When persons are hospitalized, their usual patterns of productive activity, leisure, and rest are suspended, and they enter an environment in which time is structured very differently than it is in everyday life. Although there are some variations, patient care activities tend to occur in a predictable sequence at traditional times during the day in all medical organizations, including general hospitals, rehabilitation centers, and extended-care facilities (Hawkins, Hayes, & Aber, 1986). In his classic analysis of the temporal structure of hospital life, sociologist Eviatar Zerubavel (1979) proposed that time in hospitals is organized around rather rigid social cycles such as the rotation and the duty period. These cycles “introduce a rhythmic structure into hospital life by forcing routine and nonroutine activities and events into regular temporal patterns” (Zerubavel, p. xxii). For example, in most hospitals, patients are awakened before 7:00 a.m., when the nurses in the day shift arrive. Vital signs must be taken in time for morning report, and then breakfast trays are passed. Morning medications are given before, with, or after the meal, depending on their interactions with food. Patients are bathed and their rooms cleaned before the physicians arrive for visits and teaching rounds. Laboratory tests and therapy appointments are usually scheduled between 9:00 and 12:00 a.m. and between 1:00 and 4:00 p.m. The pace of activities slows considerably after 4:00 p.m., when the lightly staffed afternoon nursing shift is on duty and many hospital departments are closed. Supper may be served as early as 4:30 p.m., so that all three daily meals can be prepared during the duty period of the dietary staff members. Patients are usually asked to turn out their lights by 10:00 p.m., so that they do not disturb roommates; sleeping, however, may present a challenge.

A substantial body of research has supported the complaint of patients that it is difficult to rest in the hospital. Inability to fall asleep and fragmented or light sleep are manifestations of many medical conditions, including stroke, head injury, respiratory and cardiac diseases, Alzheimer’s and Parkinson’s diseases, multiple sclerosis, and depression (Culebras, 1992a; Gorbien, 1993). Pain, anxiety, noise, and being awakened for treatment are among the other factors that have been shown to disturb nocturnal rest during hospitalization (Beyerman, 1987; Potter & Perry, 1993; Topf, 1992; Verran & Snyder-Halpern, 1988).

Traditional hospital routines violate many of the findings of chronobiologists about human activity-rest cycles and daily variations in physical and cognitive functioning. For example, for most persons, the early morning awakening typical in hospitals interrupts a period of low body temperature and deep sleep (Perry & Dawson, 1988). Therapy appointments are often scheduled between 1:00 and 3:00 p.m., during a postprandial dip in alertness and energy. In the early evening hours, when physical strength and coordination are at peak levels,
patients are engaged in passive activities such as watching television or talking with visitors.

Research with healthy young subjects exposed to long workdays, busy schedules, or interrupted sleep has indicated that fatigue increases and physical and cognitive functioning decline when patterns of activity and rest are disrupted (Culebras, 1992b; Horne & Minard, 1985; Rosa & Colligan, 1988). Coordination, reaction time, concentration, reasoning, and mood are among the functions affected. Healthy older persons typically have more problems with sleep than do younger persons (Culebras, 1992b; Feinsilver & Hertz, 1995), and they display even greater deterioration in performance when they are fatigued or stressed. Most vulnerable of all to the deficits associated with unbalanced activity-rest cycles are persons who are both elderly and recovering from an illness or injury (Gall, 1990; Gorbien, 1993; Kaplan, 1990). The largest (and most rapidly growing) population of patients treated by occupational therapists in rehabilitation programs falls into this category (DeLisa & Gans, 1993; McCourt, 1993).

The importance of addressing the activity-rest needs of older rehabilitation patients is clear. Rehabilitation programs are physically demanding, and patients’ learning and coping skills should be at optimal levels so they can develop functional independence and deal with the lifestyle changes that result from disability. Although sleep patterns tend to normalize in the weeks after a brain lesion (Culebras, 1992a), and patients adapt to hospital noises within a few days after admission (Potter & Perry, 1993), therapists no longer have the luxury of waiting for this process of adjustment to occur. The pressure to document significant improvements in patients’ function during shorter hospital stays mandates “squeezing every drop of efficiency out of an established treatment protocol” (Atchison, 1993, p. 406).

It is a daunting task, however, to modify the temporal structure of an organization as complex as a hospital in order to provide more natural and balanced patterns of activity and rest for patients. Empirical evidence about whether (and in what ways) manipulating hospital routines affects patient progress is needed to justify and guide change. This article reports the results of a pilot study conducted at a regional rehabilitation center as an initial step toward collecting data about the effects of specially designed daily schedules for older patients.

Method

Hypothesis

Including an afternoon nap in a geriatric patient’s rehabilitation program affects his or her alertness and ability to perform simple physical and cognitive tasks.

Subjects

The subjects were one man and five women admitted to the rehabilitation facility with hip and other lower extremity fractures. They were referred to the study over a 1-year period by staff physicians and referral coordinators. I screened each of the subjects to ensure that they met the criteria for inclusion. These criteria were that they were 75 years of age or older, oriented and able to respond to basic questions and directions, had no history of psychiatric or physical conditions that substantially alter the sleep cycle, and were not taking medications that cause sleepiness (e.g., narcotic pain medications, anticonvulsants, tranquilizers, sedatives). After I explained the conditions of the study and obtained written consent, the subjects were admitted to private or semiprivate rooms in relatively quiet wings of the building.

Design

Single-subject methodology was used to study the responses of each subject individually. An ABA (reversal) design was applied with the first five subjects (see Figure 1). A BABA design was used with the sixth subject, who had an extended stay in the hospital. All of the subjects entered the study on a Monday or Tuesday, and each phase of the design extended for 1 work week. The research protocol was not applied on weekends because patient care routines were atypical on Saturdays and Sundays. The experimental treatment (B phase) was the addition of an afternoon nap to the standard schedule of daily activities for geriatric patients in the hospital. A nap was chosen as the pilot intervention for three reasons. First, napping throughout the day is a normal biophysical function for older persons (Feinsilver & Hertz, 1993). Second, the very busy daily routine of geriatric patients’ nursing care and therapies standard in the facility did not allow time for naps, and patients often requested them. Third, adding an afternoon nap required relatively few changes in staffing patterns and procedures. The nap was scheduled between 1:00 and 2:30 p.m., because sleep cycles are typically 90-min long and the postprandial period is a natural time for rest (Perry & Dawson, 1988).

<table>
<thead>
<tr>
<th>Week 1</th>
<th>Week 2</th>
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<td>M T W Th F</td>
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<tr>
<td>Baseline (No Nap)</td>
<td>Treatment (Nap)</td>
<td>Withdrawal (No Nap)</td>
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</table>

Figure 1. ABA design.
Data Collection and Analysis

During baseline and withdrawal weeks, subjects were scheduled in the traditional manner, as follows:

- 7:30 a.m. Breakfast group
- 8:00 a.m. Morning care
- 9:00 a.m. Mobility group
- 10:30 a.m. Occupational therapy
- 11:00 a.m. Physical therapy
- 12:00 p.m. Lunch
- 1:00 p.m. Geriatric education session
- 2:00 p.m. Aerobic exercise group
- 5:00 p.m. Supper

Data on alertness and performance were collected at 10:00 a.m. and at 4:00 p.m. each day by a trained research nurse or assistant. Two measures, the Stanford Sleepiness Scale (SSS) (Hoddes, Zarcone, Smythe, Phillips, & Dement, 1973) and the Symbol Digit Modalities Test (Smith, 1973) were administered to all subjects. The SSS is a self-rating instrument developed and tested in the Department of Psychiatry at Stanford University and widely used in sleep laboratories. The subject circles a value from 1 to 7 that corresponds to the statement that best describes his or her current state of sleepiness (e.g., 4 = a little foggy, not at peak, but down). Higher values represent sleepier states. The Symbol Digit Modalities Test, a neuropsychological test frequently used in sleep research, measures the ability to concentrate on a cognitive task. Subjects are asked to decode a line of symbols according to a key at the top of the worksheet, and their performance is timed.

Two indicators of physical performance—the 9-Hole Peg Test1 and measurement of grip strength with a dynamometer—were administered to the first three subjects but were discarded later in the study because they did not appear to be sensitive to fluctuations in levels of alertness or energy. Instead, eye-hand reaction time was scored for the remaining subjects, with the use of an electronic device developed at the facility. Subjects responded to a flashing red light by pushing a 2⅛-in. diameter button. Times were recorded by computer in tenths of seconds and were averaged over the 10 trials per session.

During the treatment weeks, the subjects’ schedules were adjusted to include the nap. A research nurse assisted subjects in transferring from wheelchair to bed, turned out their lights, and placed a sign on their doors warning visitors and staff members that the patients should not be disturbed. Because napping prevented subjects from attending 1:00 p.m. geriatric education sessions, extra instruction was provided during their individual therapy appointments.

Data collection was continued twice daily during the treatment phases. Hour-by-hour activity diaries were also maintained for each subject in order to record adherence to and variations from the planned schedule. The first three subjects kept their own diaries. Later in the year, an aide was hired to complete the diaries for the remaining subjects with greater accuracy and to protect patients from interruptions during nap times.

When each subject was discharged from the hospital, his or her scores on the measures of alertness and physical performance were graphed and analyzed through visual inspection.

Results

The results of this pilot study are tentative, because it proved very difficult to maintain consistency in subjects’ daily schedules and prevent encroachments on rest time. In some cases, the subjects’ medical needs conflicted with the requirements of the research protocol. For example, one subject developed thrombophlebitis and was placed on bed rest before the study was completed. In other cases, traditional hospital routine could not be overridden (e.g., some consultations were available only in the early afternoon, shift change interfered with afternoon data collection).

The clearest patterns in the graphed data were related to sleepiness in the afternoon. For four of the subjects, the mean levels of 4:00 p.m. SSS scores rose during the treatment (nap) week, indicating that they felt drowsier, with reversal during the withdrawal (no nap) week (see sample graphs in Figure 2). The subject whose length of stay permitted a second B (nap) phase displayed small increases in mean levels of sleepiness during both periods of intervention. A fifth subject, however, demonstrated the opposite response: She felt slightly more alert in the afternoon during the nap week than she did during the baseline or withdrawal weeks. There was a tendency toward greater variability in scores during the intervention periods that may have been the result of inconsistency in providing the scheduled rest.

An interesting pattern was also apparent in some of the afternoon Symbol Digit Modalities Test data. Although an accelerating trend was typical for scores on this measure (i.e., decoding skills improved with practice), two of the six subjects demonstrated better performance during the treatment phase of the study than during the other phases (see example, Figure 3). One subject attained higher Symbol Digit Modalities Test scores during the nap week in spite of feeling sleepier (according to her SSS values). The nap did not appear to affect morning scores on either of these measures, and the data on reaction time were inconclusive.

Conclusion

Relationships between hospital routines and health have

1Available from Smith & Nephew Rolyan, 1 Quality Drive, PO Box 1005, Germantown, Wisconsin 53022.
been of interest to occupational therapists since the earliest years of the profession. In the first published philosophy of occupational therapy, Adolph Meyer (1922/1977) discussed the importance of creating a natural and orderly rhythm in patients' days by involving them in balanced programs of “work and play and rest and sleep” (p. 641). Occupational therapists who worked in state hospitals during the 1920s through 1940s were often responsible for developing 24-hour habit training schedules for patients that specified times for rising and going to bed, engaging in self-care, exercise, work, and recreational activities, as well as for napping in the early afternoon (Slagle & Robeson, 1941). Today, therapists educate patients about balancing work and rest (e.g., applying the principles of energy conservation), but they are seldom responsible for establishing hospital routines. As members of the health care team, however, occupational therapists are in a position to advocate for scheduling practices that help patients feel and perform well and to facilitate research in this area.

This pilot study provided preliminary data about relationships between one aspect of hospital routine (afternoon rest) and elderly fracture patients' alertness and cognitive performance. When a nap (from 1:00 to 2:30 p.m.) was added to the traditional schedule of daily activities in the facility, most subjects felt drowsier than usual at 4:00 p.m. One explanation for this finding may be that older patients need more time after a nap to return to full alertness. The drowsy period is not necessarily unproductive: Two subjects decoded a page of symbols more quickly and accurately after awakening than they did when no afternoon rest was provided. A logical next step in research would be to measure alertness and performance in the evening hours, during nap and no nap weeks. Evidence about whether scheduled rest enables geriatric patients to work and learn efficiently later into each day of a brief hospitalization would have important implications for rehabilitation programming. ▲

Acknowledgments

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References


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