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Research paper

Factors influencing quality of sleep among non-mechanically ventilated patients in the Intensive Care Unit

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ABSTRACT

Aim: To investigate the self-reported quality of sleep of non-mechanically ventilated patients admitted to an ICU, and to identify barriers to sleep in this setting.
Method: Patients admitted to the ICU of Frankston Hospital over a two month period who had spent at least one night in the ICU, and had not received mechanical ventilation were surveyed as they were discharged from the ICU. This survey required patients to rate the quality of their sleep in the ICU and at home immediately prior to hospitalisation on a 10 cm visual analogue scale; and to identify perceived barriers to sleep in the ICU and at home prior to hospitalisation.
Results: 56 respondents were surveyed during the study period. Median age was 74 years (range = 18–92 years); median ICU length of stay was 1 day (range = 1–7 days).

Overall, respondents rated their quality of sleep in ICU (median = 4.9/10) as significantly worse than at home immediately prior to ICU admission (median = 7.15/10; $Z = -3.02$, $p < 0.002$); however 44% of respondents rated their quality of sleep in ICU as better, or no worse, than at home immediately prior to hospitalisation. Sub-group analysis revealed that among patients with reduced quality of sleep (<5/10) prior to hospitalisation, 71.4% rated their quality of sleep in ICU as better, or no worse, than at home prior to hospitalisation, with no significant difference between sleep quality ratings in ICU and at home ($p = 0.341$).

Respondents identified the following as barriers to sleep in the ICU: noise levels overnight (53.6%); discomfort (33.9%); pain (32.1%); being awoken for procedures (32%); being attached to medical devices (28.6%); stress/anxiety (26.8%); and light levels (23.2%).
Conclusion: Pre-hospitalisation sleep quality appears to be an important influence on sleep in ICU. Many barriers to sleep in the ICU identified by respondents are potentially modifiable.

1. Introduction

Sleep has long been recognised as essential for good health, allowing for both physical and psychological restoration and recovery from illness. Poor quality sleep has been associated with impaired immune function and associated susceptibility to illness and infection, decreased energy levels, delirium, delays in recovery, and disturbed cognitive, respiratory, cardiac, and endocrine function.[1,2] Good-quality sleep is therefore an important part of recovery from critical illness.

Numerous studies have reported that patients admitted to ICU regularly experience reduced quality and duration of sleep with frequent awakenings and loss of circadian rhythm.[1–5] The environment of the Intensive Care Unit (ICU) itself poses numerous barriers to sleep.[2,3,6,7] Critically ill patients admitted to the ICU are subject to disrupted day/night routine, high levels of noise (e.g. staff conversations and alarms) and light levels overnight, invasive and painful procedures, noxious smells, numerous physical restraints (such as monitor leads, catheters, and oxygen masks or mechanical ventilation), and stress, in addition to illness and pain associated with their health condition.[1,7–9]

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Research utilising self-report measures has consistently found that patients experience poor quality of sleep (QoS) and increased daytime sleepiness whilst in the ICU.[1,3,7,10] These findings have been largely attributed to the nature of the ICU environment and the numerous barriers posed to sleep by routine care in this setting.

Few studies have attempted to examine and account for the quality and patterns of patients' sleep prior to ICU admission. Chronic illness and pain may predispose individuals to poor sleep prior to ICU admission, and inadequate or fragmented sleep may exacerbate the acute deterioration of an individual's health state, necessitating hospitalisation.[3,11] Bihari and colleagues[3] found that QoS at home prior to ICU admission was a significant predictor of QoS in the ICU; however QoS at home only accounted for 6% of variability in reported sleep quality throughout ICU stay. This relationship is further called into question by Ehlers and colleagues,[7] who found that 82% of ICU patients reported that they slept well or 'very well' at home, despite 71% reporting inadequate sleep in the ICU. It is therefore important to investigate whether individuals admitted to the ICU have poor baseline sleep quality preceding ICU admission, in order to better-account for the influence of the ICU environment on the quality of patients' sleep.

This study aims to examine the self-reported QoS of non-mechanically ventilated patients admitted to the ICU of Frankston Hospital (Victoria, Australia), particularly in relation to their pre-hospitalisation QoS. This study also aims to examine the factors identified by patients as barriers to gaining sufficient sleep whilst in the ICU.

2. Method

2.1. Ethics

Ethical approval for this project was granted by the Low Risk Research Sub-committee of the Peninsula Health Human Research Ethics Committee (ref.: LRR/14/PH/13).

2.2. Study design and setting

Frankston Hospital ICU is a 15-bed Level-3 Metropolitan medical and surgical ICU located in Victoria, Australia. Approximately 1100 patients are treated in this ICU each year, of which approximately 60% do not require mechanical ventilation.

2.3. Participant population and data collection

All adult (≥18 years) patients admitted to the ICU of Frankston Hospital (Victoria, Australia) during July and August 2014, that had spent at least one night in the ICU, and had not received mechanical ventilation during their ICU stay were eligible for participation. Patients that had already participated in the survey that were readmitted to the ICU during the study period were not asked to complete the survey again. Patients that had received mechanical ventilation whilst in ICU were excluded due to the confounding nature of sedation on sleep.

During this study period 186 patients were admitted to the ICU, 107 of which (57.5%) met inclusion criteria (Fig. 1).

A convenience sample of 56 patients admitted to the ICU of Frankston Hospital was surveyed over the two-month study period. This is an approximate response rate of 52.3%.

2.4. Instruments

Survey packs consisted of three pages: a nursing screening checklist; an information sheet for participants; and the participant survey. These packs were attached to ICU discharge documentation during the study period.

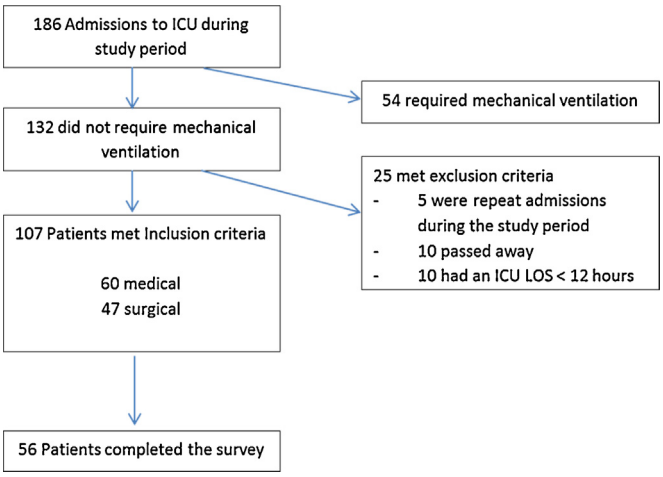

Fig. 1. Participant recruitment diagram.

Once patients were deemed fit for discharge from ICU, nurses were asked to screen their patient for eligibility. If the patient was determined to be eligible, they were asked to remove the first page and provide the patient with the information sheet and survey.

The first page, to be completed by nursing staff, consisted of a screening checklist of participant inclusion and exclusion criteria (listed above), and questions related to the demographic information of any patients that decided to participate in this survey. Demographic information included the patient's age; gender; ICU length of stay; whether the participant had received any steroids, benzodiazepines, opiates, beta-blockers, other sedatives, or anti-depressants/anti-psychotics during their ICU stay; whether the patient was diagnosed with delirium during their ICU stay; and their current delirium status, as assessed by their most recent Confusion Assessment Method for the ICU[12,13] (CAM-ICU) screening. The CAM-ICU is part of routine nursing care in this ICU, and all bedside nurses are familiar with its use.

The participant information sheet and survey were provided to patients that were deemed to be eligible for participation in this study. The information sheet outlined the purposes of the study, that all responses were anonymous and strictly voluntary, and details of the ethical review process. It was made clear that a decision to complete and return the survey would be considered as informed consent for their responses to be recorded and used as outlined.

The patient survey consisted of 10 questions regarding the participants' sleep in the ICU and at home immediately prior to hospitalisation. Patients were asked to indicate whether they managed to get enough sleep in these settings; how many hours they slept on average at home immediately prior to hospital admission; and to rate the QoS in ICU and at home using a visual analogue scale. This scale was 10 cm long and ranged from "worst possible sleep" (0 cm) to "Good quality sleep" (10 cm). This was adapted from the Richards-Campbell Sleep Questionnaire[14] with question text adapted to better suit the aims of this study.

Patients were also asked to identify barriers to their sleep in ICU and at home; to report whether they were using any of a number of medications in the fortnight prior to hospital admission that have been associated with disrupted sleep (e.g. sleeping tablets, painkillers, anti-histamines, beta-blockers, etc.); and whether they experienced any comorbidities that have been associated with disturbed sleep (including depression, anxiety, chronic pain, or insomnia). Participants were also asked to indicate whether they had experienced any delirium symptomology (i.e. confusion, disorientation, memory problems, hallucinations) during their ICU stay. For each of these items, participants selected from a list of