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When is nighttime? A description of bedtime in persons with dementia in the nursing home

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ABSTRACT

The purpose of this secondary data analysis was to describe the bedtime patterns of persons with dementia in the nursing home and make recommendations for nursing practice. Nursing staff observed, researcher observed, and actigraph data on bedtimes were compared with nighttime facility routines. Seventy per cent ($n = 14$) of all participants ($n = 20$) were in bed before 8:30 pm and 30% ($n = 6$) of the participants went to bed after 8:30 pm. All participants who went to bed before 8:30 pm ($n = 14$) took evening medications and 64% ($n = 9$) were dependent upon nursing care for nighttime activities of daily living (ADLs). Results suggested that bedtimes may be influenced by nighttime tasks. An understanding of these unique sleep patterns may facilitate the development of nonpharmacological, person-centered interventions for building sleep cycles around individual preferences versus facility-driven routines.

Introduction

Sleep disturbance (SD) is a risk factor for nursing home placement and has a high prevalence of 44% in community dwelling persons with dementia (PWD).[1] The National Sleep foundation reports that SD are a problem for two-thirds of nursing home residents.[2] Sleep disturbance worsens after transition to a nursing home.[3,4] Neurodegeneration[4] associated with dementia causes damage along the pathways that are responsible for synchronizing the interactive homeostatic and circadian processes.[5] These deficiencies contribute to SD through the blunting of neuronal networks to zeitgebers. Zeitgebers are cues such as turning off lights or following a bedtime routine that promotes sleep. Certain zeitgebers control physiological circadian rhythms that are related to brain function. Others synchronize behavioral circadian rhythms that are related to lifestyle.[6]

Studies have shown that zeitgebers for behavioral circadian rhythms may be just as important as physiological circadian rhythms.[6,7] PWD who experience SD are sensitive to changes in behavioral circadian rhythms such as nighttime routines, social activities, noise, and medications. The strongest zeitgeber is exposure to light.[8] Light stimulates the suprachiasmatic nucleus (the sleep pacemaker) located in the hypothalamus to release sleep hormones.[5] Neurodegenerative changes resulting from dementia impair the suprachiasmatic nucleus. Thus, the management and timing of behavioral circadian rhythms may improve sleep for PWD who experience deficits in physiological circadian rhythms caused by neurological damage.

The stage of dementia influences sleep patterns. Sleep patterns become more fragmented[9] in the later stages of dementia.[4,10] For example in one actigraphy study,[11] persons with mild to moderate dementia in the nursing home slept about 45% of the night and napped 15% of the daytime; while persons with severe dementia slept 58% of the night and 29% of the day. The severe consequences of SD for PWD include a need for institutionalization, agitated behaviors, increased morbidity, and decreased quality of life.[12]

In addition to being in a moderate stage of dementia, living in a nursing home exacerbates SD.[3] For example, factors that contribute to SD include long hours spent in bed associated with facility-driven nighttime routines,[13,14] frequent nighttime sleep interruptions due to noise in the environment,[15] nighttime nursing

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tasks such as incontinence care or vital signs,[14,16] pain due to chronic medical problems such as degenerative joint disease,[17] and side effects from psychotropic medications.[18]

At the same time, caregivers are challenged to manage nighttime tasks and bedtimes for all residents in a facility. Accomplishing nighttime tasks may be influenced by high resident acuity, transfers requiring two-person assistance or the use of hoyer or mechanical lift systems for safety, and staffing limitations.[13,19]

Qualitative studies[13] of caregiver perceptions have found that caregivers experienced stress associated with the demands of nighttime task oriented procedures. Interestingly, caregivers believed that they did not intentionally awaken residents and the residents slept well throughout the night. In contrast, residents reported that they were awakened by nighttime caregivers who were following facility routines.[14] Although in one study[16] nighttime rounding was viewed as reassuring for some residents and families, other studies revealed that residents felt compromised but eventually acquiesced to bedtime facility routines and nighttime awakenings.[13]

The research hypothesis for this study was that bedtimes are determined by cues associated with facility routines for PWD in the nursing home. This study was designed to describe the bedtime patterns of PWD in the nursing home and make recommendations for the development of nonpharmacological, person-centered interventions to build sleep cycles around individual preferences. In addition, we hypothesized that there would be a difference between those going to bed early versus later with regard to whether or not the resident needed help with ADLs or medications.

Methods

Design and sample

This descriptive study was a secondary analysis of data on residents collected in a randomized controlled trial on sleep, dementia, and massage.[20] Participants were recruited from four nursing facilities in the Southeastern United States. The mean age, gender, racial and socioeconomic mix, admission criteria of residents were similar in their numbers of Medicare beds. Only one facility had a specialized unit for residents with dementia. The average number of beds in the facilities was approximately 126, and most rooms were double occupancy. Data were collected from June 2008 to January 2009 after approval from the University of Arkansas for Medical Sciences Institutional Review Board (IRB). Inclusion criteria for the parent study were: 1) English speaking, 2) aged 65 years or older, 3) diagnosed with dementia in the medical record, 4) sleeping less than 7 h a night averaged from two nights of baseline actigraph data, 5) being a long term resident of the facility for more than 90 days.

Forty residents met the inclusion criteria for the massage intervention study. Out of 50 potential participants who were approached, one was deemed able to consent using the Mac Arthur Competency Tool[21] and the remaining 49 were consented by the legally authorized representative. Participants were randomized to either a control group ($n = 20$) or a massage intervention group ($n = 20$). Bedtimes observed on participants in the massage intervention group were used in this descriptive study.[20] Baseline vital signs were recorded and the Mini-Mental Status Examination (MMSE) was administered to determine the level of cognitive impairment. The MMSE consists of 11 questions that test orientation, registration, attention, and calculation, recall and language. The maximum score is 30. Scores of 23 or lower indicate cognitive impairment.[22,23] Other baseline data determinations and cut-off points for categorizing the stages of dementia were based on a similar descriptive study in this population.[24]

Bedtime determinations

Participants were unable to reliably verbalize actual clock bedtimes. Therefore, three methods were used to make bedtime determinations. Nursing assistants performing usual bedtime care for the resident reported the participant's usual bedtime and rise time. This information was used to determine the settings to analyze bedtimes from the actigraph data. Actigraph data were analyzed to identify decreased nighttime activity and this determined the bedtime for participants. Finally, the nurse researcher observations were used to determine bedtimes. The nurse researcher observed and recorded the exact clock time when the participant was lying quietly in bed and observed to be asleep.

Actigraphy

The MicroMini Motionlogger actigraph model from Ambulatory Monitoring, Inc.[25] was used to measure sleep. Actigraphy has a reliability of 0.89–0.98 for normal sleep patterns and 0.78–0.88 for disturbed sleep. When actigraphy data were compared with data from electroencephalograms on persons with dementia in the nursing home, the correlation was $r = 0.91$ for average activity and $r = 0.81$ for maximal activity for total sleep time. One study showed sensitivity (ability to detect wake) of 87% and specificity (ability to detect sleep) of 90%.[26]

The actigraphs for this study were initialized and set to record movement in 1 min epoch intervals.[25] Data were analyzed based on 48 h of usual sleep intervals. The actigraph was placed on the non-dominant wrist of the participant. The dominant wrist was used if the participant was unable to tolerate the actigraph on the non-dominant wrist or if there were contraindications for wearing the actigraph on the non-dominant wrist, such as skin tears, hemiparesis or breast mastectomy. Participants wore the actigraph for 48 h. The data were analyzed using Act Millennium Software Version 3.31.0.0.[25] The participants' bedtimes as indicated by the three methods were averaged. Differences between the overall bedtime means, the bedtime mean for the nursing assistant, nurse researcher, and the actigraph data were examined.

Data were also calculated on bedtime assessment, defined as individual routines that influenced usual nighttime care. Dressing for bed, individual nighttime rituals, sedating medications and the time of medication administration were included in bedtime assessment. Sedating medications were defined as pain medications, antidepressants, anxiolytics, mood stabilizers, melatonin, sedative hypnotics, and antipsychotic medications. Severity of dementia and the degree of dependence on nurses for assistance with bedtime care were also recorded. Demographic data, chronic conditions, and diagnoses that disturb sleep were also included in the bedtime assessment.

Results

Demographics

There were 14 females (70%) and 6 males (30%) in this study, ranging in age from 75 to 94 years (mean 84.6 ± 6.1). All were Caucasian. Arthritis ($n = 10$, 50%), anxiety ($n = 13$, 65%) and depression ($n = 13$, 65%) were the most common medical diagnoses; 80% ($n = 16$) were being treated for pain, 30% ($n = 6$) were taking medications for anxiety, 55% ($n = 11$) received antidepressants, and 45% ($n = 9$) received antipsychotic medications. Only one participant was prescribed a sedative hypnotic.[20]