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# Caregiver Fatigue

## *Implications for Patient and Staff Safety, Part 1*

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**OBJECTIVE:** This article describes the profound impact of fatigue and the process by which 1 academic medical center assessed fatigue levels, and associated factors, among nursing personnel in their effort to develop a comprehensive fatigue management program.
**BACKGROUND:** To adequately perform amid high patient acuity and in today's fast paced healthcare environment, nurses must be attentive and react quickly and appropriately with clear judgment and reasoning—abilities that can be greatly impaired by fatigue. Nursing leaders are instrumental in systematically addressing work-related fatigue and implementing processes designed to prevent fatigue and overwork; however, baseline measures are necessary if the efficacy of these initiatives is to be assessed.
**METHODS:** The 15-item Occupational Fatigue Exhaustion/Recovery scale was used to assess current fatigue levels among nursing staff at a university medical center. Demographic and schedule-related questions were used to examine the characteristics of the population and identify any associated factors.
**RESULTS:** Work-related fatigue is prevalent among all nursing staff, but differences were noted based on the respondent's position, age, and typical work shift.
**CONCLUSIONS:** Nursing administrators and shared governance councils can address the factors contributing to work-related fatigue and negatively impacting nursing personnel's ability to rest and recuperate.

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Nurse leader involvement is needed to develop comprehensive fatigue reduction strategies.

In today's healthcare environments, staffing shortages, rapid cycle shift rotations, and schedule flexing (ie, adjusting the number and duration of work hours based on patient census) are among the factors that are known to contribute to work-related fatigue among nursing staff.[1,2] Whereas around-the-clock shift work has inherent risks in healthcare settings, the mental and physical demands of overtime, in combination with high patient acuity, unpredictable or traumatic events, and rapid admission-discharge cycles, exacerbate the situation.[3]

Fatigue is "the body's response to sleep loss or to prolonged physical or mental exertion[4(p1)]; it is not the same as sleepiness, which is the tendency to fall asleep during certain times or situations, such as after a meal or late at night.[4(p1)] Fatigue may be manifested physically, cognitively, and emotionally—with each presenting potentially negative consequences in the work environment.[5] Fatigue can affect physical functioning, producing clumsiness, which in turn can lead to personal injury and workplace accidents. Long-term physical consequences of fatigue include neurologic, cardiovascular, metabolic, and immune disorders.[6-8] Cognitive processing, essential to nurse's work, may be the most negatively impacted by fatigue, decreasing the ability to respond to stimuli and to critically think.[9,10] Emotional status can be compromised, resulting in emotional lability, outbursts, heightened irritability, excessive giddiness, and decreased tolerance to stress.[11,12]

### *Fatigue and the Workplace*

The consequences of fatigue are not limited to the individual but are detrimental to patients and colleagues.[13]

Although The Joint Commission leadership standards recommend a "sufficient number and mix of individuals" to support safe, quality care, treatment, and services,[14(p LD-1)] increased work hours and shift work, 2 frequently used staffing solutions, are uniquely associated with an increased likelihood of accidents and injury both on and off the job.[15,16] Positive associations are found between the number of work hours and the risk for needle stick injuries[17] and musculoskeletal injuries.[18] Injury rates are 37% higher among persons working 12 hours or more per day[15] and 23% higher among those working 60 hours or more per week.[19] Inattention, memory lapses, and confusion, the end result of extended work hours, produce faulty decision making, reduced problem-solving skills, and impaired communication and judgments.[10] These consequences impact not only patients and colleagues on the current shift but also, because of the cumulative nature of fatigue, subsequent shifts and patients.[10]

More static corollaries of fatigue (daytime sleepiness, poor sleep quality, indifference, loss of empathy, and decreased emotional well-being) can negatively impact workers' interactions and relationships with patients, families, and colleagues.[20] Left untreated, chronic fatigue–related anger, increased anxiety, and decreased vigor and happiness deepen the social isolation that can result from shift work alone.[21]

### Staffing and Fatigue

Nursing staffing costs often comprise the largest share of a unit's budget. Although dynamic staffing models are touted as an option for optimizing resources and decreasing costs, their utilization can have consequences on the work environment.[1,22] Indeed, the organization and management of nursing staff can have a profound impact on fatigue levels, particularly those practices that result in extended shifts or additional shift work.[9,23] Whereas evening and night shifts are associated with higher injury rates compared with day shifts, extending the shift duration compounds this impact.[24,25] Regardless of time of day, nurses working more than 12.5 consecutive hours have 2 to 3 times the risk of making a medication error compared with those working fewer hours.[6,26,27] The care provided to patients by nursing staff who work shifts of 13 hours or more is likely to suffer, as evidenced by the negative associations that exist among patient satisfaction, communication, pain control, and nurse responsiveness.[19] Despite this preponderance of evidence, staffing shortages continue to be remedied with mandatory overtime and requests to unscheduled staff to fill staffing needs at many facilities—to the detriment of patients and nursing staff alike.[23,28] Although these strategies provide short-term solutions, the cumulative effects of disrupted sleep patterns or missed nighttime sleep on cognitive ability is dramatic—decreasing performance up to 25% after 1 night and up to 40% after 2 nights.[29] This evidence and serious implications can impact any institution's patient safety efforts and 1 of its most valuable human capital resources: nurses.[28,30,31]

Instituting comprehensive fatigue reduction measures, which include staffing policies and procedures, is essential in ensuring a healthy, productive, and reliable nursing work force. These practices should not be reflexively implemented without data about the level and type of fatigue that exists and the factors that influence fatigue among the target nursing population. Without baseline information, future efforts to evaluate the efficacy of these measures are impaired as the outcomes cannot be accurately assessed. The following describes the efforts of 1 institution to explore the fatigue levels and identify associated factors among nursing staff as they developed a comprehensive fatigue reduction plan.

### Assessing Fatigue

In response to the growing body of evidence linking fatigue to negative outcomes, the nursing leadership at an academic medical center charged 2 shared governance councils—Nursing Research Council and the Nursing Professional Practice Council (NPC)—to develop an effective house-wide fatigue management program. To accomplish this task, baseline knowledge of the current level of fatigue among the nursing staff (ie, registered nurses [RNs], clinical support technicians [CSTs], nursing assistants [NAs], and health unit coordinators [HUCs]) was needed. The CST is a blended role with the dual responsibility of an NA and administrative support. Health unit coordinators are nonclinical staff members who provide administrative support to unit leadership and nursing staff.

The aims of the initial phase were to (1) assess the level of fatigue among nursing staff, (2) explore any differences between fatigue levels, and (3) determine whether other factors were associated with fatigue, such as position, age, or the shift typically worked.

## Methods

The University of North Carolina institutional review board approved the study. The NPC spearheaded the survey and broadcast participation information to nursing staff using a variety of communication strategies that included flyers, employee news, and weekly updates.

### Instrument

The 15-item Occupational Fatigue Exhaustion/Recovery 15 scale (OFER15) was used to assess

current fatigue levels among nursing staff.[32] The OFER15 assesses 4 dimensions of fatigue: chronic fatigue (CF), acute fatigue (AF), persistent fatigue (PF), and intershift recovery (ISR). Chronic fatigue is considered to be an enduring trait, whereas AF, PF, and ISR are temporal. The AF status reflects workplace demands that vary from shift to shift or week to week. The recovery subscales, PF and ISR, use the same items but the scoring is altered to better reflect aspects of work and their effects on sleep hygiene (PF), whereas the ISR assesses an individual's recovery between shifts.[29] The subscale scores result in values between 0 and 100, with higher scores indicating a greater presence of the construct. High scores on the CF, AF, and PF subscales are interpreted as undesirable, whereas high ISR scores, an indication of an individual's recuperation, are desirable. Low scores for ISR suggests the individual's physical, cognitive, and emotional well-being may be compromised because of impaired recovery.

The NPC added demographic and schedule-related questions to the survey to examine associated factors. An electronic version of the instrument was written and the link was sent to all nursing staff using the institutional e-mail system. The Qualtrics electronic survey system was used to host the survey and store responses. The survey was sent to the nursing staff on approximately 50 inpatient units. Staff were allowed to complete the 15-minute survey during work time and the link remained active for 3 weeks.

### Analysis

Survey data were analyzed using IBM SPSS 2013 for Windows, V. 22 (Armonk, New Jersey). Descriptive analysis was performed to determine the characteristics of the survey respondents. One-way analysis of variance (ANOVA) and post hoc analysis were performed to test for differences among the groups. The internal consistency of the OFER15 subscales were computed, resulting in Cronbach's $\alpha$ reliability as follows: CF, 0.90; AF, 0.89; ISR, 0.86; and PF, 0.86. These results indicate satisfactory reliability among the subscales. Data were analyzed in aggregate by position, gender, or shift to ensure the anonymity of individual respondents.

## Results

Nursing staff who completed the survey numbered 1,023, representing a 60% response rate (n = 1,700). Responses were not required for each survey item, which resulted in an inconsistent number of responses on some items, which is evident in the reported results. Most persons completing the survey were female, RNs between 20 and 40 years of age. More than half the RN respondents had a bachelor of science in nursing degree (59%) and 5 or fewer years of experience. Demographics of respondents were representative of the demographic composition of the nursing staff throughout the institution. As illustrated in Table 1, the highest percentage of responses were received from the surgery, children's, heart and vascular, and medicine service lines.

### Scheduling

Typical work schedules varied by position and are illustrated in Table 2. Most respondents worked 12-hourshifts. The typical schedule of RNs and CSTs was divided nearly equally among day, night, and rotating shifts; most NAs (46%) and HUCs (57%) reported working day shifts. Most participants worked 3 shifts per week (89%) and worked the shifts successively (81%).

Although most staff reported that their unit had scheduling guidelines, RNs', NAs', CSTs' and HUCs'

***Table 1.*** *Overall Staff and RN Sample Characteristics*

| Total Sample Characteristics | % (n) |
|---|---|
| Gender | |
| Female | 89 (947) |
| Male | 11 (122) |
| Age | |
| ≤19 y | 31 (333) |
| 20-30 y | 29 (306) |
| 30-40 y | 21 (219) |
| 41-50 y | 16 (174) |
| ≥51 y | 3 (36) |
| Position | |
| RN | 76 (807) |
| NA | 10 (105) |
| CST | 8 (81) |
| HUC | 7 (71) |
| RN sample characteristics | |
| ADN | 20 (153) |
| BSN | 59 (455) |
| MSN | 7 (51) |
| Nursing experience | |
| 0-5 y | 39 (309) |
| 6-10 y | 22 (176) |
| 11-20 y | 19 (152) |
| >20 y | 20 (163) |
| Clinical service line | |
| Surgery | 21 (231) |
| Medicine | 10 (107) |
| Heart and vascular | 11 (113) |
| Women's | 7 (69) |
| Children's | 21 (218) |
| Oncology | 9 (93) |
| Psychiatry | 5 (51) |
| Emergency services | 9 (96) |
| Rehabilitation center | 1 (11) |
| Surgical | 2 (26) |
| Other | 3 (31) |

The total number of each characteristic may vary because of missing responses to this item.

*Table 2. Responses to Scheduling Items all Nursing Staff*

| Typical Work Schedule | Overall Percentage (n) | RN (n = 807) | NA (n = 105) | CST (n =81) | HUC (n = 71) |
|---|---|---|---|---|---|
| Day shift | 36% (338) | 35% (249) | 46% (41) | 36% (28) | 57% (13) |
| Night shift | 30% (279) | 29% (206) | 30% (27) | 32% (25) | 13% (3) |
| Rotating shifts | 31% (284) | 34% (239) | 19% (17) | 30% (23) | 9% (2) |
| Do not have a typically scheduled shift. | 3% (26) | 3% (18) | 4% (4) | 1% (1) | 13% (3) |
| Typical number of consecutive shifts worked | | | | | |
| >3 | 26% (221) | 28% (185) | 19% (15) | 25% (16) | 9% (5) |
| 3 day or night | 53% (454) | 54% (351) | 52% (40) | 54% (35) | 44% (24) |
| >3 | 11% (91) | 9% (56) | 14% (11) | 18% (12) | 22% (12) |
| >4 | 10% (86) | 9% (60) | 14% (11) | 3% (2) | 24% (13) |

The number of responses to any given item varied. Day shift: 7:00 AM to 7:00 PM or 11:00 AM to 11 PM; night shift: 7:00 PM to 7:00 AM or 11:00 PM to 11:00 AM. Rotating shifts: day to night or night to day schedule.

interpretation of what the guidelines contained differed. Eighty percent of RNs reported that there was no reference in the guidelines to recuperation time (nonscheduled time) between a night to day shift rotation (Table 3).

### Fatigue Levels

Most CF scores were in the low and low/moderate (66%) ranges, which contrasted with AF scores, which were in the moderate/high and high (68.4%) ranges. Approximately one-third (34.7%) of respondents reported a high level of CF. The ISR levels were comparable across all positions and fell into a distribution around the midpoint, with 36.4% at the low/moderate level and 33.2% at the moderate/high level. Similar results were found with PF, with 39% of responses in the low/moderate range and 29.6% in the moderate/high range.

### Associated Factors

To understand and identify any characteristics that were associated with staff fatigue levels, such as the shift typically worked, position, or age, ANOVA and post hoc analysis procedures were performed. The results suggest that 3 factors—position, typical shift, and age—were associated with fatigue levels among the study population.

### Position

Respondents at baseline were divided into 4 groups according to position (Table 4). The AF scores were significantly different across these 4 groups ($P = 0.003$). Specifically, HUCs had, on average, the lowest AF scores; and their scores were much lower than those of RNs, NAs, and CSTs.

### Age

Age was associated with differences in AF, ISR, and PF (Table 5). Among all nursing personnel, AF levels were significantly different across age levels with a greater number of younger participants having *high* AF levels compared with older respondents ($\alpha = .05$, $P = .002$). Intershift recovery fatigue levels were significantly different ($\alpha = .05$, $P = .008$) across the age levels: younger participants had moderate level of ISR fatigue levels than older participants did. For PF, older participants had a slightly lower level of PF on average compared with those who were younger.

### Shift

For all staff, fatigue levels were significantly different based on the normally scheduled shift, with the exception of CF. The mean scores are illustrated in Table 6. Nursing staff who worked rotating shifts comprised the highest percentage of persons in the moderate/high and high levels of PF; night shift staff had the largest

*Table 3. Scheduling Questions, Affirmative Responses by Position*

| | RN | NA | CST | HUC |
|---|---|---|---|---|
| Does your unit have scheduling guidelines? | 87 (683) | 89 (90) | 85 (69) | 84 (54) |
| Do the guidelines recommend the amount of time off between a night and day shift? | 20 (135) | 52 (46) | 34 (23) | 43 (23) |
| Do the guidelines recommend the consecutive number of shifts you should work? | 34 (230) | 69 (60) | 48 (32) | 63 (34) |

Data are presented as % (n).

*Table 4. Position and Fatigue Level for all Staffs at Baseline*

| Fatigue Subscale | RNs (n = 807) | NAs (n = 105) | HUCs (n = 71) | CST (n = 81) | *P* |
|---|---|---|---|---|---|
| Chronic (missing = 92) | 40.94 (26.27) | 42.20 (30.97) | 33.85 (27.85) | 35.94 (26.15) | .085 |
| Acute (missing = 88) | 63.12 (23.98) | 58.72 (26.65) | 49.63 (26.28) | 61.39 (26.70) | .003 |
| ISR (missing = 91) | 51.24 (23.24) | 54.06 (23.76) | 55.79 (22.15) | 51.56 (22.61) | .354 |
| Persistent (missing = 91) | 48.75 (23.24) | 45.94 (23.76) | 44.21 (22.15) | 48.44 (22.61) | .354 |

Data are presented as mean (SD).
ANOVA and post hoc analysis (Tukey) were applied.

percentage of persons in the low-moderate level of PF; day shift staff had the largest percentage of people in the low level of PF.

## Limitations

The strengths of this study were in the large sample size and the inclusion of support staff. A password was not required to participate in the survey; thus, some persons may have accessed or responded to the survey more than once. A response was not required for each survey item, which resulted in missing data and a varying number of responses to individual items. Although additional factors may have impacted staff fatigue levels (eg, child or family care obligations, commute time, school enrollment), these conditions were beyond the scope of the current project and were therefore not explored. Despite the large sample size, our results may not be generalizable to nursing staff in other institutions or settings.

## Discussion

Nurses must be focused and attentive and react quickly and appropriately with clear judgment and reasoning to effectively perform amid high patient acuity in today's fast paced healthcare environment—abilities that can be greatly impaired by fatigue. This study examined the baseline work-related fatigue levels among nursing staff at an academic medical center as the 1st step to develop and implement a fatigue management plan. Data collection included the OFER15 scale to assess staff fatigue levels; demographic data were used as covariates to identify associated factors.

The responses to scheduling items indicate the need for standardized, comprehensive scheduling guidelines throughout the institution. The difference between RN and assistive personnel's responses about the guidelines' content presents opportunities for discussing fatigue, recuperation, and the individual and leader's responsibility for personal well-being, the work environment, and patient safety.

The OFER15 results revealed that fatigue is prevalent across all nursing personnel; the highest incidence may be AF. Additional analysis of variance procedures suggest that age, shift, and position were associated variants to fatigue levels. The results elucidated differences in fatigue level and type between RNs and support personnel, thus identifying areas in which nurse leaders might focus fatigue reduction efforts in the workplace. Health unit coordinators had the lowest levels of fatigue, whereas RNs scored the highest on CF and AF levels compared with assistive personnel. As recommended by Scott and colleagues,[20] AF may be best reduced in the work environment by charge nurses or unit leaders, ensuring that RN staff take allotted breaks during their shift—which may include napping.

Among this study population, age was associated with fatigue level. This result contrasted to the findings of Kubo and colleagues[4] but coincided with those of Barker and Nussbaum,[9] who found that younger staff experienced higher levels of AF. This association could be due to younger individuals' recuperation habits, personal or family obligations, or the frequency of their shift rotations.[10,33,34]

*Table 5. Age and Fatigue Level for All Staffs (N = 1083)*

| Fatigue Subscale | <20 y | 20-30 y | 31-40 y | 41-50 y | >50 y | *P* |
|---|---|---|---|---|---|---|
| Chronic (missing = 87) | 41.97 (25.50) | 39.10 (27.27) | 38.16 (27.48) | 39.10 (27.74) | 45.43 (29.60) | .34 |
| Acute (missing = 83) | 64.61 (22.38) | 63.06 (25.60) | 59.75 (25.27) | 55.28 (25.50) | 60.67 (29.38) | .002 |
| ISR (missing = 86) | 49.80 (21.96) | 51.22 (24.57) | 54.65 (22.16) | 54.12 (23.45) | 52.55 (26.76) | .008 |
| Persistent (missing = 86) | 50.19 (21.96) | 48.78 (24.57) | 45.35 (22.16) | 45.88 (23.45) | 47.45 (25.76) | .133 |

Data are presented as mean (SD).
ANOVA and post hoc analysis (Tukey) were applied.

*Table 6. OFER 15 Results and Shift (N = 1084) All Staff*

| Fatigue Subscale (Missing) | Day | Night | Rotating | *P* |
|---|---|---|---|---|
| Chronic (228) | 42.44 (27.44) | 38.87 (26.36) | 42.46 (26.20) | .192 |
| Acute (259) | 63.01 (24.90) | 60.73 (22.82) | 67.47 (23.37) | .004 |
| ISR (226) | 52.78 (23.20) | 51.27 (21.81) | 46.57 (23.23) | .003 |
| Persistent (226) | 47.22 (23.20) | 48.73 (21.81) | 53.43 (23.23) | .003 |

Data are presented as mean (SD).
ANOVA and post hoc analysis (Tukey) were applied.

Intershift recovery scores, wherein a higher level is desired, was less than ideal, with most respondents reporting low-moderate to moderate/high levels. Although ISR can be discounted as the result of poor personal choices, the American Nurses Association states that nursing administrators influence this metric through strategic staffing organization and management.[35] Minimizing overtime, using float pool or per diem staff to fill acute staffing vacancies, limiting the number of hours per shift and the number of shifts per week, and instituting forward rotation shift rotation (ie, day to night) schedules hold promise for ways in which nurse leaders can enhance ISR.[4,18,19,36] If backward shift rotation must occur, requiring a 48-hour recuperation time between night-to-day shift rotations is 1 tactic for enhancing recovery.[6,37]

## Summary and Implications

This study was innovative in its exploration of work-related fatigue among nursing staff, including assistive personnel. Assistive workers are a population that is largely overlooked in the fatigue literature, but they perform a considerable percentage of direct patient care. Nursing administrators, nurse managers, and charge nurses are the leaders in promoting healthy work cultures and safe practice environments. Management paradigms must consider nursing staff as a limited resource—one that requires rest and respite at work and adequate recuperation time—if patients are to receive the best quality and safest care possible. Fatigue management plans should include all those who provide direct patient care and should address the factors that contribute to or are associated with work-related fatigue. Nursing staff should receive ongoing education about the benefits and importance of healthy sleep and recuperation and information about the negative effects of fatigue. In a subsequent article, the process of designing and implementing work-related fatigue reduction interventions across 4 patient care units and the outcomes will be described.

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