

# Nocturnal Awakenings, Sleep Environment Interruptions, and Fatigue in Hospitalized Children With Cancer

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**Purpose/Objectives:** To describe nocturnal awakenings and sleep environment interruptions experienced by children and adolescents hospitalized for two to four days to receive chemotherapy and to assess the relationships among nocturnal awakenings, sleep environment interruptions, sleep duration, and fatigue.

**Design:** Longitudinal, descriptive design.

**Setting:** St. Jude Children's Research Hospital and Texas Children's Cancer Center.

**Sample:** 25 patients with solid tumors and 4 with acute myeloid leukemia.

**Methods:** Actigraphy, fatigue instruments, sleep diary, room entry and exit checklists, and blood samples.

**Main Research Variables:** Nocturnal awakenings, sleep environment interruptions, sleep duration, and fatigue.

**Findings:** The number of nocturnal awakenings per night as measured by actigraphy ranged from 0–40. The number of room entries and exits by a staff member or parent was 3–22 times per eight-hour night shift. The number of nocturnal awakenings was related to fatigue by patient report; patients who experienced 20 or more awakenings had significantly higher fatigue scores than those with fewer awakenings. Nocturnal awakenings also were significantly associated with sleep duration by patient and parent report.

**Conclusions:** Hospitalized pediatric patients with cancer who experience more nocturnal awakenings are more fatigued and sleep longer.

**Implications for Nursing:** Nurses may be able to control some of the factors that contribute to nocturnal awakenings and sleep environment interruptions that affect fatigue and sleep duration in hospitalized pediatric patients with cancer.

Sleep has a restorative function for children and adolescents because it provides a period of increased protein synthesis, cellular division, and growth hormone release that contributes to tissue renewal (Adam & Oswald, 1983; Lee & Stotts, 1990; Spenceley, 1993) and compensates for energy deficits acquired during daily functions (Amschler & McKenzie, 2005; Green, 1998; Hartmann, 1973). Hospitalized pediatric patients and their parents have reported that disruptions to patients' usual sleep patterns (delayed, prevented, or interrupted rest or sleep) occur to such an extent that hospital-related fatigue results and, in turn, patients' overall health status is affected negatively, even during brief hospital stays. Bed rest and sleep interruptions are two major disruptions to patients' typical daily functioning that occur during hospital-

## Key Points . . .

- ▶ Actigraphy is an accurate and low-burden method to noninvasively monitor nocturnal awakenings and sleep duration in children and adolescents who are hospitalized for as many as four days and nights for scheduled chemotherapy.
- ▶ Fewer nocturnal awakenings and sleep environment interruptions could improve sleep quality and lower hospital-related fatigue in hospitalized pediatric patients with cancer.
- ▶ Children and adolescents hospitalized for scheduled chemotherapy can experience as many as eight times the number of nocturnal awakenings that healthy children in their home sleep environments experience.

ization. Combined, the two factors also contribute to hospital-related fatigue, immunosuppression (Palmblad, Petrini, Wasserman, & Akerstedt, 1979), anorexia, inability to concentrate (Fallone, Acebo, Arnedt, Seifer, & Carskadon, 2001), muscle wasting (al-Majid & McCarthy, 2001), and slowed physical healing (Corser, 1996). Accordingly, hospitalized children

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