Spotlight On

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Is It Time to Pull the Plug on 12-Hour Shifts?

Part 1. The Evidence

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Shift durations of 12 hours or more are now ubiquitous in hospitals, with currently working staff nurses reporting satisfaction with this shift length, although others who prefer shorter work hours have generally left hospital nursing. Nurse administrators are beginning to question the wisdom of having nurses work extended hours. In part 1 of this 2-part series, the authors provide an update on recent findings that challenge the current scheduling paradigm that supports unsafe long work hours. Part 2 discusses obstacles that nurse administrators face when they "buck the 12-hour trend" and offers guidance for introducing work schedule changes.

Many hospital nurses now work 12 hours only, with few hospitals offering alternatives to this pattern. Privately and quietly, some administrators admit doubts about the wisdom of these hours, citing nurses' fatigue as a major concern. Administrators are loath to consider eliminating 12-hour shifts because of their popularity.

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Research Evidence

There is increasing evidence that 12-hour shifts adversely affect performance. In a recent review of studies between 1970 and 1998,[1] 12-hour-shift nurses were more fatigued in 5 of 7 studies, and of 10 studies measuring performance, 4 were negative and 6 were neutral; none showed positive effects. The systematic review of extended-work-hour studies of Caruso et al[2] from 1995 to 2002 showed among nurses an increase in musculoskeletal disorders (MSDs),[3] biohazard exposures,[4] smoking, and alcohol use.[5] In this review, laboratory studies showed deteriorated performance; but field studies found no difference between 8 and 12 hours.[2] Recent studies with stronger designs and methods have increased the evidence that questions the safety of 12-hour shifts.

Patient Care Errors

More recent studies demonstrate an increase in patient care errors when nurses work 12-hour shifts compared with 8 hours. Because bedside nurses are the linchpin of the hospital safety net, errors that actually reach the patient can indicate the presence of fatigue-related changes in nursing vigilance. When nurses are assured of anonymity, as in a population-based mailed survey, a diary method used for recording errors and near-errors can capture errors that are missed in studies using incident reports. Two diary studies examined nurses' errors and near-errors over 4 weeks. In population-based sample of 393 staff nurses of Rogers et al[6] covering 5,317 shifts, nurses working 12.5+ hours reported over 3 times the odds of making errors (odds ratio [OR], 3.29; $P = .001$) versus nurses working in shifts up to 8.5 hours. The study was repeated in critical care nurses (n = 502; 6,017 shifts) by Scott et al,[7] and they found nearly identical results, with the risk of errors nearly doubling (OR, 1.94) for nurses working 12.5 hours.

These results are congruent with nonnursing studies of worker's compensation claims data that examined the hour of the shift in which workplace injuries occurred. In a German study of 1.3 million claims, there was an exponential increase in claims at the ninth hour into the shift; this was more pronounced among evening and night workers.[8] Macias et al[9] examined blood-borne pathogen exposure

data from hospital workers and found that, in 12-hour shifts, exposures increased in the last 2 hours of the shift, but not among 8-hour shifts.

Lately, studies examining the health and safety consequences to nurses themselves are beginning to shed some doubt about the wisdom of continuing to use this work schedule.

Needlestick Injuries

Nurses have the highest rate of needlestick injuries of the health professions; each year, more than 1,000 healthcare workers contract a serious infection from a needlestick despite mandatory changes to make needles safer. In the population-based longitudinal study of nurses of Trinkoff et al,[10] 16% sustained a new needlestick injury over a 15-month period. Furthermore, when nurses worked 12 or more hours, the odds of needlestick injury were significantly increased (OR, 1.63; 95% confidence interval, 1.17-2.26) versus nurses working only 8 hours a day. Of these needlestick injuries, 37% were from definitely or possibly contaminated needles, so the potential for serious consequences is quite real.

Musculoskeletal Disorders

Musculoskeletal disorders of the neck, shoulder, and back are common in nurses, with healthcare workers having one of the highest back-injury rates of any industry. When nurses work extended hours, it increases their exposure to physical demands (eg, lifting, bending, pulling); the short time between shifts also limits rest and recovery wherein healing can occur. In the longitudinal study of nurses of Trinkoff et al,[11] they found a 19% to 22% increase in the odds for MSDs in nurses working 12+ hours a day, even after adjustment for physical and psychological demands of the job. In this study, 14% of nurses developed new symptoms in their neck, 17% in the shoulder, and 21% in the back, over the 15 months covered by the study.

Drowsy Driving

Drowsy driving is common in both night shift and sleep-deprived workers, and this more than quadruples the risk of a motor vehicle collision (MVC) or near miss. Nurses working 12.5 hours or more had twice the odds of drowsy driving and of an MVC or near miss[12] when compared with those working 8.5-hour shifts. In addition, two-thirds had at least 1 drowsy driving episode in the 4 weeks of data collection, and a small number (n = 30 of 895 nurses) reported drowsy driving after every shift.

Sleep Deprivation and Health Consequences

Although increased rates of errors and injuries to nurses may be related to accumulated fatigue over the 12 hours of their shift, these may also be due to sleep deprivation before the shift even starts. Extended work hours decrease sleep opportunity, especially when long shifts are worked over consecutive days. The consequences of chronic sleep deprivation are well documented.[13,14] There are several highly controlled laboratory studies where participants were partially sleep deprived for several nights, and their neurobehavioral status was carefully measured during waking time.[15,16] These studies showed a linear increase in impairment (reaction time, lapses of attention) as the participant became more fatigued each day. However, participants' perceptions of their own sleepiness did not parallel their actual impairment after 3 days of deprivation, suggesting that people cannot accurately judge their level of sleepiness. Recovery studies in these same laboratories also showed that it took much more than a few full nights of sleep for the participants to return to full neurobehavioral functioning.[15] Yet, the level of sleep deprivation in this study was quite comparable to actual sleep achieved by nurses working successive 12-hour shifts as studied by Geiger-Brown, where nurses working successive 12-hour shifts slept only 5.5 hours between shifts, on average.

In addition, other health consequences of sleep deprivation begin after only a few days of reduced sleep. When the body is sleep deprived, it produces proinflammatory cytokines and increases sympathetic outflow and insulin resistance.[17] There is strong evidence that sleep deprivation contributes to hypertension, diabetes and impaired glucose tolerance, obesity, heart attack and stroke, unhealthy behaviors, and depression.[13,14] It also reduces the body's response to immune challenges by reducing antibody production.[18]

Administrators and 12-Hour Shifts

There is clear evidence that nurses are at risk for making more errors with longer work shifts. They also have more needlestick and musculoskeletal injuries, drowsy driving, sleep deprivation, and fatigue. Given these problems, why has the alarm not sounded among nurse administrators? Part 2 will discuss obstacles administrators will face

and offer guidance for introducing work schedule changes.

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