INTEGRATIVE LITERATURE REVIEW ARTICLE

QUALITY OF SLEEP IN INTENSIVE CARE UNITS: A LITERATURE REVIEW

QUALIDADE DO SONO EM UNIDADES DE TERAPIA INTENSIVA: UMA REVISÃO DE LITERATURA

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ABSTRACT

Objective: to conduct a literature review of scientific production published in the last 10 years, related to sleep quality and factors that interfere in adult ICU patients. Method: this is an integrative review of the literature in PubMed using the key words intensive care, intensive care units and sleep. Found at first 265 items, applying the boundaries of research (human past 10 years, english and spanish) were found 117 articles, but 13 studies met the criteria. Results: analysis of results emerged categories: factors that affect the sleep of critically ill patients; consequences and effects of sleep deprivation; and strategies. Conclusion: The disturbed sleep pattern of the patient is still a critical focus little attention by health professionals, especially nursing, and thus this important event is being neglected. By understanding the physiology of the sleep cycle, ways to promote rest and relaxation and sleep, nurses can minimize the factors that disturb sleep in ICU patients and avoid the possible negative effects that sleep deprivation leads to the patient. Descriptors: intensive care; intensive care units; sleep.

RESUMO

Objetivo: realizar revisão de literatura sobre produções científicas publicadas nos últimos 10 anos, relacionada à qualidade do sono e fatores que o interferem nos pacientes internados em UTI adulto. Método: trata-se uma revisão integrativa da literatura realizada no PubMed, utilizando os descritores intensive care, intensive care units e sleep. Foram encontrados em um primeiro momento 265 artigos; aplicando os limites da pesquisa (humanos, últimos 10 anos, inglês e espanhol) foram encontrados 117 artigos, porém 13 estudos atenderam aos critérios estabelecidos. Resultados: da análise dos resultados emergiram as categorias: fatores que interferem no sono do paciente crítico; consequências e efeitos da privação do sono; e estratégias. Conclusão: os distúrbios no padrão de sono do paciente crítico constituem ainda um foco de pouca atenção pelos profissionais da saúde, especialmente pela enfermagem, e com isso essa importante ocorrência está sendo negligenciada. Ao compreender a fisiologia do ciclo de sono, descanso e formas de promover relaxamento e sono, os enfermeiros podem minimizar os fatores que perturbam o sono em pacientes internados em UTI e evitar os possíveis efeitos negativos que a privação do sono acarreta para o paciente. Descritores: cuidados intensivos; unidades de terapia intensiva; sono.

RESUMEN

Objetivo: realizar una revisión bibliográfica de la producción científica publicada en los últimos 10 años, relacionados con la calidad del sueño y factores que influyen en los pacientes ingresados en la UCI adultos. Método: se trata de una revisión integradora de la literatura en PubMed usando las palabras claves de cuidados intensivos, unidades de cuidados intensivos y el sueño. Encontrado en un primer momento 265 artículos, la aplicación de las fronteras de la investigación (humanos últimos 10 años, inglés y español) se encontraron 117 artículos, pero 13 estudios cumplieron los criterios. Resultados: el análisis de los resultados surgieron categorías: factores que afectan el sueño de los pacientes en estado crítico; las consecuencias y efectos de la privación del sueño; y estrategias. Conclusión: El patrón de sueño alterado del paciente sigue siendo objeto de atención crítica poco a profesionales de la salud, en especial de enfermería, por lo que este importante evento que se descuida. Mediante la comprensión de la fisiología del ciclo del sueño, las formas de promover el descanso y la relajación y el sueño, las enfermeras pueden reducir al mínimo los factores que perturban el sueño en pacientes de UCI y evitar los posibles efectos negativos que la falta de sueño conduce a la paciente. Descriptores: cuidados intensivos; unidades de cuidados intensivos; el sueño.

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INTRODUCTION

Defined as a complex state of apparent periodic and normal rest, qualitatively and quantitatively variable, sleep is characterised by the partial suspension of the perception of environmental factors and voluntary motility.1

In that sense, sleep is a peculiar state of consciousness, different from coma and anaesthesia as it is functional and regular, that is, spontaneously reversible and recurrent. It is important to highlight that the sleeping period is very important, because many metabolic and physiological changes occur during this period and interfere with the proper performance of organic functions.1

It is understood that there are changes occurring in the ICUs, and patients’ stress-related demands have been discussed and heeded4. Available studies show that approximately 60% of patients who pass through an intensive care unit complain of sleep disorders due to poor quality of sleep during hospitalisation.3

In this scenario, numerous sources causing sleep patterns alterations can be identified, including endogenous factors like the severity of the disease and exogenous factors such as environmental conditions, medications and sedation.4

Assessing and mitigating sleep disorders becomes difficult due to their complex natures. The very fact that the causes are multifactorial and affects almost all body systems makes it a challenging interdisciplinary syndrome. Prolonged experiences of sleep deprivation can affect the body’s defence mechanisms, decreasing responses against injury and illness. These effects may impair weaning from mechanical ventilation, delay recovery and lessen the chances of positive outcomes related to therapy.3

Considering that the vast majority of patients admitted to the Intensive Care Unit (ICU) have altered sleep patterns, and that the consequences of this change can range from a delay in the recovery of these patients to death, together with the involvement of nursing staff dealing directly with the patient, identifying and minimising potential consequences, the relevance of this study can be justified.

FROM these considerations, our question emerges: what constitutes the scientific literature on sleep quality and its interfering factors in patients in intensive care units?

This study’s main objective is to conduct a literature review of scientific production published in the last 10 years related to sleep quality and its interfering factors in adult ICU patients.

METHODOLOGY

This is an integrative literature review, a research method that allows the incorporation of evidence into clinical practice in order to gather and synthesise research findings on a specific issue or question, in a systematic and orderly way.6,7

The survey of scientific production related to sleep quality and its interfering factors in adult ICU patients was conducted using the PUBMED database for the period October-November 2010.

In the virtual research, the following descriptors found in MESH were used: intensive care, intensive care units and sleep, finding at first 265 articles; applying the limits of research (humans, past 10 years, English and Spanish) 117 articles were found, from which 37 were literature reviews. Thirteen studies were selected, of which 3 were analysed based on the abstract and 10 in full.

The sample comprised papers of original research and literature review of articles, experience reports and reflection study in English, Portuguese and Spanish.

RESULTS

Among the 13 reviewed studies, the journal with the most articles published was the Critical Care Journal, with three (23%), followed by Critical Care Nursing Quarterly, with two (15%). Other journals, such as Intensive and Critical Care Nursing, Chest Journal, Critical Care Nurse, Dimensions of Critical Care Nursing, Critical Care Clinics, Nursing in Critical Care, Current Opinion in Critical Care, Neurocritical Care Unit, published an article each (7.7%).
In examining Table 1, it was found that most of the studied articles were in journals specific to the critical care area, with only one of the journals covering other areas of health care (Chest Journal).

Of the 13 studies analysed, the following distribution of the last 10 years production was identified, according to Table 2.

It can be observed that there were few publications, only four (30%) before the year 2009, and in this year seven studies occurred (54%), the highest incidence.

In analysing the sample outlines and research methods, nine (69%) were classified as literature and bibliography review articles and the other studies were: one descriptive, (7.7%), one semi experimental (7.7%), one randomised (7.7%) and one non-informed (7.7%).

Studies which have a nurse as first author correspond to 30% of the sample (04). In the majority of the nine studies (69%) the professional status of their authors could not be identified.
Figure 1 shows the information about the article’s title, objectives and analysis unit.

<table>
<thead>
<tr>
<th>nº</th>
<th>Article’s title</th>
<th>Objectives</th>
<th>Analysis unit</th>
</tr>
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<tbody>
<tr>
<td>01</td>
<td>Factors that impact on sleep in intensive care patients</td>
<td>Identify factors that contribute to sleep disturbance, the strategies employed to evaluate and promote sleep, changes in the practice of sedation and its implications on sleep.</td>
<td>Factors that interfere with sleep, strategies employed, consequences and effects.</td>
</tr>
<tr>
<td>02</td>
<td>Sleep in the ICU: potential mechanisms and clinical implications</td>
<td>Describe characteristics of sleep physiology, emphasising the current knowledge of sleep in adult ICU patients, including recent investigations in patients requiring mechanical ventilation, the factors that affect sleep in critically ill patients and clinical implications of sleep disturbance.</td>
<td>Factors that interfere with sleep, consequences and effects.</td>
</tr>
<tr>
<td>03</td>
<td>Nighttime lighting in intensive care units</td>
<td>Answering the questions: - What is the total amount of time that patients in a Midwest surgical intensive care unit (SICU) are exposed to light radiation between 10:00 and 6:00? - What are the sources of this light? - What activities are or are not occurring in the hospital room while the lights are on?</td>
<td>Factors that interfere with sleep.</td>
</tr>
<tr>
<td>04</td>
<td>Nature’s nurse: promoting sleep in the ICU</td>
<td>Describe nursing interventions to help patients have adequate sleep.</td>
<td>Strategies used by nursing staff.</td>
</tr>
<tr>
<td>05</td>
<td>Sedation and sleep disturbances in the ICU</td>
<td>Review the common sleep disorders in the ICU, the relationship between sedation and sleep, and the effects of sedatives commonly used in natural sleep, through its acute effects and withdrawal.</td>
<td>Factors that interfere with sleep, consequences and effects.</td>
</tr>
<tr>
<td>06</td>
<td>Filtering out the noise: evaluating the impact of noise and sound reduction strategies on sleep quality for ICU patients</td>
<td>Knowing which factors are responsible for different results and limitations of existing studies, including the lack of attention to other acoustic parameters, as well as sound level, and the combined effects of different factors of sleep disturbance.</td>
<td>Factors that interfere with sleep, consequences and effects.</td>
</tr>
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<td>07</td>
<td>Clinical review: the impact of noise on patients’ sleep and the effectiveness of noise reduction strategies in intensive care units</td>
<td>Answering the questions: - Is noise the most detrimental factor to patients’ sleep in intensive care units? - Are strategies to reduce noise and reduce sleep disturbances effective?</td>
<td>Factors that interfere with sleep, strategies employed.</td>
</tr>
<tr>
<td>08</td>
<td>Earplugs improve patients’ subjective experience of sleep in critical care</td>
<td>Determine the effects of earplugs on the subjective experience of intensive care patients’ sleep.</td>
<td>Strategy employed.</td>
</tr>
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<td>09</td>
<td>Sleep in the Intensive Care Unit Setting</td>
<td>To analyse the effects of sleep deprivation and review an integrated approach on the treatment of sleep deprivation in patients with acute illness and being treated in intensive care unit (ICU).</td>
<td>Factors that interfere with sleep, consequences and effects.</td>
</tr>
<tr>
<td>10</td>
<td>Sleep disruption in the intensive care unit</td>
<td>To review studies that substantiate the existence of sleep disturbances in the ICU, to discuss the adverse effects of sleep disruption and recent strategies to improve sleep quality.</td>
<td>Factors that interfere with sleep, strategies employed, consequences and effects.</td>
</tr>
<tr>
<td>11</td>
<td>Bench-to-bedside review: delirium in ICU patients - importance of sleep deprivation</td>
<td>To review the clinical and neurobiological consequences of sleep deprivation and the possible relationship between sleep deprivation and delirium in intensive care patients.</td>
<td>Factors that interfere with sleep, consequences and effects.</td>
</tr>
<tr>
<td>12</td>
<td>Sleep deprivation among critical care patients</td>
<td>Understand and learn about the presence of environmental stressors on the sleep of critically ill patients and the effectiveness of the implementation of measures to promote sleep within the environment of intensive care unit.</td>
<td>Factors that interfere with sleep and strategies employed.</td>
</tr>
<tr>
<td>13</td>
<td>Quiet time: a nursing intervention to promote sleep in neurocritical care units</td>
<td>Determine whether the implementation of a quiet time, protocol for reducing the external stimuli of the environment, is associated with increased frequency of sleep among patients in a neurocritical care unit.</td>
<td>Strategies employed.</td>
</tr>
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</table>

**DISCUSSION**

The studies were carefully examined, culminating in the formation of thematic categories that were based on the primary focus of each study. Hence three categories...
emerged: factors that affect the sleep of critically ill patients, consequences and effects of sleep deprivation; strategies.

- Factors that affect the sleep of critically ill patients

According to the analysis of the studied material, 10 articles were found addressing the factors that interfere with the sleep of patients admitted to the ICU. Several factors were related to sleep disorders in critically ill patients, some specific to the environment, others in conjunction with the invasive nature of the ICU procedures. Evidence suggests that sleep disturbance is most likely due to a combination of intrinsic and external factors that influence patients differently, according to each particular circumstance. The same studies suggest that sleep quality depends on the severity and impact of individual disease, pain, medical and nursing procedures, mechanical ventilation, ICU environment (including noise) and pharmacological agents.

The ICU environment makes patients' sleep fragmented, due to the complexity of the assistance, physical structure, noise, and equipment. Some factors are not specific to the ICU (noise, light, etc.), although they are more intense and frequent in these units.

Research indicates that environmental stressors within the intensive care unit can have detrimental effects on patients' sleep.

Night lighting and a good night's sleep are essential for overall health and healing cannot occur without it. Future research may assist healthcare professionals in order to consider lighting as an important environmental factor in the regulation of normal circadian rhythm.

A study on sleep found that 40% of ICU patients' awakenings are caused by noise generated by conversations and activities of patient care, which make these very significant factors for sleep disturbances.

The literature shows noise as the most important cause for sleep disturbances in critically ill patients, while another six studies suggest that noise is only responsible for a small number of sleep interruptions. In two analysed studies, the levels of noise in the ICUs exceeded those recommended by the Environment Protection Agency.

However, researchers have suggested that articles using the experiences of patients as the main source to identify sleep interruptions may lead to inaccuracy, as most people have experienced sleep interruptions due to a noisy environment at some point in their lives, so patients may be more likely to attribute poor sleep quality in ICU to noise, rather than other factors that they could ignore, such as patient-ventilator asynchrony or the severity of their disease.

Besides the external factors that can cause sleep disruption in critically ill patients, the authors also emphasise intrinsic factors, such as anxiety, fear, disease and pain.

Several authors show that patient-ventilator asynchrony may also contribute to sleep disturbances. Finally, it is possible that some types of mechanical ventilation may be less harmful to the patients' sleep than others, as studies indicate that the support pressure appears to disrupt sleep less when compared to assisted ventilation in critical cardiac patients.

When compared to the use or not of mechanical ventilation, a study showed that both have short periods of sleep, and 50% of total sleep time occurs during the day. The factors that affect sleep in intubated patients include uncoordinated breathing, mode of ventilation, endotracheal tube discomfort and stress resulting from the inability to communicate with caregivers and relatives.

Subjacent to diseases, medications can also dramatically affect the patient's ability to sleep efficiently. Drugs such as benzodiazepine, opiates, antipsychotics and corticosteroids decrease REM (rapid eye movement) sleep. The withdrawal of some medications used in ICU, like sedatives and beta-blockers, can also cause insomnia and sleep fragmentation. Complementing the previous statement, it is known that drugs such as vasopressors, benzodiazepine and narcotics can suppress stages of sleep (slow wave sleep and REM).

However, studies addressing sleep and sedatives found contradictory results; some indicate similar physiological functions and others seem to interfere with the sleep-vigil cycle.

- Consequences and effects of sleep deprivation

Studies associating sleep deprivation with healing process delay showed that chronic sleep disruption is detrimental to immune function and increases energy expenditure. It is also assumed that the disturbance of the circadian rhythm alters the secretion of nocturnal melatonin and thus increases the levels of reproductive hormones during the day. Other various effects of sleep deprivation were analysed by the same author, such as...
immune system dysfunction, interference with wound healing, neurological and behavioural alterations and affected quality of life, loss of memory and communication skills. Speech production may become deficient, a decrease in verbal fluency and mental changes such as irritability, memory loss, inattention, delusions, hallucinations, slurred speech, incoordination and blurred vision occurs, which fit the criteria for delirium.

Sleep deprivation may be associated with neurocognitive effects and physiological similarities with delirium, and has many effects on the immune system and metabolic functions. It was also noticed that sleep deprivation is associated with the patient’s mood disorder, for example, ICU psychosis.

It is understood that there is a reduction of the respiratory muscles after 30 hours of sleep deprivation; therefore, it may interfere with the process of weaning from mechanical ventilation. Besides compromising respiratory muscles, cognitive impairment and delirium (ICU psychosis) may also occur, partly caused by the interruption of sleep, and may also delay patients’ recovery.

Studies suggest a relationship between hypertension and sleep pattern changes, and noisy stimuli have been shown to stimulate the pituitary-adrenal axis, as well as inducing vasoconstriction and arterial hypertension.

The differences between sleep and sedation are at least as important as the similarities, but it is less clear whether sedation is directly responsible for adverse outcomes associated with poor sleep quality in critically ill patients. Sedatives, therefore, can have positive and negative effects on patients sleep and on quality of life in ICU.

Postoperative patients have some reduction or absence of REM sleep. On the other hand, the increase in REM sleep in the early postoperative period may increase the risk of postoperative atelectasis, pneumonia, hypoxia and cardiovascular morbidity, including myocardial infarction.

Finally, there is greater sleep disturbance in those patients who had a more severe disease and died.

- Strategies

There are usually four interventions for sleep improvement, including headphones, behavioural modification, sound masking and acoustic absorption. Sound absorption is an effective strategy for noise reduction, considering that sound masking appears to be the most effective technique for sleep improvement.

The use of earplugs improves the subjective experience of sleep for critically ill non-sedated patients, without interfering in attendance, having a low cost and a low level of invasion, thus avoiding the unnecessary use of sedative medications. In this sense, studies show that the REM latency (time to enter REM sleep) and its duration were significantly improved when earplugs were used, moreover, the use of headphones subjectively improved the sleep of a group of patients with acute diseases in comparison with a control group.

It was found that the reduction of excessive noise and the use of earplugs can help increase the onset and duration of REM sleep. Continuous pain control, reduced use of sleep inducing medications and maintenance of patients in mechanical ventilation with their own respiratory efforts of physiological basis are also important. Also pointed out was the fact that non-drug treatments such as relaxation massage, aromatherapy and music therapy help to promote sleep in the ICU.

However, it is understood that there are some limitations of the existing studies, including the lack of attention to other environmental acoustics conditions, noise level and combined effects of different sleep disturbance factors. Studies suggest that melatonin, a natural hormone with immunological properties, may play a role in facilitating sleep.

Decreasing environmental stimuli with discrete pre-defined intervals increases the chances for the patient to have adequate and quiet sleep at the neurocritical care unit.

Modification of environmental factors such as noise reduction, promotion of uninterrupted and appropriate sleep, modes of mechanical ventilation and patient-ventilator synchrony, and the reduction of procedures during sleep are strategies that can be used to facilitate the sleep of critical patients.

Similarly, interventions are proposed to promote sleep in critically ill patients: pain control (with analgesics and non-pharmacological interventions); modification of the environment (sound level and lighting reduction); promoting comfort; promoting psychological welfare (explaining procedures, apply relaxation techniques as music therapy) and establishing sleep and rest patterns.

Research indicates that environmental
stressors within the intensive care unit may have detrimental effects on patients’ sleep, and nursing interventions that focus on the reduction of environmental stressors can improve patients’ sleep.16

Zolpidem tartrate, a non-benzodiazepine hypnotic, is presented in studies as a sleep facilitator, as it reduces the time the patient takes to fall asleep and increases total sleep time, without interrupting the sleep cycle18. Other medications that demonstrate to improve patients’ sleep were propofol and midazolam.14

Disturbances in sleep patterns in critically ill patients are still a subject given little attention by health professionals, especially in nursing, and thus this important event is being neglected. Practitioners do not acquire suitable knowledge for the diagnosis and subsequently for the prophylaxis and treatment of complications associated with this problem. By understanding the physiology of the sleep cycle, rest and ways to promote relaxation and sleep, nurses can minimise the factors that cause sleep disruption in ICU patients and avoid the possible negative effects caused by sleep deprivation.

More research is needed to find adequate and effective ways of monitoring and evaluating sleep quality in critically ill patients, to determine the modes of ventilation that affect sleep less, and to establish the relationship between sleep deprivation and sedatives.

REFERENCES

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