Education was key for implementation</td>
<td>USE of CAM-ICU Is beneficial.</td>
<td></td>
</tr>
<tr>
<td>Glynn &amp; Corry Ireland (Unpublished)</td>
<td>2012</td>
<td></td>
<td>ICU nurses belief and practices</td>
<td>Quantitative questionnaire survey</td>
<td>N=157</td>
<td>90% nurses agree delirium Is under recognised</td>
<td>Only 3% considered Evaluating for delirium</td>
<td>Need for further research indicated</td>
<td></td>
</tr>
</tbody>
</table>
Appendix 7: Screening tools for evaluation of delirium.

Screening tools

The literature revealed following list of commonly used tools in delirium screening process in the health sector.

The Delirium Rating Scales (DRS)

Confusion Assessment Method ICU Scale (CAM- ICU).

Intensive CARE Delirium Screening Checklist (ICDSC)

Nursing Delirium Screening Scale (Nu-DESC)

Diagnostic and statistical manual MSD criteria scale (DSM-IV).

International Classification of Disease checklists (ICD-10)

Delirium Assessment Scale (DAS)

Delirium Symptom Interview (DSI)

The organic Brain Syndrome Scale (OBS)

Neecham Confusion Scale (NCS)

Delirium Index (DI)

Delirium Severity Scale (DSS)

Appendix 8 Advertisement

Are you involved in caring for patients in ICU/HDU/CTICU? Have you cared for patients that have exhibited signs of agitation or confusion?

You are invited to take part in a study being conducted among ICU Nurses focusing on assessment and management of delirium in patients in an ICU setting.

This study is the first exploration of delirium in ICU setting in Ireland.

Study begins in 2 weeks’ time on DATE.

Questionnaires will be circulated to all staff interested in participating. Watch out for questionnaires circulation.

Results will be used to inform future education and training needs.

Please consider participating in this important study. For info, call Researcher at 0879786472
Delirium Survey

A gentle reminder!

Dear Folks,

If you haven't already completed the survey on the evaluation of nursing practice regarding delirium assessment in adult intensive care units, please do so. The survey is short and designed to take no longer than 10 to 15 minutes. It will be available until 15, April 2014. Thank you for your time and participation.

Kind regards.

Researcher.

087986472
Appendix 10. PARTICIPANT INFORMATION SHEET

INVITATION
My name is Ajoy Sunil Anbu and I am a student in The National University of Ireland, Galway. I am conducting a research study as part requirement of a Masters in Specialist Nursing and I would like to invite you to participate. My research is entitled: An evaluation of nursing practice regarding delirium assessment in adult intensive care units. The study aims to explore the perceptions and practice of nurses working in intensive care units (ICU) in relation to the identification of delirium in patients in the ICU setting. The study has received full ethical approval from…………………………….

WHAT WILL HAPPEN
If you decide to participate you will be asked to fill out a questionnaire. Taking part in the study is your decision. All information collected in this questionnaire will be anonymous. You will not be linked in any way to the responses you provide. Participation in this research is entirely voluntary. You can withdraw from the study at any stage, without any consequence.

TIME COMMITMENT
The completion of questionnaires can take up to fifteen (15) minutes. The Data will be analysed statistically. All data will be stored in line with the Data Protection Acts 2001/2003. After a designated period of time (5 years) all data will be destroyed.

BENEFITS AND RISK
The risks from participating in this study are not more than would be encountered in everyday life. Understanding the current perceptions and practices of nurses in ICU will identify key areas of need for educating and training of nurses regarding delirium assessments for future. Results can be used to inform improved patient care planning and thereby potentially reducing patients stay in intensive care units.

CONFIDENTIALITY/ANONYMITY
A report of the study will be submitted to the School of Nursing & Midwifery NUIG as part fulfilment of course requirements. The results of this study may be submitted for publication in relevant peer reviewed journals and/or presented at relevant conferences. No personal details will be included in any reports and no participant will be identifiable in any reports resulting from this study.

FOR FURTHER INFORMATION
I will be happy to answer any questions you have about the study. You may contact me at 0879786472 or by email a.anbu1@nuigalway.ie, will be glad to answer your questions about this study at any time. All participating units will receive a report on the results of the study on final completion.

Thank you for your time,

Yours sincerely,

Ajoy Sunil Anbu.
Appendix 11. Letter to the Author asking permission to use survey instrument

Dear (author name)
My name is Ajoy Sunil Anbu. I am a staff nurse in the Cardiac Intensive Care Unit at University Hospital Galway. I am also studying Masters in Specialist Nursing at NUI Galway, Ireland. As part of the requirements of this course I need to complete a piece of research. My area of interest would be Delirium in Critical care units. I read your article on Nursing perceptions and practices of Delirium assessment dated 2008. I have plans to do similar study in Critical care units at (western sea board area), Ireland. I would like to use the tool/questionnaires used by you in my research with your permission. I assure you that, I will acknowledge you in my thesis and others publications. Please let me know about how you feel about the same. I am hoping to obtain my data by using a questionnaire specifically designed to use among nurses working in critical care units. I am going to have my project proposal ready in a weeks’ time for the local ethics committee. If you need any more information about this please do not hesitate to ask. I am open to any ideas or suggestion.
Thank you for your consideration.
Yours Sincerely,
Ajoy Sunil Anbu
CICU unit III Floor
University Hospital xxx
Ireland

Permission from the author to use survey instrument

(Author) to Ajoy. Via E-mail.

Most definitely please feel free to use the survey instrument in any way that you would like. Good luck with your research! (Author name).

(Author name), Phar.D., FCCM, FCCP Associate Professor, Department of Pharmacy Practice,(Address of the Author)
Date: Oct 15
Place Boston MA.
Appendix 12 LETTER TO DIRECTOR OF NURSING

67 Bun A cnoic
Rahoon, Galway

Dear Ms DON

My name is Ajoy Sunil Anbu. I am a staff nurse in the Intensive Care Unit and I am also studying for my Masters in Health Sciences (Specialist Nursing). As part of the requirements of this course, with your permission I would like to conduct a study using the nursing staff in the intensive care units (ICU/HDU/CTICU) in XXX (sea board hospitals).
Research has shown that nurses are becoming more involved in the Delirium Identification and management process. This study aims to study current practices and perception of ICU nurses regarding delirium identification. It is stated in the literature that nurse involvement in the delirium identification process helps to prevent major complications in ICU and improve patient care. It is also extremely important to the hospital, as delirium preventive measures, reduces the risk of complication and length of stay for the patient in the critical care units and therefore reduces the cost to the hospital.
I am hoping to obtain my data by using a questionnaire specifically designed to use among nurses working in critical care units. I have also obtained/applied for approval from the local ethics committee. Please grant me permission to carry out this study. If you need any more information about this study please do not hesitate to contact me.
Thank you for your consideration.
Yours Sincerely,
Ajoy Anbu
CICU unit
Mob: 0879786472.
Appendix 13 APPROVAL LETTER FROM DIRECTOR OF NURSING

Director of Nursing Office
xxxxxxx hospital
Xxxxxx

TO
Ajoy Anbu
Staff Nure -ICU
Xxxxx Hospital

Dear Ajoy,

I would like to give you permission for conducting a research study – An evaluation on nurses practice on delirium assesments in adult intensive care unit

I have also seen the Hospital Ethics Committee approval form.

All the best!

Ms. XXX XXX
Director of Nursing
Xxxxxx Hospital

Date : xxxxxxxx

Place : xxxxxxxx
Appendix 14 LETTER TO THE RESEARCH ETHICS COMMITTEE

XXXXXXXXXXX
XXXXXXX Ethics Committee
Date: XXXXXXX
XXXXXXXXX
College,
Galway.
Re: Ethical approval to conduct a study of an evaluation of nursing practice regarding delirium assessment in adult intensive care units.

Dear Sir/ Madam,

My name is Ajoy Sunil Anbu and I am a student in The National University of Ireland, Galway. I am conducting a research study as part requirement of a Masters in Specialist Nursing. The topic I have chosen is aimed at conducting a study of practices and perceptions of staff nurses in intensive care units in identifying delirium. This could be of benefit to the future development of nurse education and nurse practice in west of Ireland.

Every effort has been made in the development of this research proposal to be sensitive to all ethical issues. I would greatly appreciate your approval to perform this study through your review of the ethical considerations. Enclosed please find a copy of the research proposal for your consideration. Any recommendations or suggestions will be considered and acknowledged. Should you have any questions or concerns, please do not hesitate to contact me on the above address or telephone number.

Thanking you for your time,

Yours Sincerely,

Ajoy Anbu

155
Appendix 15 RESEARCH ETHICS COMMITTEE APPROVAL(S)

xx/xx/xxxx

Main Administration Building
XXXXXXX Hospital

To
Mr. Ajoy Anbu
Staff Nurse ICU
XXXXX Hospital (s)

Ref: C.A 998 – An evaluation on nurses practice on delirium assessments in adult intensive care unit

Dear Mr. Anbu,

I have considered the above project, and I wish to grant Chairman’s approval to proceed.

Yours sincerely,

Dr. xxxxxxxxxxxxxxxxxxx
Chairman Clinical Research Ethics Committee(s)

xxxxxxxx
Appendix 16 Reminder Letter

Dear Participant,

Many thanks for choosing to complete this questionnaire. Your opinions, practices and perceptions of Critical care staff nurse towards delirium assessment are invaluable. Remember this questionnaire is anonymous so please answer honestly. The questionnaire should take no longer than fifteen minutes of your time to complete. Please complete all questions.

Once completed please place the questionnaire in the envelope provided and deposit it into the sealed box. This is provided in your department staff room.

Thanking you,

Ajoy Sunil Anbu

0879786472

The researcher
Confusion Assessment Method for the ICU (CAM-ICU) Flowsheet

Delirium can only be assessed in patients more alert than RASS -3 or SAS 3

1. Acute Change or Fluctuating Course of Mental Status:
   - Is there an acute change from mental status baseline? **OR**
   - Has the patient's mental status fluctuated during the past 24 hours?
   
   Yes → CAM-ICU negative
   
   NO DELIRIUM

2. Inattention:
   - "Squeeze my hand when I say the letter 'A.'"
   - Read the following sequence of letters: S A V E H A R T
     ERRORS: No squeeze with 'A' & Squeeze on letter other than 'A'
     - If unable to complete Letters → Pictures

   > 2 Errors → CAM-ICU Positive
   
   DELIRIUM Present

3. Altered Level of Consciousness
   
   Current RASS or SAS level

   RASS = 0 or SAS = 4

4. Disorganized Thinking:
   
   1. Will a stone float on water?
   2. Are there fish in the sea?
   3. Does one pound weigh more than two?
   4. Can you use a hammer to pound a nail?

   Command: "Hold up this many fingers" (Hold up 2 fingers)
   "Now do the same thing with the other hand" (Do not demonstrate)
   OR "Add one more finger" (If patient unable to move both arms)

   > 1 Error → CAM-ICU negative

   NO DELIRIUM

   0 - 1 Error → CAM-ICU negative

   NO DELIRIUM

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Source: Crit Care Med © 2013 Lippincott Williams & Wilkins
# Appendix 18 ICDSC Flow sheet

1. Altered level of consciousness. Choose one from A to E

<table>
<thead>
<tr>
<th>Option</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Exaggerated response to normal stimulation</td>
<td>SAS = 5, 6, 7 or RASS = +1 to +4 (1 point)</td>
</tr>
<tr>
<td>B. Normal wakefulness</td>
<td>SAS = 4 or RASS = 0 (0 points)</td>
</tr>
<tr>
<td>C. Response to mild or moderate stimulation (follows commands)</td>
<td>SAS = 3 or RASS = −1 to −3 (1 point)</td>
</tr>
<tr>
<td>D. Response only to intense and repeated stimulation (e.g., loud voice and pain)</td>
<td>SAS = 2 or RASS = −4 Stop assessment*</td>
</tr>
<tr>
<td>E. No response</td>
<td>SAS = 1 or RASS = −5 Stop assessment*</td>
</tr>
</tbody>
</table>

2. Inattention (1 point if any present)

<table>
<thead>
<tr>
<th>Option</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Difficulty in following commands or</td>
<td></td>
</tr>
<tr>
<td>B. Easily distracted by external stimuli or</td>
<td></td>
</tr>
<tr>
<td>C. Difficulty in shifting focus</td>
<td></td>
</tr>
</tbody>
</table>

*Does the patient follow you with their eyes?*

3. Disorientation (1 point for any abnormality)

<table>
<thead>
<tr>
<th>Option</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Mistake in either time, place, or person</td>
<td></td>
</tr>
</tbody>
</table>

*Does the patient recognize ICU caregivers who have cared for him/her and not recognize those who have not? What kind of place are you in? (list examples)*

4. Hallucinations or delusions (1 point for either)

<table>
<thead>
<tr>
<th>Option</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Hallucination or delusion that is not there with no stimulus</td>
<td></td>
</tr>
<tr>
<td>B. Delusions or gross impairment of reality testing (delusion = false belief that is fixed/unchanging)</td>
<td></td>
</tr>
</tbody>
</table>

*Any hallucinations now or over past 24 hr? Are you afraid of the people or things around you? (Fear that is inappropriate to the clinical situation)*

5. Psychomotor agitation or retardation (1 point for either)

<table>
<thead>
<tr>
<th>Option</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Hyperactivity requiring the use of additional sedation or restraints in order to control potential danger (e.g., pulling IV catheters out or hitting staff)</td>
<td></td>
</tr>
<tr>
<td>B. Hypoactive or clinically noticeable psychomotor slowing or retardation</td>
<td></td>
</tr>
</tbody>
</table>

*Based on documentation and observation over shift by primary caregiver*

6. Inappropriate speech or mood (1 point for either)

<table>
<thead>
<tr>
<th>Option</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Inappropriate, disorganized, or incoherent speech or</td>
<td></td>
</tr>
<tr>
<td>B. Inappropriate mood related to events or situation</td>
<td></td>
</tr>
</tbody>
</table>

*Is the patient apathetic to current clinical situation (i.e., lack of emotion)?*  
*Any gross abnormalities in speech or mood? Is patient inappropriately demanding?*

7. Sleep/wake cycle disturbance (1 point for any abnormality)

<table>
<thead>
<tr>
<th>Option</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Sleep &lt; 4 hr at night or</td>
<td></td>
</tr>
<tr>
<td>B. Waking frequently at night (do not include wakefulness initiated by medical staff or loud environment) or</td>
<td></td>
</tr>
<tr>
<td>C. Sleep &gt; 4 hr during day</td>
<td></td>
</tr>
</tbody>
</table>

*Based on primary caregiver assessment*

8. Symptom fluctuation (1 point for any)

<table>
<thead>
<tr>
<th>Option</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Any fluctuation of any of the above items (i.e., 1–7) over 24 hr (e.g., from one shift to another)</td>
<td></td>
</tr>
</tbody>
</table>

*Based on primary caregiver assessment*

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*Delirium assessment can not be completed in patients who are stuporous or comatose.  
SAS = Richmond Agitation Sedation Scale, NASS = Richmond Agitation Sedation Scale,  
# Appendix 19  RASS Flow sheet

## Richmond Agitation Sedation Scale (RASS) *

<table>
<thead>
<tr>
<th>Score Term</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>+4</td>
<td>Combative</td>
</tr>
<tr>
<td>+3</td>
<td>Very agitated</td>
</tr>
<tr>
<td>+2</td>
<td>Agitated</td>
</tr>
<tr>
<td>+1</td>
<td>Restless</td>
</tr>
<tr>
<td>0</td>
<td>Alert and calm</td>
</tr>
<tr>
<td>-1</td>
<td>Drowsy</td>
</tr>
<tr>
<td>-2</td>
<td>Light sedation</td>
</tr>
<tr>
<td>-3</td>
<td>Moderate sedation</td>
</tr>
<tr>
<td>-4</td>
<td>Deep sedation</td>
</tr>
<tr>
<td>-5</td>
<td>Unarousable</td>
</tr>
</tbody>
</table>

### Procedure for RASS Assessment

1. Observe patient
   a. Patient is alert, restless, or agitated.  \((\text{score } 0 \text{ to } +4)\)

2. If not alert, state patient’s name and say to open eyes and look at speaker.
   b. Patient awakens with sustained eye opening and eye contact.  \((\text{score } -1)\)
   c. Patient awakens with eye opening and eye contact, but not sustained.  \((\text{score } -2)\)
   d. Patient has any movement in response to voice but no eye contact.  \((\text{score } -3)\)

3. When no response to verbal stimulation, physically stimulate patient by shaking shoulder and/or rubbing sternum.
   e. Patient has any movement to physical stimulation.  \((\text{score } -4)\)
   f. Patient has no response to any stimulation.  \((\text{score } -5)\)

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Appendix 20  Letter(s) to ADON/CNM

01-03-2014

Galway city

TO:

Ms XXX
Clinical Nurse Manger
Intensive care unit,
XXXHospital
XXX

Re: Proposed research on Delirium Assessments in Intensive Care Units.

Dear XXX,

Please find information posters enclosed herewith for all the nurses in ICU/HDU.

I am grateful, if you grant permission for displaying the posters on the noticeboard for staff nurses so that they will be well informed in advance about making a decision to take part in the study. I am hoping to make visit to XXX hospital after XX March XXX to discuss any issues if arises.

Please feel free to contact me if there is any questions/clarifications needed regarding the study

Thanking you

Yours sincerely,

Ajoy Sunil Anbu
67, Bun a Cnoic
Rahoon
Galway city
Mobile 0879786472