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Work and Health Correlates of Sleep Quantity and Quality Among Correctional Nurses

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Abstract

Background/Objectives: The correctional environment exposes nurses to unique physical and psychosocial work stressors, such as inmate violence and safety concerns. Nurses often experience short and poor sleep; however, the quantity and quality of sleep in this specialty practice group of nurses are underexplored. The study objective was to examine a wide range of work and health correlates of sleep quantity and quality in correctional nurses.

Methods: A Web-based survey was administered to nurses within a Northeastern State Correctional Health-care System, covering questions on sleep quantity and quality, working conditions, health outcomes, and work outcomes.

Results: Among the 89 correctional nurses who participated, 56.2% reported short sleep duration (≤6 hours/day) and 31.8% reported poor sleep quality. Multivariate Poisson regression modeling suggested that night shift (prevalence ratio [PR] = 1.95, $p < 0.05$) and single marital status (PR = 2.25, $p < 0.05$) were significantly associated with increased prevalence of short sleep duration, whereas none of the work and health variables were significantly associated with increased prevalence of poor sleep quality, after adjustment for sociodemographics and other covariates.

Conclusion: Correctional nurses experience a high prevalence of short and poor sleep. Similar to previous studies, we found that short sleep duration was associated with night shift work. Interventions targeting work schedule remodeling (e.g., reduce the number of consecutive night shifts) and shift work coping mechanisms may promote sleep health of correctional nurses.

Keywords

Correctional nurses; shift work; sleep; stress

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Correctional nurses represent a large population of healthcare providers (Chafin & Biddle, 2013), who are caring for more than 2.2 million inmates in jails and prisons across the United States (Bureau of Labor Statistics, U.S. Department of Labor, 2016). Nurses in correctional facilities have a high turnover rate. One study reported a correctional nurse turnover rate of 20% in a 3-year period, compared with a national turnover rate of 13% in the entire nursing workforce (Chafin & Biddle, 2013). In addition to the general challenges faced by the nursing workforce including heavy workload and short staffing, correctional nurses experience unique occupational risks such as inmate violence and prison lockdowns causing increased pressure/tension from inmates (Stevens, 2010). Other work stressors in the correctional environment include safety and security concerns and a high level of vigilance as part of the regular work routine (Flanagan & Flanagan, 2001; Weiskopf, 2005); stigmatization and disparagement (Hardesty, Champion, & Champion, 2007); isolation, aggression, violence, and manipulative behaviors (Flanagan, 2006; Garland & McCarty, 2009); and time pressure, role ambiguity, and lack of organizational support (Flanagan, 2006; Flanagan & Flanagan, 2002).

Workplace safety is a concern for all nurses (Hughes, 2008). Depending on the specialty, nurses may encounter a higher risk of some unique work stressors such as working with patients with a known capacity for violence. Correctional nurses are trained to take care of victims of trauma and abuse. Providing healthcare to incarcerated patients can potentially challenge nurses' safety. The diversity of correctional nursing practice, and the unexpected events encountered in their daily lives, sees nurses responding as emergency nurses and/or psychiatric nurses. Like emergency nurses and psychiatric nurses, correctional nurses are exposed to a higher risk of workplace violence than the general nursing population. It has been estimated that more than 50% of prisoners have experienced mental health issues (James & Glaze, 2006), compared with one in five adults in the general population (National Institute of Mental Health, 2016). The 2011 U.S. Bureau of Justice Statistics reported a nurse workplace violence rate of 3.9% (Bureau of Justice Statistics, 2011). Studies have reported that emergency and psychiatric nurses experience a significantly greater number of workplace violence incidents than other specialty nurses (Pekurinen et al., 2017; Speroni, Fitch, Dawson, Dugan, & Atherton, 2014). Cashmore, Indig, Hampton, Hegney, and Jalaludin (2012), reported that, in one correctional setting in Australia, nurses were victims of 90% of the 208 incidences of workplace violence during a 3-year period. Correctional environments are often places of distrust and cynicism, leading to bullying among nurses, correctional officers, and patients. Nurses may experience compassion fatigue and secondary traumatization when working with the incarcerated patient population (Johnson, 2016).

Sleep Quantity and Quality in the Nursing Workforce

Healthcare workers such as nurses provide continuous services around the clock; as a result, they are at a high risk for decreased sleep quantity and quality, continuous sleep deprivation, and cumulative sleep debt (Caruso, 2014; Geiger-Brown et al., 2012). Fatigue resulting from short and poor sleep as experienced by nurses tends to reduce their ability to concentrate and make correct decisions, leading to the possibility of errors and injuries (Scott, Arslanian-Engoren, & Engoren, 2014). Sleep deprivation, sleepiness, and fatigue

were consistently associated with nurse performance and patient safety, which are important public concerns (Caruso & Hitchcock, 2010; Lockley et al., 2007).

Shift work has been consistently identified as a contributor to short and poor sleep of nurses. Working at night or on a rotating schedule can lead to misalignment between the timing of the biological clock and the work/sleep schedule, resulting in poor and shortened sleep during the day (Roach, Fletcher, & Dawson, 2004). Perkins claimed that nurses who sleep during the day(night shift nurses)obtained 4 hours less sleep than night sleepers (day shift nurses), and night shift nurses may accumulate a significant number of hours of sleep debt, leading to long-term exhaustion (Perkins, 2001). One study estimated that accident rates increased by 50%–100% for employees working long or irregular shifts (Wagstaff & Sigstad Lie, 2011).

Besides shift work, many other work factors may cause poor sleep of nurses, such as physical and psychosocial work strain (Geiger-Brown & Lipscomb, 2010; Zhang, Punnett, McEnany, & Gore, 2016). Previous studies have reported that workers with higher perceived stress had a significantly shorter sleep duration and worse sleep quality than workers with lower perceived stress (Charles et al., 2011; Kashani, Eliasson, & Vernalis, 2012). The work stress may also conflict with family responsibilities, such as childcare and eldercare, further contributing to poor sleep of nurses (Jacobsen et al., 2014; Zhang et al., 2016).

In addition to work factors, other identified risk factors for reduced sleep quantity and/or quality in other occupational groups or the general population include sociodemo-graphics such as older age (Green, Espie, Hunt, & Benzeval, 2012; Marquiae, Folkard, Ansiau, & Tucker, 2012), female gender (Green et al., 2012), African American racial group (Tomfohr, Pung, Edwards, & Dimsdale, 2012), unmarried status (Troxel et al., 2010), low income and low educational level (Paparrigopoulos et al., 2010), and having dependent family members (K. C. Lee, Yiin, Lin, & Lu, 2015). Disturbed/reduced sleep has also been linked to lifestyle factors such as smoking (Paterson, Dorrian, Clarkson, Darwent, & Ferguson, 2012), lack of physical activity (Farnsworth, Kim, & Kang, 2015), and poor health outcomes such as obesity (Buscemi, Kumar, Nugent, & Nugent, 2007), chronic diseases (Foley, Ancoli-Israel, Britz, & Walsh, 2004), and musculoskeletal pain (Takahashi, Matsudaira, & Shimazu, 2015).

Research Gap and Objectives

Although there has been much research on shift scheduling, work stress, and its impacts on nurses' sleep, the quantity and quality of sleep and their correlates in this specialty practice group of nurses are underexplored. The correctional environment exposes nurses to unique physical and psychosocial work stressors, especially workplace violence, which has not been examined for its impact on nurses' sleep health. Therefore, the objective of this study was to examine a wide range of potential work and health correlates of sleep quantity and quality in correctional nurses.

Methods

Setting and Subjects

The study took place in a multifacility Northeastern State Correctional Healthcare System that directly employs all nursing personnel working in its system. It is the largest managed medical care provider in the state. All registered nurses (RNs) working in the State Correctional Healthcare System were invited to participate in this cross-sectional web-based survey. A nonprobability purposive sampling method was used to ensure reaching all potentially available individuals to obtain as representative a sample as possible (Hulley, Cummings, Browner, Grady, & Newman, 2013). We achieved a response rate of 71% (107 of targeted 150 RNs responded to the survey), which was desirable to ensurethat results were representative of the full workforce.

Measurement of Variables

Dependent Variables

Sleep Quantity and Quality.: Both sleep quantity and quality were assessed from participants' subjective reports. The measure of sleep quantity indicated participants' typical amount of sleep per 24-hour period during the work week (6 hours or less, about 7 hours, about 8 hours, about 9 hours, and more). For these analyses, sleep quantity was dichotomized as >6 hours per day versus ≤6 hours per day ("short sleep duration"; Luckhaupt, Tak, & Calvert, 2010; Qiu, Gelaye, Fida, & Williams, 2012). The participants' subjective quality of sleep was measured in four categories (good, fairly good, fairly poor, and poor). This item was modified from the sleep quality question from the Pittsburgh Sleep Quality Index (Buysse, Reynolds, Monk, Berman, & Kupfer, 1989). Sleep quality was dichotomized as good (good and fairly good) versus poor (poor and fairly poor; (Caska et al., 2009) for subsequent analyses.

Independent Variables

Working Conditions.: The study used the Healthy Work-place All Employee Survey developed by the Center for the Promotion of Health in the New England Workplaces (CPH-NEW) to assess working conditions including physical demands, physical safety, psychological demands, decision latitude, social support, and work–family conflict. CPH-NEW, a Total Worker Health center of excellence funded by the U.S. National Institute for Occupational Safety and Health, has selected and adapted multiple working condition measures and developed a thorough survey to assess employee attitude related to health, safety, and wellness. The study also assessed inmate-related violence and workplace bullying. All these scales used items selected from standardized instruments.

Physical demands (two items), psychological demands (three items), decision latitude (four items), and social support (four items) were selected from the Job Content Questionnaire (Karasek et al., 1998). The Job Content Questionnaire sub-scales have shown good validity and acceptable reliability in large study populations from six countries (Karasek et al., 1998). Physical safety was assessed with seven items adapted from the Work-Safety Tension Scale (Dedobbeleer & Béland, 1991) measuring the perception of safety climate in the workplace. Work–family conflict was assessed with four items adapted from the

National Comorbidity Survey (Kessler, 2008) measuring the level of difficulty in balancing the demands of work with family obligations. A 4-point Likert scale (strongly disagree, disagree, agree, and strongly agree) was used to assess each item in the above scales. Instrument reliability was assessed in the study sample with Cronbach's alpha (α). Three subscales, namely, physical demands (α = 0.74), social support (α = 0.80), and work–family conflict (α = 0.76) had acceptable reliability, and three subscales, namely, physical safety (α = 0.62), psychological demands (α = 0.31), and decision latitude (α = 0.56), had lower values. This is consistent with a previous study of nursing home caregivers (Zhang et al., 2016). Previous studies with hospital nurses have also reported lower reliability of psychological demands and decision latitude subscales (Choobineh, Ghaem, & Ahmedinejad, 2011; Griep et al., 2009). Inmate-related violence was assessed with six items selected from the Assessing Risk of Exposure to Blood & Airborne Pathogens & General Health Survey (Amuwo, Sokas, McPhaul, & Lipscomb, 2011; El Ghaziri, Zhu, Lipscomb, & Smith, 2014) focusing on assessing workplace violence and client characteristics in the past 12 months. Each item was assessed as yes or no, resulting in a total score of 0–6 with higher scores indicating more inmate-related violence. The Cronbach's alpha of the instrument for the study sample was 0.49, which may attribute to the two dimensions measured in the scale: exposure to violence and experience with violence. Workplace bullying was assessed using the Negative Acts Questionnaire-Revised (Einarsen, Hoel, & Notelaers, 2009). The Negative Acts Questionnaire-Revised consists of 21 items describing different kinds of behaviors in the past 6 months that may be perceived as bullying if they occur on a regular basis. A 5-point Likert scale (daily or almost daily, more than once a week, more than once a month, at least once during the past 6 months, not in the past 6 months, or never) was used to assess each item. The summary score of the instrument was divided into three categories (not bullied, occasionally bullied, and regularly bullied). The instrument reliability for the study sample was excellent with a Cronbach's alpha of 0.96. The survey also collected information about participants' work shift arrangements, such as day (7 a.m.–3 p.m.), evening (3 p.m.–11 p.m.), night (11 p.m.–7 a.m.), or rotating shifts (rotating among days, evenings, and nights) and weekly work hours (≤40 or >40).

Work Outcomes.: Work outcomes were collected from the aspects of stress, burnout, job satisfaction, and intention to turnover assessed by the CPH-NEW Healthy Workplace All Employee Survey. Stress was assessed with two items measuring the amount of stress experienced by participants at work and at home. Burnout was assessed with two items adapted from the Job Demands-Resources Model of Burn-out (Demerouti, Bakker, Nachreiner, & Schaufeli, 2001), measuring the feelings of overwork characterized by emotional exhaustion and disengagement. Job satisfaction was assessed with two items adapted from the Organizational Assessment Survey (Gowing & Lancaster, 1996) measuring participants' satisfaction with their jobs and organization. Intention to turnover was assessed with two items adapted from the Organizational Assessment Survey (Gowing & Lancaster, 1996) measuring participants'desire to quit their job and find new jobs during the next year. The summary scores were calculated for these four variables. Instrument reliability was assessed in the study sample with Cronbach's alpha (α), suggesting good reliability for burnout (α = 0.81), job satisfaction (α = 0.84), and intention to turnover (α = 0.88).

Health Outcomes.: Health outcomes were collected from musculoskeletal disorders (MSDs) and depressive symptoms assessed by the CPH-NEW Healthy Workplace All Employee Survey. MSDs were assessed for five regions—hand/wrist, shoulder/neck/upper back, low back, knee, and foot—and were defined as "yes" for participants reporting moderate, severe, or extreme pain in any region. Depressive symptoms were assessed with two items selected from the Center for Epidemiological Studies Depression Scale (Radloff, 1991) measuring participants' feeling of depression during the past week. The instrument reliability for the study sample was acceptable ($\alpha = 0.68$).

Covariates

Sociodemographics.—The survey collected information on nurses' sociodemographics, including age, gender, race, marital status, education, weight, family income, work tenure (years at current State Correctional Healthcare System), and responsibility for children and other dependents. We did not calculate body mass index in this study because of many missing values on self-reported height.

Data Collection

The survey was administered online through Qualtrics with all RNs working in the State Correctional Healthcare System. A participatory action research approach (Baum, MacDougall, & Smith, 2006) was used to ensure stake-holders' involvement in the study design, data collection, interpretation, and dissemination of the results. The research team first gave a presentation about the project at an informational and planning meeting with the health service administrators, nursing supervisors, and direct care nurse representatives and solicited feedback regarding the study design and data collection methods. Then, the research team solicited feedback from direct care nurses regarding the purpose and aims of the study, made corresponding revisions, and built agreement about the study expectations with all stakeholders. The online survey was then announced through the system broadcast emails, and fliers were displayed around the facilities. Using a multitiered approach and procedures described by Dillman (2007) and Dillman, Smyth, and Melani (2009), nurses received a presurvey email that introduced the study, followed by an invitation email with the survey link, a follow-up email, and a final reminder/thank-you email. All emails were sent out directly through the State Correctional Healthcare System's administrative assistant. The study was approved by the institutional review board at the University of Massachusetts Lowell (No. 15–087). The need for informed consent was waived by the institutional review board because of minimal risk of participation. Participants were asked to voluntarily provide their contact information through a different link after completing the online survey to receive a compensation of a $15 gift card (Dickert & Grady, 1999).

Data Analysis

All analyses were conducted using SPSS software 24.0.0. The correlations among sleep quantity or quality with working conditions, work and health outcomes, and sociodemographic factors were examined using independent-samples t tests (comparing the means of two independent groups) or cross-tabulation analyses (examining the relationship between two categorical variables; Field, 2013). Because the prevalence of short sleep duration

and poor sleep quality in the study participantswere56.2%and 31.8%, respectively, Poisson regression modeling with robust variance estimate was more conservative and accurate than logistic regression modeling; therefore, it was used to calculate prevalence ratios (PRs) among groups and investigate potential confounding (Barros & Hirakata, 2003). Multivariate modeling to identify factors associated with short sleep duration or poor sleep quality was adjusted for variables that were associated with short sleep duration or poor sleep quality at a $p < 0.10$ level in the bivariate analyses. Two-tailed significance level was reported at $p < 0.05$.

Results

Descriptive Analyses

Among the 107 correctional nurses who completed the online survey (response rate of 71%), 18 surveys were omitted because of missing data on sleep quantity and quality, leaving 89 responses for the current analyses. The 89 nurses were primarily female (75.3%) with an average age of 44.5 years and an average work tenure of 8.45 years. Over half reported short sleep duration (≤6 hours/day), and about a third reported poor sleep quality (see Table 1). About a quarter (25.6%) of these nurses reported being occasionally bullied, and 10.5% reported being regularly bullied. Over two thirds (67.1%) of these nurses reported MSDs, defined as moderate, severe, or extreme pain in at least one body region (see Table 1).

Bivariate Analyses

Bivariate analyses suggested that short sleep duration was associated with night or rotating shift work (see Figure 1; $\chi^2 = 20.48$, $p < 0.001$), MSDs (see Figure 2; $\chi^2 = 5.17$, $p < 0.05$), higher weight ($t = 2.05$, $p < 0.05$), single marital status ($\chi^2 = 8.70$, $p < 0.05$), and childcare responsibility ($\chi^2=5.52$,$p<0.05$). Short sleep duration was not associated with any other sociodemographics, work conditions, or work and health outcomes measured in this study.

Bivariate analyses suggested that poor sleep quality was associated with night or rotating shift work (see Figure 1; $\chi^2 = 7.91$, $p < 0.05$), stress ($t = 2.77$, $p < 0.01$), depression ($t = 2.75$, $p < 0.01$), lower educational level ($\chi^2 = 5.68$, $p < 0.05$), and younger age ($t = 2.26$, $p < 0.05$). Poor sleep quality was not associated with any other sociodemographics, work conditions, or work and health outcomes measured in this study.

Multivariate Analyses

Multivariate robust Poisson regression models suggested thatnightshift(PR=1.95, $p<0.05$) and single marital status (PR = 2.25, $p < 0.05$) were significantly associated with increased prevalence of short sleep duration, after adjustment for age, weight, childcare, MSDs, depression, psychological demands, and intention to turnover (see Table 2). After adjustment for covariates, none of the work and health variables showed significant associations with poor sleep quality.

Discussion

In this study of 89 correctional nurses, over half (56.2%) reported short sleep duration (≤ 6 hours/day). This is a higher prevalence than in all U.S. workers (30%) in the National Health Interview Survey (Luckhaupt et al., 2010), than in U.S. nurses in the National Nurses' Health Study (30%; Patel et al., 2004) and also than in nursing assistants (46%) from a large study of 18 nursing homes (Zhang et al., 2016). About a third (31.8%)of these correctional nurses reported poor sleep quality, which is a higher prevalence than in nursing assistants (23%) from the large study of 18 nursing homes (Zhang et al., 2016). These findings are of significant concern because short and poor sleep of correctional nurses could represent a threat to the safety and health of both patients and nurses themselves. The study found that night shift work was significantly associated with short sleep duration of correctional nurses, which is consistent with previous findings in the nursing workforce and the general worker population. Night shift requires work to occur during the biological night, whereas sleep would occur during the biological day; the resulting misalignment between internal circadian time and required work–rest schedules leads to shortened sleep. Night and rotating shift work have been continuously reported to cause reduced sleep quantity and quality (Lim, Hoe, Darus, & Bhoo-Pathy, 2018; Zverev & Misiri, 2009). Perkins claimed that nurses who sleep during the day normally obtain 4 hours less sleep than night sleepers (Perkins, 2001). On the basis of a national sample, Luckhaupt et al. reported that workers who usually worked the night shift were significantly more likely to report short sleep duration (44.0%)than those who worked the day shift (28.8%) or some other shifts (31.6%; Luckhaupt et al., 2010). Contrary to our expectation, night shift was not significantly associated with poor sleep quality in the multivariate Possion regression model with adjustment of covariates. A possible explanation for the nonassociation between night shift work and poor sleep quality may be related to the voluntary selection of night shifts (Moradi etal., 2014) and personal adaptation to night shifts (Boudreau, Dumont, & Boivin, 2013).

The study also reported a significant association between single marital status and short sleep duration. This is consistent with previous findings. The association between single marital status and short sleep duration has been reported in a large population study with Finnish adults (Lallukka et al., 2012). Another large population study of adults from Korea reported that being unmarried, including single and widowed/divorced status, was associated with abnormal sleep duration (Yoon et al., 2015).

On the other hand, the study found that MSDs, higher weight, and childcare responsibilities were associated with short sleep duration in the bivariate analyses, although these associations disappeared after adjusting for covariates. There may be a bidirectional relationship between sleep and MSDs (Koffel et al., 2016). Compromised or disrupted sleep is a known consequence of chronic pain (Kelly, Blake, Power, O'Keeffe, & Fullen, 2011), and individuals with MSDs that interfere with sleep are reported to perceive pain as more intense and have worse musculoskeletal outcomes (Schrimpf et al., 2015; Takahashi et al., 2015). Previous studies have reported associations between overweight/obesity and short sleep duration (Cappuccio et al., 2008; Wu, Zhai, & Zhang, 2014). Nurses, as informal caregivers of their own families, often sacrifice their sleep hours voluntarily to take care

of their children and dependents, which explains the possible association between childcare responsibilities and short sleep duration.

Besides, in this study, we found that stress, depression, lower education, and younger age were associated with poor sleep quality in the bivariate analyses, although these associations disappeared after adjusting for covariates. Previous studies have reported that work stress was significantly associated with both short sleep duration and poor sleep quality (Charles et al., 2011; Kashani et al., 2012). Geiger-Brown and Lipscomb (2010) conducted a systematic review and reported a number of hazardous working conditions experienced by nurses and their associations with adverse health and safety consequences including poor sleep quality. Zhang et al. (2016) reported that, with each increase in beneficial work conditions, nursing assistants were less likely to experience short sleep duration and poor sleep quality. (Zhang et al., 2016). Quality sleep is essential to daily functioning. Both sleep quantity and quality have been closely associated with self-rated physical and mental health (Chasens, Twerski, Yang, & Umlauf, 2010; Faubel et al., 2009), and sleep problems were reported to have a significant impact on the mental health of nurses (Perry, Lamont, Brunero, Gallagher, & Duffield, 2015). In addition, low educational level was previously reported to be associated with both short sleep duration and poor sleep quality (Lallukka et al., 2012; Paparrigopoulos et al., 2010). Although the quality of sleep usually decreases with increasing age (Marquiae et al., 2012), one study found that age was a significant covariate of sleep quality among 760 nurses, with younger nurses reporting poorer sleep quality (K. Lee, 1992). Younger nurses could have more work and family responsibilities that may interfere with their sleep, causing poor sleep quality.

In addition, the study found that sleep quantity and quality shared different correlates, suggesting differentiating these two concepts in future research. Contrary to our expectations, the wide range of working conditions and work and health outcomes measured in this study, such as work-place violence and bullying, burnout, and others, were not significantly and directly associated with poor sleep outcomes. It is possible that individual physical and psychosocial work stressors assessed in this study were not strong enough by themselves to cause poor sleep outcomes; however, their collective effect may have had a significant impact on sleep outcomes of correctional nurses. This may also be attributed to the small sample size of the study and the use of selected items from standard instruments in measuring these variables, given the challenges of access to this study population and the collection of a wide range of data on work and health outcomes.

Strengths and Limitations

Although the study had a small sample size, it received good response rate (71%) from the target population. The study is innovative because it assessed the associations between a comprehensive range of work and health variables with poor sleep outcomes and considered potential confounders in data analyses. There are several limitations. The generalizability of the results may be limited because all participants belong to a Northeastern State Correctional Healthcare System; therefore, the results may not be generalizable to other correctional healthcare systems in other states. The study was based on self-reported data on work, health, and sleep outcomes, causing potential recall and reporting bias. Because of the

challenges of assessing a wide range of work, health, and sleep outcomes, the measurement of sleep lacked the use of a standard scale and the measurement of other variables used selected items from standard instruments, which may threaten the internal validity of the study (Polit & Beck, 2014). In addition, the cross-sectional design does not allow us to draw causal relationships; future analyses of longitudinal data will be needed to verify the study findings.

Implications for Clinical Forensic Nursing Practice

Considering the potential negative influences of nurses' sleep on patient safety and nurses' personal health and safety, correctional nurses are maintaining a high level of vigilance because of their safety and security concerns at work; as such, sleep becomes even more important for this specialty practice group of nurses. The study findings deserve particular attention in clinical forensic nursing practice. On the one hand, sleep is an important self-care domain (Dugan & Barnes-Farrell, 2018). Correctional nurses need to identify their own sleep problems and look for specific training in recognizing risk factors for sleep deficiency and how to cope with the impact of work on sleep. On the other hand, to examine the best practices to improve sleep of this specialty group of nurses at risk, future research should focus on the development of interventions targeting work schedule remodeling and shift work coping. Because night shift is not avoidable in this population of nurses, organizations and correctional nurses themselves could consider reducing the number of consecutive night shifts (Costa, 2010; Magee et al., 2016) and reducing the total number of monthly night shifts (Costa, 2010;Raminetal.,2015)to have better sleep, health, and recovery from work. Overtime has been a recognized risk in this State Correctional Healthcare System, and it may worsen the negative effect of night shift work on sleep and health (Buden et al., 2017); therefore, limiting overtime especially on night shifts, no matter whether it is voluntary or mandatory, should be implemented in the system.

Other organizational strategies that may improve sleep of correctional nurses include structuring work schedules to allow sufficient time for sleep and recovery between shifts, providing routine educational seminars on coping with shift work and healthy sleep hygiene practices, and establishing Employee Assistance Programs to support nurses who experience sleep deficiency, high psychological strain, or mental health problems. Previous studies also suggested that the health effect of nonstandard shift work is less severe if it is chosen by employees (Buessing, 1996); therefore, advocating for correctional nurses' control over their work shifts may reduce the negative health and safety consequences resulting from irregular work schedules. In addition, management training on supporting staff in self-scheduling and decision making may indirectly reduce nurses' work and family stress and mitigate the negative influences of shift work (Gillet, Fouquereau, Bonnaud-Antignac, Mokounkolo, & Colombat, 2013).

Conclusions

This quantitative cross-sectional study found that correctional nurses experience a high prevalence of short sleep duration and poor sleep quality. Night shift work was significantly associated with short sleep duration among correctional nurses. With the high turnover in

correctional healthcare system, the increased demands on correctional nurses, and the focus on quality of care, more effort is needed to promote the health and well-being of these nurses. This study suggests that well-designed evidence-based interventions targeting work schedule remodeling and shift work coping may promote sleep health of correctional nurses.

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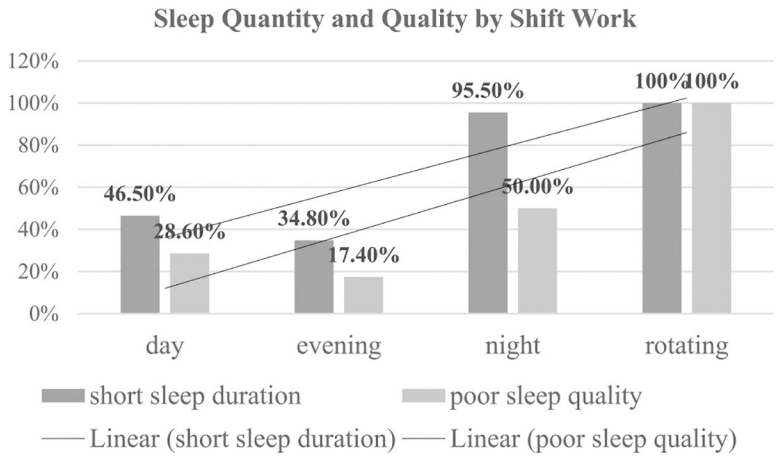

FIGURE 1.

Prevalence of short sleep duration and poor sleep quality by shift work. Note that there was higher prevalence of short sleep duration and poor sleep quality in night and rotating shift nurses compared with day and evening shift nurses.

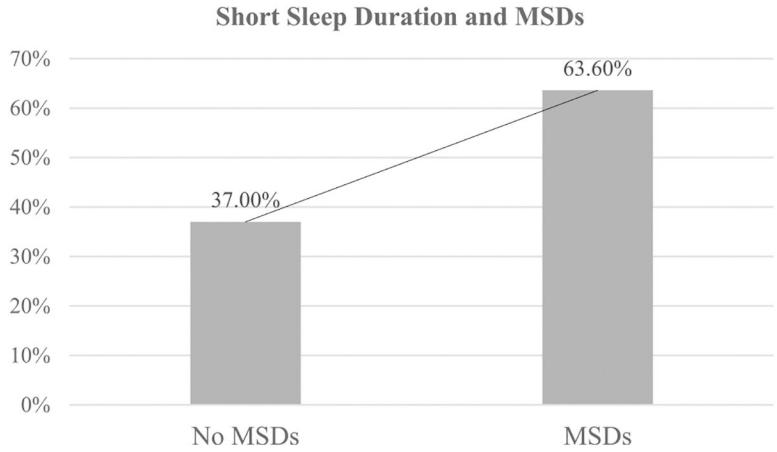

FIGURE 2.

Association between short sleep duration and musculoskeletal disorders (MSDs). Note that there was higher prevalence of short sleep duration in nurses reporting MSDs compared with those without MSDs.

TABLE 1.

Sociodemographics, Sleep, and Work and Health Outcomes of Correctional Nurses.

Variables	Mean ± SD or frequency (%)
Age (years)	44.5 ± 9.71
Gender	
Female	67 (75.3%)
Male	22 (24.7%)
Race	
White	71 (80.7%)
Black	12 (13.6%)
Others	5 (5.7%)
Marital status	
Married	61 (68.5%)
Single, never married	10 (11.2%)
Separated/widowed/divorced	18 (20.3%)
Education	
College degree	69 (77.5%)
Graduate degree	20 (22.5%)
Family income	
< $75,000	16 (18.0%)
≥ $75,000	73 (82.0%)
Work tenure (years)	8.45 ± 6.70
Children responsibility (yes)	49 (55.1%)
Adult dependent responsibility (yes)	41 (46.6%)
Short sleep duration (≤6 hours)	50 (56.2%)
Poor sleep quality	28 (31.8%)
Shiftwork	
Day (7 a.m.–3 p.m.)	43 (48.3%)
Evening (3 p.m.–11 p.m.)	23 (25.8%)
Night (11 p.m.–7 a.m.)	22 (24.7%)
Rotating	1 (1.2%)
Weekly work hours (> 40)	8 (9.6%)
Workplace bullying	
Not bullied	55 (64.0%)
Occasionally bullied	22 (25.6%)
Regularly bullied	9 (10.5%)
Musculoskeletal disorders (yes)	55 (67.1%)

TABLE 2.

Multivariate Poisson Regression Models for Factors Associated With Short Sleep Duration and Poor Sleep Quality Among Correctional Nurses

	Short sleep duration		Poor sleep quality	
Predictor variable	**PR**	**95% CI**	**PR**	**95% CI**
Shift work				
Day	1.00		1.00	
Evening	0.94	0.48, 1.85	0.36***	0.11, 1.17
Night	1.95*	1.03, 3.70	0.89	0.41, 1.93
Rotating				
Stress	0.97	0.71, 1.34	1.52***	0.95, 2.45
Marital status				
Married	1.00		1.00	
Single	2.25*	1.11, 4.54	1.02	0.40, 2.59
Separated/ Widowed/ divorced	0.92	0.37, 2.27	0.23***	0.05, 1.01
Education				
College	1.00		1.00	
Graduate	1.78***	0.96, 3.31	0.15***	0.02, 1.34

Both models were adjusted for age, weight, childcare, MSDs, depression, psychological demands, and intention to turnover. Psychological demands and intention to turnover were included in both models because of their correlates with either short sleep duration or poor sleep quality at the $p < 0.10$ level in the bivariate analyses. Missing value in the rotating shift category was because of only one participant reporting a rotating shift schedule in this study. PR = prevalence ratio; CI = confidence interval.

* $p < 0.05$.

** $p < 0.01$.

*** $p < 0.10$.