JONA
Volume 46, Number 7&8, pp 408-416

THE JOURNAL OF NURSING ADMINISTRATION

Caregiver Fatigue

Implications for Patient and Staff Safety, Part 2

Cheryl A. Smith-Miller, PhD, RN-BC
Jacqueline Harden, MHA, MBA, RN, NE-BC
Christa W. Seaman, DNP, RN, CCRN
Yin Li, BM, RN, PhD(c)
Ann Scott Blouin, PhD, RN, FACHE

Fatigue negatively affects healthcare workers' health and well-being, decreases patient safety, and negatively impacts the work environment. Although individual lifestyle choices influence fatigue levels, much responsibility lies with nursing administrators to prevent situations that may result in sleep deprivation or overwork. This article, the 2nd in a 2-part series, describes the results that were achieved from a fatigue reduction intervention.

The implementation of fatigue reduction measures in clinical settings is clearly supported by the evidence[1-3] and is advocated by both professional nursing organizations and accrediting bodies.[4-7] However, widespread strategic fatigue reduction plans remain a rarity for nursing staff in acute care environments. Unlike infection control and similar measures—whose role in patient safety is clearly defined and quantified—work-related fatigue reduction is a complex process and often proposes changes with uncertain benefits or that are perceived as inherently contradictory in some practice environments.[3,4]

Although fatigue reduction policies are certainly needed, policies alone are insufficient to change workplace cultures or individual behaviors. The literature is replete with fatigue reduction studies, but the interventions that are used during these explorations were typically implemented solely for research purposes, for brief periods, and by persons who are external to the organization.[3] Although the results can inform effective strategies for reducing fatigue in the workplace, there is little guidance on how nurse leaders can successfully and efficiently deploy these interventions in real-world settings where unit cultures and individuals must be taken into account. This article describes how participatory action research (PAR) methods[8] were used within an existing nursing shared governance structure to implement and examine the effect of a workplace fatigue reduction plan at an academic medical center.[9]

Background

Two shared governance councils—Nursing Practice Council (NPC) and Nursing Research Council (NRC)—were charged with developing a fatigue management solution for the division of nursing in response to the growing body of evidence linking fatigue with increased number of safety-related incidents and impaired performance. On the basis of a review of the literature[10] and existing policies, an NPC subcommittee collaborated with a doctorate of nursing practice student and a PhD nurse researcher on the project design and implementation.

The full NPC membership, the NRC, and the institutional review board approved the study before the initiation of any study activities. The project goals were to (1) identify the barriers and facilitators in implementing a fatigue management plan and (2) explore and evaluate the effects of a fatigue management intervention on nursing staff, time and attendance, and work culture.

Author Affiliations: University of North Carolina Medical Center (Dr Smith-Miller); Inpatient Heart & Vascular Services (Ms Harden) and Emergency Services (Dr Seaman), University of North Carolina Medical Center; and University of North Carolina at Chapel Hill (Ms Li); and Customer Relations, The Joint Commission, Oakbrook Terrace, Illinois (Dr Blouin).

The authors declare no conflicts of interest.

Correspondence: Dr Smith-Miller, University of North Carolina Hospitals, 3rd Fl Old Infirmary, 101 Manning Dr, Chapel Hill, NC 27599 (*Cheryl.Smith-Miller@unchealth.unc.edu*).

DOI: 10.1097/NNA.0000000000000366

Methods

Design

Participatory action research strategies served as the study framework.[11,12] With a history of use in organizational change and emphasis on empowerment and collaboration, PAR was compatible with the division of nursing's existing shared governance structure.[13,14] The use of PAR strategies engaged staff in a democratic dialogue about the intervention components and implementation, provided the opportunity for reflection, and constructed new understandings related to the work environment and individual's experience.

Procedures

Four nursing units—1 medical-surgical, 1 surgical, 1 medical, and 1 women's health—were invited to participate in the intervention based on their baseline Occupational Fatigue, Exhaustion, Recovery Scale (OFER15)[15] and "Current Fatigue Reduction Practices" survey results. The research team identified the units that had higher levels of fatigue and a low number of current fatigue reduction practices. This identification was followed by a meeting request to the nurse managers to explain their roles and responsibilities during the 3-month intervention and to reassess their willingness to participate.

Intervention

The intervention was implemented for 12 weeks from August 31 to November 22, 2014 (ie, two 6-week schedules) and is described in detail in Figure 1. This amount of time was considered adequate for measurable trends to occur and any work practice changes to become routine. All intervention units were expected to identify or reclaim a designated duty-free break room that was separate from the work space and provided a door that could be closed and telephones that could be placed in "do not disturb" mode.

The research team recommended that the breaks occur in the 1st 8 hours of the shift. Napping was allowed, but privacy and accommodations (eg, comfortable chair) were sometimes limited. An NPC volunteer visited each unit once a shift during the 1st 2 weeks of the intervention to support the unit's efforts and disseminate information about the intervention components. The nurse managers agreed to be responsible for monitoring and ensuring staff adhered to the scheduling components of the intervention (Figure 1).

Staff were encouraged to work throughout the shift in a manner that allowed everyone to leave on time. Registered nurses reported that interruptions during change-of-shift handoff contributed to delayed clock-outs and hindered patient handoff. However, a majority of these interruptions were found to be requests that fell under the purview of nursing assistants (NAs), (M. Langston, oral communication, July 2015). Thus, during the intervention period, NAs were asked to continue rounding on patients even after their report to the oncoming shift had been completed. This stipulation promoted the entire team leaving together and on time, thereby facilitating the consecutive work hour component of the intervention.

1. **Duty-Free Break** – A minimum of a 30 minute period in which nursing staff are relieved of all patient care responsibilities
    - i. This occurs within the first 8 hours of the 12 hour shift
    - ii. Break/Respite space is clearly defined and separate from work space
    - iii. Work communication devices in this area are not permitted (i.e., handed off prior) and/or set to a "do not disturb" mode as appropriate
2. **Limit Consecutive Work Hours/Shift Duration**
    - i. Shift length is limited to 12.5 hours under normal circumstances
3. **Limit Consecutive Shifts** – Shift rotation and consecutive work hours
    - i. Forty-eight hours is scheduled between night-to-day rotations to allow for adequate rest between night-to-day "flipping" (e.g. working Tuesday day shift after having worked Sunday night shift would not be permitted, the employee would need to be scheduled for Wednesday day shift after having worked Sunday night).
    - ii. Consecutive shifts are limited to no more than 60 hours in a rolling 7-day period per hospital policy

Figure 1. Intervention components and definitions.

Participants

Staff members were oriented to the intervention components through flyers posted around the units and personalized introduction letters placed in their unit mailboxes. During the month before the intervention, the NPC chairperson and the research team participated in staff and unit leadership meetings. The team encouraged an exchange of ideas, including possible implementation strategies for each unit, and distributed a proposed schedule of the focus groups. Suggested implementation strategies from staff members included selecting a break buddy at the beginning of the shift to facilitate patient handoff and assigning break times at the beginning of the shift to facilitate nurses' efforts to plan for their break.

Measures

Qualitative and quantitative data were collected. The quantitative measures included demographic and work-schedule–related items, the postintervention OFER15,[16] and time and attendance records. The OFER15 was used to examine 4 fatigue constructs: chronic fatigue (CF), acute fatigue (AF), intershift recovery (ISR), and persistent fatigue (PF), which have been previously described in detail.[17] Higher scores on 3 subscales (ie, CF, AF, and PF) are undesirable, whereas higher scores on the ISR are desirable because it indicates adequate recuperation between shifts.[10] The survey was available for 3 weeks; a reminder was sent at the 2-week mark. "Clock-in" and "clock-out" data were retrieved from the automated time and attendance collection system (Kronos). Data were de-identified; only position (eg, RN) and unit were retained.

Focus Groups

The focus groups were advertised on each unit. Two sessions, at 7:00 AM and 7:00 PM (times recommended by staff), were held on each of the 4 units at the start and end of the intervention period, for a total of 16 sessions. Participation was voluntary, and staff could attend a session on any unit. The sessions were facilitated by the nurse researcher; participants were encouraged to contact her after the session with any additional comments or concerns. Attendance, individual comments, and correspondence were confidential; participants were asked to maintain the confidentiality of the session. The groups were recorded using two digital recorders; field notes and memos were documented.

Data Analysis

Descriptive statistical procedures were performed on the house-wide OFER15 results, excluding the data from the 4 intervention units. Survey responses were confidential; data were analyzed in aggregate by unit, profession, gender, or shift using IBM SPSS for Windows v22.[18] Descriptive analysis and *t* test procedures were performed, and only completed surveys were included in the analysis. The survey scores were categorized as quartiles of scale distribution as recommended by the instrument author.[15]

Shift durations of less than 12.5 hours were excluded from analysis. The incidence of "no break" clock-outs and shifts greater than 12.5 hours and the number of minutes exceeding 12.5 hours were calculated by unit using Microsoft Excel 2010.

Focus Groups

Qualitative data analysis began during the focus group sessions. The digital recordings were reviewed at the end of each session to assess quality, allow additional note-taking, and clarify any questionable content.[19] A professional transcription service transcribed the recordings. The transcripts and recordings were concurrently reviewed to assure their accuracy, facilitate data immersion, and identify similar themes and relationships.[20] This validation process allowed for additional data synthesis and interpretation.[19,21] Additional reviews of the transcripts occurred during the manual and electronic coding processes, which facilitated identifying patterns across and among the units.

Qualitative comparative analysis techniques were used to explore how specific intervention components influenced the unit culture and individuals' subjective experiences[22-25] and identify the factors that facilitated or hindered the process. Comparisons were made between the day and night shifts and between each unit to discern commonalities and differences.

Findings

Nursing Practice Council members facilitated the intervention implementation by rounding on the units every shift for the 1st 2 weeks of the intervention. This level of involvement communicated the importance of the project—of reducing work-related fatigue—and was a catalyst to the successful implementation of the intervention.

Focus Groups

Data saturation (ie, the point when no new information was shared) was achieved within the 16 sessions. The session durations ranged from 15 minutes to 1 hour, ending when participants had nothing more to share. The number of participants in each group ranged from 2 to 8; both assistive personnel and RNs attended. Exemplar quotes are used to depict major

themes and provide context to quantitative findings. All names and locations are replaced by pseudonyms and identifiable speech patterns were removed but are otherwise presented in vivo. The qualitative findings will be discussed concurrently with the quantitative data in the following sections.

Participants

The postintervention survey response rate was 34%, lower than the preintervention rate of 60%. Most of the respondents, as illustrated on Table 1, were female, 40 years and younger. Despite a lower response rate, the characteristics of the respondents, such as education and experience, aligned with those of the preintervention sample.

OFER15

The house-wide OFER15 scores did not change significantly from the preintervention to postintervention period (Table 2), suggesting that any changes in OFER15 scores for the intervention units could be attributed to the intervention rather than other factors.

The CF and AF levels did not change significantly on the intervention units. However, the ISR and PF subscales showed a statistically significant difference, as illustrated on Table 3. The percentage of staff with high level of ISR increased (improved), whereas PF scores shifted downward (ie, improved) from the preintervention to postintervention period.

Intervention Components

Duty-free Breaks

The number of "no break" clock codes among RNs decreased on 3 of the 4 units and decreased significantly ($\alpha = .10$, $P = 0.09$) on 1 of the 3 units, as illustrated in Figure 2. Nurses' work habits related to breaks and staying past their shift were influenced by the unit culture as Elizabeth described early in the intervention:

> I developed some bad practices when I 1st came here because I saw what everyone did. I never…not ever, walked off the floor for 10 minutes. (In my previous position) I never charted or anything while I ate, ever—then I started doing that here and I was like, whoa. I've got to stop that.

Some nurses were aware of the possible negative consequences of fatigue at work and for the community and took measures to mitigate these risks:

> Towards the end of my shift—especially night shift—I…pay closer attention to everything I'm doing. Correct patient, order, medication, and etcetera. (Beth)
>
> I generally have a cup of coffee or other caffeine late in the afternoon or in the morning on the way home from a shift. (Jerome)

Staff members in the habit of leaving the unit readily acknowledged the benefits—"I have to leave the floor…need a reset" and "that is a good break when you can leave." Changes in work habits were evidenced in the time and attendance records and were noticed by co-workers:

Table 1. *Descriptive Analysis of Demographics: Pre (N = 1083) and Post (N = 614)*

	n (%)	n (%)
Gender		
Female	947 (88.6)	534 (88.0)
Male	122 (11.4)	73 (12.0)
Age, y		
<20	333 (31.2)	182 (29.9)
20-30	306 (28.6)	173 (28.5)
31-40	219 (20.5)	127 (20.9)
41-50	174 (16.3)	113 (18.6)
>50	36 (3.3)	13 (2.1)
Years of practicing as an RN		
0-5	309 (39)	172 (38.4)
6-10	176 (22)	103 (23.0)
11-20	152 (19)	76 (17.0)
>20	163 (20)	97 (21.6)
Educational level		
High school	31 (2.9)	14 (2.3)
Some college	127 (12.0)	92 (15.2)
Associate in nursing	167 (15.8)	89 (14.7)
Bachelor in nursing	483 (45.6)	278 (46.0)
Master of nursing	53 (5.0)	24 (4.0)
PhD/doctorate-nursing	3 (0.3)	1 (0.2)
Other bachelor	114 (10.8)	53 (8.8)
Other PhD/doctorate	6 (0.6)	5 (0.8)
Other master	42 (4.0)	27 (4.5)
Other associate	34 (3.2)	22 (3.6)
Working hours per shift		
12	927 (87.6)	534 (88.7)
8	107 (10.1)	63 (10.5)
4	24 (2.3)	1 (0.2)
24	0 (0.0)	4 (0.7)
Typical scheduled shift		
Day	71 (66.4)	215 (40.3)
Evening	4 (3.7)	0 (0.0)
Night	6 (5.6)	173 (32.4)
Rotating	11 (10.3)	139 (26.0)
Do not have a typical scheduled shift	15 (14.2)	7 (1.3)
Clinical service line		
Surgery	231 (21.3)	105 (18.0)
Medicine	107 (9.9)	66 (11.3)
Heart and vascular	113 (10.3)	64 (10.9)
Women's	69 (6.4)	35 (6.0)
Children's	218 (20.1)	115 (19.7)
Oncology	93 (8.6)	33 (5.6)
Psychiatry	51 (4.7)	32 (5.5)
Emergency services	96 (8.9)	60 (10.3)
Rehabilitation center	11 (1.0)	29 (5.0)
Surgical	26 (2.4)	18 (3.1)
Other	31 (2.9)	28 (4.8)

Table 2. *Preintervention and Postintervention Fatigue Scores: All Staff, RNs, NAs, and CSTs (Pre, N = 1083; Post, N = 614)*

Fatigue Subscale Results	All Staff, n/Mean (SD)	RNs, n/Mean (SD)	NAs, n/Mean (SD)	CSTs, n/Mean (SD)
Chronic				
Pre	997/40.09 (26.97)	755/40.94 (26.27)	94/42.20 (30.97)	78/35.94 (26.15)
Post	566/38.20 (24.80)	413/38.60 (23.78)	72/36.90 (29.61)	46/36.01 (22.86)
p	0.17	0.13	0.27	0.99
Acute				
Pre	1001/51.58 (24.84)	757/63.12 (23.98)	96/58.72 (26.65)	79/61.39 (22.70)
Post	563/59.66 (24.42)	413/62.16 (23.70)	71/53.70 (27.83)	46/58.70 (20.57)
p	0.20	0.51	0.10	0.56
Intershift recovery				
Pre	998/51.97 (23.22)	758/51.24 (23.24)	92/54.06 (23.76)	77/51.56 (22.61)
Post	357/53.91 (22.49)	415/53.71 (22.65)	71/59.38 (23.90)	47/53.83 (17.21)
p	0.11	0.31	0.18	0561
Persistent				
Pre	998/48.03 (23.22)	758/48.76 (23.24)	92/45.94 (23.76)	77/48.44 (22.61)
Post	411/46.09 (22.49)	415/47.32 (22.65)	71/40.85 (23.90)	47/46.17 (17.21)
p	0.11	0.31	0.18	0.56

Abbreviation: CST, clinical support technician.

I've seen more nurses taking a break, leaving the floor then I did before the intervention started. New nurses still don't want to leave because they are afraid they will get behind. (Kate)

A greater emphasis was placed on planning as duty-free breaks became standard practice. Nurses began to compartmentalize their shift into before- and after-break periods and, as such, developed different ways of working. This way of working was new for some nurses. Megan described how she oriented a float nurse to the duty-free break procedure while also modeling support and teamwork:

> It's a culture change. We just have to encourage people that this is your break time, you need to use it, give your phone up. There's other nurses who are capable of handling things. I had a float nurse the other day who said, "I'm just taking my phone. I got an admission coming and 1 person's coming back from the OR. I said, "oh, that's okay we're nurses. I can help with that. Go. Give your phone away and I will help your buddy if they need extra help.

Work habits, even among those who were reticent about participating in the intervention components,

Table 3. *Levels of Chronic, Acute, Intershift Recovery, and Persistent Fatigue for All Staff in 4 Intervention Units: Pre Versus Post (N = 90)*

Fatigue Subscale (0-100)	Pre, n (%)	Post, n (%)	*p*
Chronic (missing, 4)			
0-25 (low)	10 (13.5)	3 (25.0)	
26-50 (low/moderate)	24 (32.4)	5 (41.7)	
51-75 (moderate/high)	18 (24.3)	2 (16.7)	
76-100 (high)	22 (29.7)	2 (16.7)	0.56
Acute (missing, 4)			
0-25 (low)	6 (8.1)	1 (8.3)	
26-50 (low/moderate)	9 (12.2)	5 (41.7)	
51-75 (moderate/high)	25 (33.8)	2 (16.7)	
76-100 (high)	34 (46.0)	4 (33.3)	0.08
Intershift recovery (missing, 1)			
0-25 (low)	15 (19.8)	1 (7.7)	
26-50(low/moderate)	32 (42.1)	1 (7.7)	
51-75 (moderate/high)	19 (25.0)	9 (69.2)	
76-100 (high)	10 (13.2)	2 (15.4)	0.01
Persistent (missing, 1)			
0-25 (low)	10 (13.2)	2 (15.4)	
26-50 (low/moderate)	25 (32.9)	10 (76.9)	
51-75 (moderate/high)	26 (34.2)	0 (0.0)	
76-100 (high)	15 (19.8)	1 (7.7)	0.01

χ^2 Test is applied. Survey scores were categorized as low (0-25), low/moderate (26-50), moderate/high (51-75), and high (76-100), as quartiles of scale distribution.

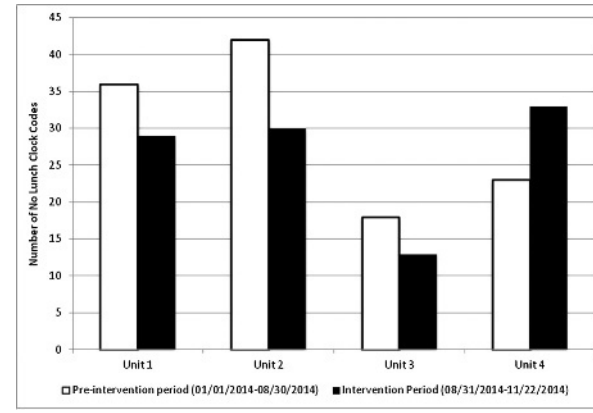

Figure 2. Number of "no break" clock codes during the preintervention period compared to the intervention period.

changed over the course of the intervention. One RN who was initially very resistant to taking a break, giving up her telephone, and leaving on time came to embrace the changes. The charge nurse described the RN's transformation:

> She was one that was very, "I don't want to give up my phone" and did not—but she really enjoys it now, and she likes to go at 3:00 to watch The Price is Right. (Matt, charge nurse)

Two factors hampered efforts to enforce duty-free breaks: first, nurses' reluctance to let float nurses cover their patient assignment and, second, a dynamic patient census, a circumstance when patient census decreases and the number of staff is correspondingly reduced and is then followed by unanticipated admissions, resulting in increased patient-to-nurse ratios.

Charge Nurses

Charge nurses were essential in assuring that the duty-free breaks occurred. Participating in the intervention allowed charge nurses to proactively prompt staff to take breaks and communicate the importance of rest during the nurse's shifts. Leslie recounted how her role changed during the course of the intervention:

> Like in the beginning, it was very…"You have to hand off your phone" and having to remind people. We were very strict about it, and now…as time goes on…the charge nurses are not hounding people, but (the breaks are) still happening. I feel like that's a good—we've created a habit since the beginning of the study.

Alicia struggled with scheduling breaks as a charge nurse because it was a new practice on her unit:

> Bridget (another charge nurse) is very good at blocking them (breaks) out so that people know. I tend to, it's like 1:00 and I'm like, "People haven't gone to break!" It's like scurrying around to make things happen. For the most—as far as I know, they are getting their duty-free breaks.

Limiting Shift Duration

Examination of the clock-out data showed that RNs worked more than 12.5 hours more often than assistive personnel and had a higher percentage of "no lunch" time stamps. Nurses were well aware of this phenomenon: "You'll see across the board; the nurses are late, and the NAs are out on time" (Alicia).

The gap between clock-out times narrowed throughout the intervention period. The incidence of working more than 12.5 hours decreased a statistically significant degree (Table 4).

Personal philosophy and personality also informed individual nurse's choice to stay beyond the end of a shift. The reasons cited for not leaving on time included being "responsible for more things" and not wanting to leave tasks unfinished. However, internal conflict existed among some nurses when they left tasks unfinished despite verbalizing that patient care was a 24-7 endeavor:

> I guess I have to—guess when I get admissions at that time, I'm just gonna have to not do it, but it's just going to be hard for me not to do that. (Sheila)

> Then I get an admission at 6:30…. I don't like to leave work for other people. (Toni)

The unit culture, as expressed by individual nurses, dictated whether nurses took breaks or left on time. At the beginning of the intervention, the nurses on some units anticipated receiving negative responses from the oncoming shift if tasks, such as an admission assessment, were unfinished at the change of shift.

> There are a couple of nurses on both shifts that say, "Why haven't you finished your admission?" Well, that patient got here at ten after 6:00…. I was trying to get some other things done. (Susan)

However, participating in the intervention empowered nurses to say, "Sorry, I have to leave on time." Rebecca shared how the intervention provoked a change in perspective, "You have to have trust that sometimes things just won't get done." Jasmin explained the culture on her unit and how expectations had evolved:

> When I get an admission like that (at the end of shift), I do a focused assessment at that time and make sure the patient's in the bed. I would expect night shift to do that for me. I'm going to go in there and do an admission while I'm meeting my patient. It's the practices that we have to embed in people. Here, when I 1st came here, it was dog-eat-dog, and you better have everything done.

Assistive personnel were essential in facilitating an efficient nurse-to-nurse report at shift change. The practices among the units with regard to NAs' engagement at the end of shift were inconsistent. In the absence of assistive personnel, the end-of-shift report was fraught with interruptions and lengthened the RNs' shift as Della described:

> We're (RNs) in the middle of report and we have to stop and (answer a call bell)…patients calling to go to the bathroom.

When the assistive personnel roles were well defined, the scenario at the end of the shift was very different:

> Nursing assistants start rounding on patients…but if call bells are ringing during our report…the NAs will go answer it…. (Jamie)

Table 4. *Intervention Units: Hours Worked During the Scheduled Shift Among RNs and NA/CSTs, Pre (N = 1083) and Post (N = 614)*

Unit	Baseline Period (>12 h), h	Intervention Period (>12 h), h	Difference Between Baseline and Intervention Periods	*t*	*P*
1					
RN	501.33	445.57	−55.76		
NA/CST	75.73	75.78	0.05		
3-mo total	577.06	521.35	−55.71	2.82	.02
2					
RN	220.23	219.27	−0.96		
NA/CST	56.78	43.63	−13.15		
3-mo total	277.02	262.90	−14.12	1.18	.26
3					
RN	85.30	95.90	10.6		
NA/CST	55.07	28.40	−26.67		
3-mo total	140.37	124.30	−16.07	0.49	.63
4					
RN	256.65	228.83	−27.82		
NA/CST	23.58	32.20	8.62		
3-mo total	280.23	262.03	−20.2	2.55	.03
Grand total	1274.68	1170.58	−104.10		

Baseline data, 3 months before intervention; α, 0.05; 2-tailed test to detect a difference in either direction (+/−).
Abbreviation: CST, clinical support technician.

Limiting Consecutive Shifts

Requiring 48 hours between a night shift and a day shift was a new scheduling limitation; nonetheless, despite initial resistance on the part of some, attitudes toward this requirement shifted.

> I do the scheduling, and so, it wasn't frequent or often, but there were occasions that somebody would work Sunday night and then come back Tuesday day. But they liked having to have 48 hours in between a night shift and day shift. That's something that people have voiced, that after the study they want to continue that. That was definitely something that people have liked. (Elena)

> I feel like it is a habit now, and so the 2nd 6-weeks has gone better. I like the 48-hour break. (Daniel)

Strengths and Limitations

Two study limitations were that the preintervention and postintervention survey responses were not matched and the number of survey respondents differed from the preintervention to postintervention period. These differences may have affected the reliability of the OFER15 results and could result in an underpowered test. However, the 6-month period between the preintervention and postintervention surveys meant that personnel changes were inevitable and it was expected that the personnel and number of respondents would change. The study did not control for factors that may have influenced staff fatigue such as personal obligations or unit admission/discharge/transfer activity or census; however, the number (n = 4) and the similarity of the units (acute care) lend validity to the findings. Data triangulation (ie, collecting data from multiple sources) also reflected changes in unit cultures and nurses' practice on the intervention units and adds to the reliability of the study findings.

Discussion

The use of a PAR framework coincided with the existing shared governance structure and engaged clinical nursing staff in the research process and the decisions that affect their work and practice.[12,14] Despite initial reluctance on the part of some staff members, "no break" clock-outs decreased on 3 units during the intervention period. The increase in "no break" clock outs on 1 unit could be attributed to a reconceptualization of a break as a duty-free period, as described in the study protocol, and as a result, staff became more diligent in accurately documenting its omission.

In the beginning, nurses were concerned about taking a duty-free break because of patient acuity levels, the busyness of their unit, and added burden of caring for additional patients. These fears were similar to those expressed in Scott et al's[3] study where participants expressed emotional and psychological difficulties about engaging in fatigue reduction measures. Among participants in this study, these feelings and cognitions decreased over time as the measures were integrated into the unit culture and nursing practice.

A culture of staying over (ie, working past the end of a scheduled shift) was evident in some units' preintervention time and attendance data. Initially, many nurses reported feeling guilty about leaving tasks undone due to personal traits or because they

were afraid of negative feedback from the oncoming shift.[26] However, although reports of negative feedback must be interpreted with caution, negative feedback was mitigated during the intervention by the fact nurses were obliged to leave on time. Regardless of the reasons that are offered, monitoring and enforcing shift duration benefit the work environment and reduce costs.

Assistive personnel's role in minimizing interruptions during shift report was an important factor in nurses' ability to leave on time. Therefore, it is essential that nurse leaders clearly delineate the roles and duties of assistive personnel during these periods to enhance teamwork and decrease staff costs. In this study, teamwork among and between the shifts improved across all units as the clock-out times between NAs and RNs became more closely aligned and overtime decreased.

A PAR framework, in concert with a preexisting structure of empowerment, facilitated the development and implementation of a sustainable fatigue reduction plan and generated new knowledge about nurses' practices related to fatigue reduction in the workplace. Benefits included the opportunity for shared governance councils to collaborate in implementing evidence-based practices. Clinical staff were actively involved in the implementation process, increasing the likelihood that the intervention measures would be accepted across the organization. Nursing leadership is an important force in driving practice change; however, it was the clinical staff who ultimately supported positive workplace changes.

Recommendations for Nurse Executives

Despite the preponderance of evidence, most nurses did not conceptualize work-related fatigue as a patient safety issue. This seemed related to a lack of awareness of the ways in which their fatigue puts their patients at risk or disbelief that fatigue is an issue for their practice. Unlike handwashing and infection reduction measures, nurses were reluctant to engage in fatigue management practices at work. While staff member's outside activities can effect fatigue in the workplace fatigue reduction plans must be implemented at an institutional level and maintained on the unit level. Staff schedules and shifts should be monitored to assure adherence to stated guidelines and to identify staff who struggle with time management. On the basis of the results in this study, the following measures are recommended as part of institutional fatigue reduction planning:

- Education for all staff about the negative impact of fatigue on patient care and safety
- Instituting duty-free breaks for all staff on all units along with:
  - designated break areas
  - scheduled break periods, preferably determined at the start of each shift
  - nurse manager and charge nurse monitoring to assure adherence
- Standardize scheduling policies, which include at a minimum:
  - limiting the number of hours to 12.5 for a single shift
  - requiring 48 hours of recuperation time between a night shift and a day shift
  - time and attendance monitoring by the nurse manager to assure adherence to guidelines and the identification of staff who need assistance with time management

Acknowledgment

The authors thank the participation of Rayna Gorisek, BSN, RN, CCRN; Jennifer Odell, BSN, RN, CPEN; Ashley Tate, BSN, RN, CPN; and William Whitaker, BSN, RN, PCCN in this work.

References

1. Amin MM, Graber M, Ahmad K, et al. The effects of a midday nap on the neurocognitive performance of first-year medical residents: a controlled interventional pilot study. *Acad Med*. 2012;87(10):1428-1433.
2. Zadeh S, Gamba N, Hudson C, Wiener L. Taking care of care providers: a wellness program for pediatric nurses. *J Pediatr Oncol Nurs*. 2012;29(5):294-299.
3. Scott LD, Hofmeister N, Rogness N, Rogers AE. An interventional approach for patient and nurse safety: a fatigue countermeasures feasibility study. *Nurs Res*. 2010;59(4):250-258.
4. Fallis WM, McMillan DE, Edwards MP. Napping during night shift: practices, preferences, and perceptions of critical care and emergency department nurses. *Crit Care Nurse*. 2011;31(2):e1-e11.
5. American Nurses Association. *Assuring Patient Safety: Registered Nurses' Responsibility to Guard Against Working When Fatigued (Official ANA Position Statements)*. Silver Spring, MD: American Nurses Association; 2006
6. American Nurses Association. *Assuring Patient Safety: The employers' Role in Promoting Healthy Nursing Work Hours for Registered Nurses in all Roles and Settings (Official ANA Position Statements)*. Silver Spring, MD: American Nurses Association; 2006.
7. The Joint Commission. *Sentinel Event Alert Issue 48: Health Care Worker Fatigue and Patient Safety*. Oakbrook Terrace, IL: Joint Commission; 2011.
8. Han K, Trinkoff AM, Storr CL, Geiger-Brown J, Johnson KL, Park S. Comparison of job stress and obesity in nurses with favorable and unfavorable work schedules. *J Occup Environ Med*. 2012;54(8):928-932.
9. MacDonald C. Understanding participatory action research: a qualitative research methodology option. *CJAR*. 2012;13(2):34-50.

10. Smith-Miller CA, Shaw-Kokot J, Curro B, Jones CB. An integrative review: fatigue among nurses in acute care settings. *J Nurs Adm*. 2014;44(9):487-494.
11. Baum F, MacDougall C, Smith D. Participatory action research. *J Epidemiol Community Health*. 2006;60(10):854-857.
12. Koch T, Kralik D. *Participatory Action Research in Health Care*. Malden, MA: Blackwell; 2006:186.
13. McTaggart R. Principles for participatory action research. *Adult Educ Quart*. 1991;41(3):168-187.
14. Madigan C, Alexander R. Creating a shared governance model for diversity. AONE: *Voice of Nursing Leadership*. 2010: 8-9.
15. Winwood P. *Manual for the Use of the Occupational Fatigue, Exhaustion, Recovery scale (OFER15)*. University of South Australia: Peter Winwood; 2005.
16. Winwood PC, Lushington K, Winefield AH. Further development and validation of the Occupational Fatigue Exhaustion Recovery (OFER) scale. *J Occup Environ Med*. 2006;48(4):381-389.
17. Blouin AS, Smith-Miller CA, Harden J, Li Y. Caregiver fatigue: implications for patient and staff safety—part 1. *J Nurs Adm*. 2016;46(6):329-335.
18. IBM. *IBM SPSS Statistics for Windows*. Armonk, NY: IBM Corp; 2010.
19. Denzin N, Lincoln Y. *The Sage Handbook of Qualitative Research*. Thousand Oaks, CA: Sage; 2005.
20. Sandelowski M, Voils CI, Knafl G. On quantitizing. *J Mix Methods Res*. 2009;3(3):208-222.
21. Patton MQ. *Qualitative Research & Evaluation Methods*. Thousand Oaks, CA: Sage; 2002.
22. Hsieh HF, Shannon SE. Three approaches to qualitative content analysis. *Qual Health Res*. 2005;15(9):1277-1288.
23. Miles M, Humberman AM. *Qualitative Data Analysis*. Thousand Oaks, CA: Sage Publications; 1994:252.
24. Sandelowski M. *Qualitative Analysis 1 Empirical/Analytical Methods in Qualitative Research*. Chapel Hill, NC: University of North Carolina at Chapel Hill School of Nursing; 2008.
25. Schutt R. *Investigating the Social World, the Process and Practice of Research*. Thousand Oaks, CA: Sage; 2011:320-357.
26. Vryonides S, Papastavrou E, Charalambous A, Andreou P, Merkouris A. The ethical dimension of nursing care rationing: a thematic synthesis of qualitative studies. *Nurs Ethics*. 2015;22:881-900.