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Clinical practices to promote sleep in the ICU: A multinational survey

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ABSTRACT

Purpose: To describe sleep assessment and strategies to promote sleep in adult ICUs in ten countries.
Methods: Multicenter, self-administered survey sent to nurse managers.
Results: Response rate was 66% with 522 ICUs providing data. 'Lying quietly with closed eyes' was the characteristic most frequently perceived as indicative of sleep by > 60% of responding ICUs in all countries except Italy. Few ICUs (9%) had a protocol for sleep management or used sleep questionnaires (1%). Compared to ICUs in Northern Europe, those in central Europe were more likely to have a sleep promoting protocol ($p < 0.001$), and to want to implement a protocol ($p < 0.001$). In > 80% of responding ICUs, the most common non-pharmacological sleep-promoting interventions were reducing ICU staff noise, light, and nurse interventions at night; only 18% used earplugs frequently. Approximately 50% of ICUs reported sleep medication selection and assessment of effect were performed by physicians and nurses collaboratively. A multivariable model identified perceived nursing influence on sleep decision-making was associated with asking patients or family about sleep preferences ($p = 0.004$).
Conclusions: We found variation in sleep promotion interventions across European regions with few ICUs using sleep assessment questionnaires or sleep promoting protocols. However, many ICUs perceive implementation of sleep protocols important, particularly those in central Europe.

What is already known about the topic?

- Sleep disturbances are common in critically ill patients treated in the intensive care unit (ICU) and may persist after ICU discharge.
- International data describing sleep assessment and promotion practices in the adult ICU is scarce.

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- The ICU inter-professional team plays an important role in sleep assessment and use of sleep promoting strategies.

What this paper adds

- This paper describes international sleep practices in the ICU with a focus on Europe.
- We found international infrequent use of objective tools to assess sleep and low adoption of sleep protocols whereas many ICUs perceive implementation of sleep protocols important, particularly those in central Europe.
- This paper provides evidence that in those ICUs with high levels of perceived nursing influence, patients were more likely to be asked about sleep preference, suggesting this is perceived an important assessment by nurses.

1. Introduction

Sleep disturbances are common in critically ill patients during intensive care unit (ICU) admission and may persist or develop after critical illness (Pisani et al., 2015). The relationship between the poor sleep in critically ill patients and their long-term outcome remains unknown (Pisani et al., 2015). Critically ill patients report sleep disturbance as one of the biggest causes of stress while in the ICU (Rotondi et al., 2002; Nicolas et al., 2008; Little et al., 2012). Sleep is important for overall well-being, while sleep-related problems may persist after ICU discharge (McKinley et al., 2012; Orwelius et al., 2008). Sleep in the ICU is often fragmented and disrupted (Cooper et al., 2000) which may be exacerbated by sedative medications (Pandharipande and Ely, 2006). Other factors that may contribute to sleep abnormalities in critically ill patients include pain and discomfort, excessive light and noise during the night interrupting circadian rhythm, delirium, and mechanical ventilation (Cooper et al., 2000). Effective interventions to promote a normal sleep-wake cycle for critically ill patients are needed. In particular, non-pharmacological strategies without the side effect profile of pharmacological interventions should be prioritized (Hu et al., 2015). However, little international data describes sleep assessment and promotion practices in the adult ICU. Understanding sleep in the critically ill is hampered by the fact that it is difficult to distinguish sleep from sedation and that sedation may be used to promote sleep. Little is known about clinical roles and responsibilities regarding key sleep practices to promote patient sleep and related contextual factors that may influence the quality of sleep of ICU patients. A better understanding of sleep in adult ICUs from an international perspective might help to identify best practices that may then be translated across different ICU contexts (Wheelan et al., 2003). Therefore, we conducted this study with the aim of describing clinical practices used to promote sleep in the adult ICUs of ten countries. A secondary aim was to evaluate roles and responsibilities of the ICU interprofessional team in relation to key sleep promoting decisions. We hypothesized that substantial variation would exist between countries with respect to sleep practices, and roles and responsibilities.

2. Materials and methods

2.1. Design and setting

We conducted a multicenter, self-administered survey sent to nurse managers of adult ICUs across 10 countries. In most participating countries, nurse managers of *all* adult ICUs were approached to participate (Poland, Denmark, Cyprus, Greece, Norway, Sweden, the Netherlands, UK) (except Scotland). In other countries, nurse managers of ICUs either within a region of the country (e.g. Italy: Piedmont and Valle D'Aosta, Canada: Ontario), or in all regions, but not all hospitals (Germany) due to inability to obtain nurse manager contact details, were invited to participate. Nurse managers were specifically directed to discuss the questionnaire with other senior ICU nurses to improve the validity of data provided.

2.2. Survey development

In discussion with country lead investigators, we reviewed our previously developed Dutch survey of sleep practices (Hofhuis et al., 2012) and iteratively modified to include contextually relevant items applicable to participating countries. Additionally, we performed a search in PUBMED and EMBASE databases using the terms: "sleep", or "sleep practices", and "intensive care" to capture recent issues relevant to sleep practices. Co-investigators iteratively refined survey items via email and teleconference discussion for face and content (validity of survey). The final survey was translated from Dutch into English and then back translated by an experienced translator in consultation with two clinical experts. For administration in non-English speaking countries, the survey was translated and back translated by an experienced native translator, in consultation with the lead investigator for that country (electronic Supplementary material- ESM-1).

2.3. Survey

The final survey (ESM-2) comprised several domains and items addressing recognition of sleep in the critically ill, frequency (never to routinely) of use of current sleep practices, roles and responsibilities in terms of decision making related to sleep, and nursing autonomy and influence on sleep practices in the ICU. After discussion with their senior nursing team, ICU nurse managers were asked to rate perceived patient sleep quality on a 0 (very poor) to 10 (excellent) numeric scale and perceived nursing autonomy and influence on a 0 (no autonomy or influence) to 10 (complete autonomy or influence) numeric scale.

2.4. Data collection

Research Ethics approval for survey conduct was obtained according to the requirements of each country. Return of survey was considered indicative of consent. In each country, a lead investigator coordinated survey distribution and reminders. The survey was distributed in 2014–2015 via mail (Netherlands), email (Germany, Denmark, Cyprus, Greece, Italy, Norway, Sweden, Canada), or as a link hosted on professional society websites (UK, Poland). Prior to survey distribution, each ICU was contacted by telephone to determine the most appropriate senior nurse with whom to correspond. One to four survey completion reminders (varied across countries) were sent via mail, email, or telephone every two to four weeks.

2.5. Data management

Survey data were checked and entered into a specifically designed excel database by the lead investigator for each country and then sent to the coordinating center in the Netherlands for cleaning and analysis (JH, PS).

2.6. Data analysis

We collapsed Likert scale questions with five responses into two nominal categories: frequently (frequently/often/routinely) and seldom (never/seldom). Continuous data such as characteristics of participating ICUs, staffing, and total scores of numeric scales are expressed as medians and interquartile range (IQR) due to non-normal distribution; counts and proportions for categorical data. We used Kruskal-Wallis tests to compare responses between countries described by continuous data and Chi square or Fisher exact tests, if applicable, for categorical data. For yes/no questions related to sleep/sedation practices we reported the "percent" as opposed to the "valid percent" i.e. calculated excluding missing values under the assumption that participants who