Neonatal Advanced Practice Nurses Shift Length, Fatigue, and Impact on Patient Safety

Position Statement
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The National Association of Neonatal Nurses (NANN) and the National Association of Neonatal Nurse Practitioners (NANNP) and their members are committed to providing safe, ethical, and professionally accountable care to our patients. All healthcare professionals are affected by the challenges associated with role expectations coupled with human performance factors. We recognize the potential safety risk for both providers and patients, due to fatigue, sleep deprivation, and extended shift lengths or hours that neonatal nurse practitioners (NNPs) often work. The uniqueness of NNP responsibilities and the patient population may preclude adherence to strict scheduling limitations.

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Several healthcare organizations have adopted strategies to address these concerns. In 2003, the Accreditation Council for Graduate Medical Education (ACGME) began limiting shift lengths and duty hours of residents and fellows (ACGME, 2002). In 2004, the Institute of Medicine (IOM) published guidelines and recommendations regarding nurses' roles in the protection of patient safety and improved patient outcomes (Agency for Healthcare Research and Quality, 2001) In fact, there have been numerous studies demonstrating that nurses play a critical role in protecting patients from medical errors; however, there are no available studies focused specifically on advanced practice nurses (APNs). (Aiken, Clarke, Sloane, Sochalski, & Silber, 2002; Needleman, Buerhaus, Mattke, Stewart, & Zelevinsky, 2002).

Association Position

NANN and NANNP recognize that research addressing sleep deprivation, fatigue, and patient outcomes is limited in the nursing profession and, specifically, in the neonatal community. It is the position of NANN and NANNP that NNPs remain professionally accountable and must be proactive in minimizing any patient safety risk. Recognizing that NNPs, like other healthcare providers, are susceptible to the effects of fatigue and sleep deprivation, it is recommended that NNPs and their organizations and employers collaborate to implement supportive risk-reduction strategies.

Background and Significance

The NNP role has evolved into a mainstay staffing option for many neonatal intensive care units (NICUs). The actual shift lengths for NNPs are unique to the dynamics of each NICU. Staffing patterns for NNPs may include varied shift lengths. Actual time spent providing patient care during prolonged shifts that extend into evening or night hours may vary as do anticipated periods of rest. In addition, NNPs may be directed to work beyond their scheduled work or call shift to meet unexpected patient care needs or to satisfy organizational or practice expectations (e.g., mandatory coverage or overtime). This can be further compounded by "volunteer" overtime.

There is a lack of current research and no data evaluating the number of hours worked weekly by NNPs or the associated acuity of the NICU where those hours are worked. In a survey among nurses conducted by the American Nurses Association, 2%–5% of nurses work more than 60 hours a week, 28% work shifts that are 12 hours or longer, and in intensive care units (ICUs), 36% work more than 12 hours a day (Lamberg, 2004). With the ongoing national nursing shortage, these numbers are expected to increase (Buus-Frank, 2005; Ewart et al., 2004). It has been shown that working these sustained hours can affect the ability to provide safe patient care as well as strain interpersonal relationships, increase stress in the work environment, and contribute to physiological implications (Akerstedt et al., 2004).

In 2003, the ACGME responded to the growing body of literature demonstrating the potential adverse effects of excessive resident duty hours and fatigue by limiting the

hours of duty for all residents and fellows (i.e., hours per shift, hours per week, and mandated time off; ACGME, 2002). Since those regulations were instituted, new studies have provided evidence that shorter shift length models result in reduced attention deficits and medical errors among interns and residents providing care in an ICU (Landrigan et al, 2004). Unfortunately, the evidence is not clear in its assessment of increased patient safety with decreased shift length (Bailit & Blanchard, 2004; Fletcher et al., 2004). There is also concern in the literature regarding the lack of patient care continuity due to shorter shift lengths and more care providers being involved in a patient's journey in the healthcare system (Keating, LaRusso, & Kolars, 2005).

An increasing body of evidence exists related to fatigue, sleep deprivation, and the circadian time of day with their effects on performance and learning and memory function. Although little research has focused specifically on fatigue in hospital personnel and its relationship to medical error, studies outside the medical field demonstrate the potential link between fatigue and poor performance. Several behavioral studies have shown that the slow-wave activity achieved through sleep is strongly correlated with improved performance in tasks. There is also a strong relationship between memory consolidation and sleep (Akerstedt et al., 2004; Huber, Ghilardi, Massimini, & Tonini, 2004; Walker & Stickgold, 2004). Perhaps the most convincing argument for the dangers of fatigue can be made when comparing its effects to blood alcohol levels. Fatigue caused by 24 hours of consecutive wakefulness is likened to a blood alcohol level as high as 0.10 (Gaba & Howard, 2002). Additionally, research by the National Highway Traffic Safety Administration (NHTSA) demonstrates that the person completing an exhausting shift is at a greater risk of injury on the way home. A person's reaction time is inversely related to the amount of time the person has been awake, and drowsy driving crashes tend to be more severe (NHTSA, n.d.). Other studies from the aviation and space industries and commercial truck drivers have also demonstrated fatigue hazards (Caldwell, 2001; Morrow & Crum, 2004).

Aging may also play a role when assessing the effects of sleep deprivation on performance. There is evidence to suggest that the aging process increases the physiological and cognitive effects of fatigue. Recent laboratory studies documented a decrease in performance in older workers on the night shift compared to a younger worker (Dean, Scott, & Rogers, 2006). The mean age of nurses in the United States was 46.8 years in 2004 and the average registered nurse (RN) seeking to advance his or her education was at a mean age of 38 years (U.S. Department of Health and Human Services, 2004). The average NNP may be at risk for further compromise due to age, given that the National Certification Corporation statistics indicate that approximately 50% of NNPs have been certified for 10 or more years (B. Grossklags, personal communication, February 15, 2006).

There are important differences between the role of acute care nurse practitioner and RN that may impact the research regarding fatigue and shift length. Current research on nursing fatigue and patient safety concerns is limited to the RN providing direct patient

care. Although responsibilities undoubtedly overlap at times, there are variations in role functions that can further contribute to or possibly alleviate fatigue. Most empirical studies focus on the physiological effects of chronic fatigue and fail to address the effects of acute fatigue that face many NNPs who work long shifts but have longer recovery time. Some research denotes that scheduling shifts to allow rest days has a positive impact on levels of shift alertness and levels of chronic fatigue (Tucker, Smith, MacDonald, & Folkard, 1999). Another important distinction is the different workload between bedside nurses and NNPs, the ability to nap during on-call hours, and the availability of rest periods during a shift where they have direct patient care obligations. Even naps of 10–60 minutes have been shown to increase alertness for hours (Dean et al., 2006).

Recommendations

The risk of fatigue-related incidents potentially impacting patient safety is a community and professional concern (Dawson & McCulloch, 2005). Three important approaches to fatigue reduction are suggested: education of professionals, fatigue management, and system management.

Education

Education is a key component in the recognition and management of fatigue. Healthcare professionals should be aware that increasing fatigue may result in altered clinical performance and an increased likelihood of committing an error which may affect patient safety (Dawson & McCulloch, 2005). Successful implementation of fatigue-reduction and fatigue-management strategies is dependent upon supportive and knowledgeable healthcare team members. Healthcare professionals must be able to recognize signs of fatigue and be willing to institute appropriate interventions. Researchers have identified that clinicians have difficulty assessing their own level of fatigue and may underestimate the degree of fatigue (Dorrian, Lamond, & Dawson, 2000; Gaba & Howard, 2002). Educational programs should include the issues of sleep physiology, sleep inertia (grogginess upon awakening), personal and professional performance limitations, perception, and identification of fatigue.

Fatigue Management

One important aspect of fatigue management is observance of good sleep habits and sleep routines. Good sleep hygiene includes monitoring hours of sleep on both working and nonworking days or nights (Dean et al., 2006). To avoid chronic sleep deprivation, healthy adults should obtain approximately 8 hours of sleep per day (Dean et al., 2006).

Even when rested, working long and irregular hours, particularly at night, can disrupt the circadian rhythm. Disruption may be reduced if the individual has an opportunity to sleep in the afternoon before working overnight (Landrigan et al., 2004). Additional prevention strategies include minimizing shift rotations and scheduling rest days in between scheduled shifts. Clinicians who are more than 40 years of age should be aware

that they are at increased risk to experience fatigue and related physiological and cognitive effects, potentially impacting performance (Reid & Dawson, 2001).

Fatigue can occur anytime throughout a 24-hour period. When developing fatigue-management strategies, it is important to incorporate opportunities for rest during the day, evening, and night, as dictated by the work environment. Scheduled naps of 10–60 minutes have been shown to decrease fatigue and sustain performance (Arora et al., 2006; Rosekind et al., 1995). To maximize the benefits of naps, it is important to provide an environment conducive for sleeping; schedule naps before sleep deprivation occurs; and provide protected, uninterrupted time to take a nap of adequate length (Caldwell, 2001).

The use of stimulants, most commonly caffeine, is a fatigue-management strategy often used by clinicians to temporarily improve alertness. Individuals are cautioned to limit the use of caffeine. The effectiveness of caffeine as a stimulant to temporarily improve the level of alertness is variable depending on the tolerance of the individual (Dean et al., 2006). With increased consumption of caffeine, there is a potential for interruption of restorative sleep. Other pharmacologic stimulants are available, but there is very limited information regarding long-term side effects, tolerance, and potential for abuse (Caldwell, 2001).

System Management

Systems or processes must be designed to prevent errors associated with fatigue in the clinical setting. One important process is scheduling. Optimal scheduling patterns may vary depending on the clinical setting. Clinicians must evaluate their work environments (including census, acuity, and clinical responsibilities) to determine the optimal shift length to provide safe and effective care. It has been suggested by some researchers that extended shifts beyond 12 hours may improve continuity of care (Bailit & Blanchard, 2004). Longer shift lengths require fewer changes in care providers and may be associated with fewer errors. This has been actively debated since the ACGME work-hour restrictions were implemented. There is no conclusive evidence available for guidance.

A second systems approach is to develop team-based care models (Van Eaton, Horvath, & Pellegrini, 2005). Rather than view patient care as the responsibility of a single individual clinician, clinicians who subscribe to team-based care consider patient care a shared responsibility. This model focuses on timely and accurate communication of information among team members, appropriate workload distribution, and use of information and documentation systems. McAllister (2006) proposed that continuity of care is “a process that optimizes our use of people, information, and management strategies” (p. 300). The value of team-based care is that it allows greater ease in transitioning care from one clinician to another.

Recognition of the effects of fatigue by the employer and healthcare team is a necessary component of system management. Development and implementation of a formal fatigue policy may be indicated. In the NICU, such a policy may recognize that NNPs and physicians work collaboratively to provide patient-centered care in an efficient and safe environment (VanEaton et al., 2005). A team approach ensures cross-coverage by identified team members who are knowledgeable of the patient's condition. Implementation of cross coverage may allow scheduled rest periods and effective transfer of care upon completion of a scheduled shift. These processes should consider the skill level of the professional and patient census and acuity. Contingency plans also should be included in the team management strategy. A back-up call schedule may be activated when a member of the team is physically unable to provide care or in the event of a significant change in patient acuity or patient census.

Conclusions

Today's healthcare environment is complex with societal demands to reduce costs, improve the quality of care, and address the shortage of nursing professionals. In this environment, NNPs are proactively addressing the issue of fatigue and patient safety. Working in cooperation with their colleagues and their employers, NNPs are encouraged to accept the challenge to create responsible staffing patterns and work models that utilize strategies designed to reduce the risk of fatigue related patient safety incidents.

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