The Impact of Sleep Disturbance on Intensive Care Patients

Essay

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Abstract

Background: Sleep definition: According to a simple behavioral definition, sleep is a reversible behavioral state of perceptual disengagement from and unresponsiveness to the environment. It is a complex amalgam of physiologic and behavioral processes. Sleep is typically (but not necessarily) accompanied by postural recumbence, behavioral quiescence, closed eye and all the other indicators one commonly associates with sleeping.

Aims: This essay discusses the impact of environmental factors: noise, light and clinical care interactions on patients' sleep, the psychophysiological consequences and management of sleep disturbance in ICU patients.

Conclusion: Sleep is considered to be an essential biological function to maintain physiological and emotional wellbeing. Future research should be directed at identifying an accurate and feasible sleep monitoring method to facilitate the ability to implement strategies that endeavour to promote sleep and recovery, whilst decreasing the associated complications linked to sleep deprivation.

Keywords: Noise, Light, Sleep Disturbance, Intensive Care Patients

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List of Abbreviations

ACTG : Actigraphy

COPD : Chronic Obstructive Pulmonary Disease

EEG : Electro Encephalo Gram

ECG : Electro Cardio Graphy

EMG : Electro Myo Graphy

EOG : Electro Oculo Graphy

FEV_1 : Forced Expiratory Volume 1

FVC : Forced Vital Capacity

ICU : Intensive Care Unit

IHD : Ischemic Heart Diseases

IL : Inter Leukin

MIP : Maximal Inspiratory Pressure

NHS : Nurses' Health Study

NREM : Non– Rapid Eye Movement

PSG : Polysomnography

RCSQ : Richards-Campbell Sleep Questionnaire

REM : Rapid Eye Movement

SNS : Sympathetic Nervous System

SWS : Slow Wave Sleep

SVR : Systemic Vascular Resistance

6-SMT : 6-sulfatoxymelatonin

TNF : Tumor Necrosis Factor

TST : Total Sleep Time

WHO : World Health Organization

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Introduction

Sleep definition: According to a simple behavioral definition, sleep is a reversible behavioral state of perceptual disengagement from and unresponsiveness to the environment. It is a complex amalgam of physiologic and behavioral processes. Sleep is typically (but not necessarily) accompanied by postural recumbence, behavioral quiescence, closed eye and all the other indicators one commonly associates with sleeping ***(Carskadon and Demant, 2005).***

Sleep is considered to be an essential biological function to maintain physiological and emotional well-being ***(Delaney et al., 2015).***

In the unusual circumstances, other behaviors can occur during sleep. These behaviors include sleepwalking, sleep talking, tooth grinding, and other physical activities. Anomalies involving sleep processes also include intrusions of sleep - sleep itself, dream imagery, or muscle weakness – into wakefulness ***(Carskadon and Demant, 2005).***

Sleep in the Intensive Care Unit (ICU) has been reported by survivors of critical illness to be of a poor quality

and a major stressor associated with their admission ***(Tranmer, 2003).***

The proclivity for sleep and circadian disturbance amongst ICU patients has been attributed to the intrusive clinical care and clinical environment, with environmental factors inclusive of noise and light as etiological causes ***(Friese et al., 2007).***

Noise, lights, discomfort, pain, medications, and stress all contribute to a patient's inability to sleep. Lack of knowledge about the sleep stages, nursing routines, and frequent nursing assessment and interventions also impact the critically ill patient's ability to sleep ***(Honkus, 2003).***

As a result patients exhibit symptoms consistent with dyssomonia, such as difficulty with sleep initiation and fragmentation, and early morning awakenings ***(Friese et al., 2007).***

Sleep deprivation can affect the healing process and thus contribute to an increased morbidity and mortality. Reasons for sleep deprivation appear to be multifactorial and include the following: the patient's chronic underlying

illness, an acute superimposed illness or surgical procedure, medications used in treatment of the primary illness, and the ICU environment itself. Therapeutic interventions need to address each of these potential causes, with an emphasis placed on providing an environment that is both diurnal and focused on the importance of uninterrupted sleep ***(Karachman et al., 1995).***

Education about sleep deprivation needs to be integrated into critical care courses and orientation programs. Sleep deprivation should be addressed on the multidisciplinary care plan and in health team conference, and nursing care planned accordingly. Sleep medications and their effects should be evaluated for each patient, as well as identifying medications that might be preventing or disturbing sleep ***(Honkus, 2003).***

Aim of the Work

This essay discusses the impact of environmental factors: noise, light and clinical care interactions on patients' sleep, the psychophysiological consequences and management of sleep disturbance in ICU patients.

Chapter (1)

Normal Sleep Architecture

(I) Definition:

Sleep is a condition of reversible loss of conscious level in which the brain is less responsive to external stimuli. Functionally, we are blind throughout sleep with no reaction to visual stimuli and an increased threshold of reaction to auditory stimuli ***(Schupp and Hanning, 2003).***

(II) Stages:

Generally, Sleep begins in NREM and progresses through deeper NREM stages (stages 2, 3, and 4 using the classic definitions, or stages N2 and N3 using the updated definitions). NREM stages 3 and 4 (or stage N3) concentrate in the early NREM cycles, and REM sleep episodes lengthen across the night ***(Carskadon and Demant, 2011).***

Sleep includes various sequential stages, with two dominate phases: Non-Rapid Eye Movement ***(NREM)*** and Rapid Eye Movement ***(REM).*** NREM depends on three stages which assigns between75% to 80% of the total sleep time

(TST) with the first stage (N1) acting as a switch between wakefulness and deep sleep. N1 is known by somatic drowsiness, combined with diminished eye movements and a lowering in muscle activity ***(Delaney et al., 2015).***

N2 is the stage following (N1), in which the person returns gradually unconscious of their surroundings, while still easily aroused by noise ***(Weinhouse et al., 2006).***

As sleep advanced, N2 becomes the stage responsible for 45% to 55% of the NREM phase. Stage N3 depends mainly on slow wave activity and is considered to be an anabolic and physically restorative stage ***(Berry, 2012).***

This stage is the main stage in the first third of the night's sleep and is deemed to be the deepest and most relaxing stage of the sleep cycle, slow wave sleep [SWS] is often referred to the combined stages 3 and 4 sleep, during (SWS), metabolic activity is at its lowest resulting in a decrease in oxygen consumption. Growth hormone is secreted during this stage which help in protein synthesis, tissue healing and physical recovery ***(Delaney et al., 2015).***