SLEEP DURING AND AFTER CARDIOTHORACIC INTENSIVE CARE AND PSYCHOLOGICAL HEALTH DURING RECOVERY

NITTAYA CARUANA, RN, ICU CERT.

A thesis submitted in accordance with the total requirements for admission to the degree of Master of Nursing (Research)

Faculty of Health

University of Technology Sydney

February 2016
Certificate of authorship/originality

I certify that the work in this thesis has not been previously submitted for a degree nor has it been submitted as part of the requirements for a degree except as fully acknowledged within the text.

I also certify that the thesis has been written by me. Any help I have received in my research work and in the preparation of this thesis has been acknowledged. In addition, I certify that all the information sources and literature used are indicated in the thesis.

Signature of candidate
Acknowledgements

This study has involved numerous people to whom I am deeply grateful. I sincerely thank my supervisors, Professor Sharon McKinley, Doctor Rosalind Elliott and Doctor Leila Gholizadeh, who passionately offered support, motivation, encouragement, comment and guidance. I appreciated all your time and effort in providing long-distance support toward finishing this thesis to a high standard. I thank the staff at Royal North Shore Hospital intensive care unit and cardiothoracic surgery ward for their support during data collection.

I am grateful for Giselle Alegria for proof reading the draft of my thesis. My sincere appreciation goes to the intensive care unit patients who spent time in answering questionnaires patiently. Also I am thankful for your concerns of my wellbeing during data collection for being in the third trimester of pregnancy.

To my husband and children (Michael, Talay and Mali Caruana), I am so grateful to have you by my side. I have no word to describe how important your support is to me especially during the candidature. Although, getting married, having one child and then another, renovating our house, moving interstate, changing job, getting sick and building a house were unforeseeable when I commenced this study, I believe our team work got much stronger now than ever. I thank my parent for the pray that keeps me calm and the courage you have instilled in me.
# Contents

Acknowledgements ............................................................................................................................. ii

List of Tables ......................................................................................................................................... vi

List of Figures .......................................................................................................................................... vi

Abstract .................................................................................................................................................. vii

1 Introduction and literature review .................................................................................................. 1

1.1 Introduction ..................................................................................................................................... 1

1.2 Stages and architecture of normal sleep ...................................................................................... 3

1.3 Sleep function ................................................................................................................................. 5

1.4 Patients’ sleep measurements in the intensive care unit .............................................................. 6

1.5 Patients’ sleep in the intensive care unit ....................................................................................... 8

1.6 Problems experienced by former ICU patients ........................................................................... 11

1.7 Cardiothoracic ICU patients ......................................................................................................... 13

1.8 Summary of findings in the literature ........................................................................................... 17

1.9 Outline of the thesis ....................................................................................................................... 18

2 Method ................................................................................................................................................ 19

2.1 Introduction ..................................................................................................................................... 19

2.2 Research question and study aims ................................................................................................. 19

2.3 Study design .................................................................................................................................... 20

2.4 Definitions of key terms .................................................................................................................. 20

2.5 Study setting .................................................................................................................................... 21

2.6 Sample .......................................................................................................................................... 22

2.7 Study instruments ........................................................................................................................... 24

2.7.1 The Insomnia Severity Index (ISI) .......................................................................................... 27

2.7.2 The Richards-Campbell Sleep Questionnaire (RCSQ) ........................................................... 27

2.7.3 Sleep in the Intensive Care Unit Questionnaire (SICQ) ......................................................... 28

2.7.4 The Pittsburgh Sleep Quality Index (PSQI) ............................................................................ 28

2.7.5 The Intensive Care Experience Questionnaire (ICEQ) ......................................................... 29

2.7.6 The Depression Anxiety Stress Scales instrument (DASS-21) .............................................. 30

2.7.7 The Post-traumatic Stress Disorder Checklist for Specific Event (PCL-S) ................................ 30

2.7.8 The Medical Outcomes Trust Short Form-36 (SF-36) .......................................................... 31

2.8 Data collection ................................................................................................................................. 32

2.8.1 Data collection in the ICU ....................................................................................................... 32
2.8.2 Data collection in hospital ward ................................................................. 32
2.9 Data analysis .................................................................................................. 33
2.10 Ethical considerations .................................................................................. 34
3 Results ................................................................................................................. 36
  3.1 Introduction ................................................................................................. 36
  3.2 Participants ................................................................................................. 37
  3.3 Participant characteristics ......................................................................... 39
  3.4 Subjective sleep outcomes ........................................................................ 41
    3.4.1 Subjective sleep outcome scores ......................................................... 41
    3.4.2 Subjective sleep outcome categorised by cut points ......................... 42
  3.5 Intensive Care Experience ....................................................................... 44
  3.6 Psychological outcomes ............................................................................ 44
  3.7 A comparison of the experience of treatment in the ICU and psychological
      wellbeing during recovery for patients who reported poor and good quality
      sleep in the cardiothoracic ICU .................................................................... 45
  3.8 Factors related to patients' sleep quality at six months .......................... 47
  3.9 Comparison of sleep quality, the experience of treatment in the ICU and
      psychological outcomes during recovery for patients who had on-pump and off-
      pump open-heart surgery ............................................................................ 45
  3.10 Summary of main findings .................................................................... 51
4 Discussion and conclusion .................................................................................. 53
  4.1 Introduction ................................................................................................ 53
  4.2 Summary of the outcomes of the literature review ................................. 53
  4.3 Summary of major findings ...................................................................... 54
  4.4 Strengths and limitations of the study ..................................................... 61
  4.5 Recommendations for clinical practice ................................................... 62
  4.6 Recommendations for future research .................................................... 63
  4.7 Conclusion ............................................................................................... 64
5. References ......................................................................................................... 66
APPENDIX A: Participant information statement and consent form .......... 76
APPENDIX B: Patient information and data collection forms .............. 81
APPENDIX C: Insomnia Severity Index (ISI) ............................................... 83
APPENDIX D: Richards-Campbell Sleep Questionnaire (RCSQ) ............ 85
APPENDIX E: Sleep in the Intensive Care Unit Questionnaire (SICQ).............................. 86
APPENDIX F: Pittsburgh Sleep Quality Index (PSQI)............................................................. 88
APPENDIX G: Intensive Care Experience Questionnaire (ICEQ)........................................ 90
APPENDIX H: Depression Anxiety Stress Scales instrument (DASS-21)......................... 92
Appendix I: Post-traumatic Stress Disorder Checklist for Specific Event (PCL-S)...... 93
Appendix J: The Medical Outcomes Trust Short Form-36 (SF-36) ................................. 94
APPENDIX K: Human Research Ethics Committee approval .............................................. 98
APPENDIX L: Cover letter to accompany questionnaires completed at home .......... 102
List of Tables

Figure 1. Flow chart showing the recruitment and retention of study participants. 38

List of Tables

Table 1. The stages and architecture of normal sleep ................................. 4
Table 2. Summary of reported abnormalities in the ICU ........................................... 9
Table 3. Subjective sleep measurement report summary ..................................... 10
Table 4. Common factors affecting ICU sleep quality ........................................ 11
Table 5. Summary of problems experienced by recovering ICU patients ................. 12
Table 6. Instruments and time lines .................................................................... 26
Table 7. Selected demographic and clinical characteristics of patients on enrolment (n=101) ................................................................................................. 40
Table 8. Subjective sleep outcome scores .......................................................... 41
Table 9. Subjective sleep data categorised by cut points ................................... 43
Table 10. Domain IECQ score ............................................................................ 44
Table 11. Depression, anxiety, stress, posttraumatic stress symptoms and HRQOL at six months after discharge from hospital ............................................................................. 45
Table 12. The experience of treatment in the ICU and psychological wellbeing during recovery for patients who reported poor and good quality sleep in the cardiothoracic ICU .. 46
Table 13. Factors related to patient’s sleep quality at six months (bivariate comparisons) ... 48
Table 14. Independent associations with sleep quality* six months after discharge from hospital ........................................................................................................ 49
Table 15. Sleep quality, the experience of treatment in the ICU and psychological outcomes during recovery for patients who had on-pump and off-pump open-heart surgery .......... 50
Abstract

The research in this thesis investigated sleep and recovery in coronary artery bypass graft (CABG) patients during and after Intensive Care Unit (ICU) treatment. Intensive care patients and former ICU patients experience sleep disruption and poor sleep quality. Psychological distress, including depression, anxiety, stress and symptoms of posttraumatic stress disorder (PTSD), and diminished health-related quality of life (HRQOL) are common among former ICU patients. Few previous studies employed longitudinal analysis to explore continuity of problems related to sleep disruption and poor sleep quality, and whether patients who experience sleep problem in ICU continue to have sleep problems during recovery. Few studies have compared sleep between on-pump and off-pump open-heart surgery patients. The main reason for adult ICU admission in Australia is CABG surgery. Therefore cardiothoracic ICU patients were the focus of this study. The broad aim was to determine any association between sleep disruption in the cardiothoracic ICU and during recovery, and patients’ psychological wellbeing and HRQOL during recovery.

One-hundred and one ICU patients who had undergone CABG surgery completed self-report questionnaires on their sleep quality in ICU, on the ward, and at two and six months after discharge; prehospital sleep state was retrospectively reported while in ICU. Perception of the ICU experience was assessed at two months after discharge, and psychological health and HRQOL six months after discharge using validated instruments.

Descriptive and multivariate statistical analyses revealed that patients had a mean age of 66.60±11.07 years, 78% were male and the median ICU stay was two days. In ICU, 76.0% of patients reported poor sleep quality, 71.9% in the ward, and 68.4% and 62.0% at two and six months after discharge; 11.9% of patients had poor sleep at all time points. Six months after hospital discharge there was a positive relationship between poor sleep quality and lower psychological wellbeing and lower HRQOL six months after discharge, but not on-pump versus off-pump open heart surgical technique.

In conclusion, it has been shown in this thesis that the quality of sleep of a substantial proportion of postoperative CABG patients is often poor in ICU, in hospital and up to six months after hospital discharge. This was associated with physical and mental aspects of HRQOL six months after discharge, but not with whether surgery was performed on or off cardiopulmonary bypass.