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Research Article

Unpaid Caregiving Roles and Sleep Among Women Working in Nursing Homes: A Longitudinal Study

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Abstract

Background and Objectives: Although sleep is a critical health outcome providing insight into overall health, well-being, and role functioning, little is known about the sleep consequences of simultaneously occupying paid and unpaid caregiving roles. This study investigated the frequency with which women employed in U.S.-based nursing homes entered and exited unpaid caregiving roles for children (double-duty-child caregivers), adults (double-duty-elder caregivers), or both (triple-duty caregivers), as well as examined how combinations of and changes in these caregiving roles related to cross-sectional and longitudinal sleep patterns.

Research Design and Methods: The sample comprised 1,135 women long-term care employees who participated in the baseline wave of the Work, Family, and Health Study and were assessed at three follow-up time points (6-, 12-, and 18-months). Sleep was assessed with items primarily adapted from the Pittsburgh Sleep Quality Index and wrist actigraphic recordings. Multilevel models with data nested within persons were applied.

Results: Women long-term care employees entered and exited the unpaid elder caregiving role most frequently. At baseline, double-duty-child and triple-duty caregivers reported shorter sleep quantity and poorer sleep quality than their counterparts without unpaid caregiving roles, or workplace-only caregivers. Double-duty-elder caregivers also reported shorter sleep duration compared to workplace-only caregivers. Over time, double-duty-elder caregiving role entry was associated with negative changes in subjective sleep quantity and quality.

Discussion and Implications: Simultaneously occupying paid and unpaid caregiving roles has negative implications for subjective sleep characteristics. These results call for further research to advance understanding of double-and-triple-duty caregivers' sleep health and facilitate targeted intervention development.

Keywords: Double-duty caregivers, Triple-duty caregivers, Sleep health, Actigraphy, Subjective and objective sleep measures

Introduction

Women who provide care in their paid work role report poor sleep quality and frequent sleep disturbances (Karagozoglu & Bingöl, 2008; Korompeli, Chara, Chrysoula, & Sourtzi, 2013). Likewise, mothers living with children younger than 18 and women providing unpaid care for adult relatives often

experience insomnia symptoms and sleep difficulties (National Sleep Foundation (NSF), 2007). Occupying paid and unpaid caregiving roles simultaneously, then, may compromise women's sleep health, or attributes of sleep and wakefulness behavioral states (e.g., adequate sleep duration) that promote physical, mental, and neurobehavioral well-being vital for optimal overall health (Buysse, 2014). This study tracked the frequency with which women working in U.S.-based nursing homes changed the composition of their unpaid caregiving roles during an 18-month period as well as examined cross-sectional and longitudinal associations between these roles and subjective and objective sleep outcomes.

Sleep and Its Importance for Care Work

Sleep is a universal need and fundamental component of daily routines—most people spend between 20% and 40% of each day, or approximately one-third of their lives, sleeping (Grandner, 2017). Sleep constitutes a period of physiological activity in which essential restorative processes occur to enable recovery from the wear and tear of everyday life as well as facilitate growth and development; day-to-day functioning, behavior, and performance; physical, social, and mental well-being; and quality of life over the life span (Barnes, 2012; Buysse, 2014; Grandner, 2017). In a contemporary society where 24/7 lifestyles are becoming increasingly common in response to around-the-clock demands, however, sleep is at particular risk of being sacrificed to prioritize waking activities such as work commitments, family responsibilities, and social engagements; therefore, sleep also serves as a proxy for time and stress management associated with multiple role occupancy (Coveney, 2014). Taken together, sleep is a critical determinant of health and well-being, with sleep health providing a positive point of reference for "how well an individual is doing" (Buysse, 2014, p. 9).

Sleep is also a complex phenomenon that can be measured across subjective (i.e., self-reported) or objective (e.g., actigraphy) levels of analysis (Buysse, 2014). Concurrent use of subjective and objective sleep measures has been deemed best practice because each measure assesses distinct phenomena (Kim & Rose, 2011). Subjective measures are based on individuals' perceptions of their sleep, whereas objective measures are based on monitoring of actual sleep behavior. Since each measure categorizes sleep differently, subjective and objective measures are often discordant, with different psychological and biological correlates. Each measure also has its strengths and shortcomings, thereby enabling one measure to compensate for the other's deficits. In addition to being measured across different levels of analysis, sleep can also be characterized along several conceptually distinct dimensions (Buysse, 2014). The two dimensions of relevance to the present study are quantity, or time-based sleep measures, and quality, or difficulty initiating and maintaining sleep (Barnes, 2012). These sleep characteristics warrant consideration as each has serious health implications. Both characteristics are correlates of mortality, metabolic syndrome, diabetes, hypertension, and coronary heart disease; individually, sleep duration has been linked to obesity and impaired neurobehavioral performance, and sleep quality has ties to depression (Buysse, 2014).

To our knowledge, only one study has examined the sleep consequences of occupying paid and unpaid caregiving simultaneously, or double-and-triple-duty caregiving. Consistent with prior research (DePasquale et al., 2016; Rutman, 1996), we use the terms *double-and-triple-duty caregiving* to differentiate health care employees who serve as unpaid family caregivers from their nonfamily caregiving counterparts, or *workplace-only caregivers*. Beyond their paid caregiving role, *double-duty caregivers* informally care for one type of family member such as children (*double-duty-child caregivers*) *or* older adults (*double-duty-elder caregivers*), whereas *triple-duty caregivers* informally care for children *and* older adults. In the aforementioned study, Scott and colleagues (2006) assessed how hospital staff nurses' unpaid caregiving roles related to sleep and work performance. Triple-duty caregivers reported significantly higher levels of sleepiness than workplace-only caregivers. Further, double-duty-elder caregivers were nearly 2.5 times more likely to make workplace errors than workplace-only caregivers. The authors speculatively linked double-duty-elder caregivers' poorer work performance to shorter sleep duration, as this group slept less, on average, than workplace-only caregivers. The Scott et al. study is foundational in that it underscores the importance of adequate sleep for health care employees with different unpaid caregiving role configurations. It is limited, however, by a relatively small sample, the exclusive use of subjective sleep measures, and a cross-sectional analysis.

Building on the Scott et al. (2006) study to advance understanding of double-and-triple-duty caregivers' sleep outcomes, particularly among women working in the long-term care industry, is important and timely for several interrelated reasons. First, researchers have traditionally studied paid and unpaid caregiving roles separately (Ward-Griffin et al., 2015). Consequently, relatively little is known about double-and-triple-duty caregivers' health and well-being despite heavy reliance on this workforce segment from the health care system, long-term care services and support systems, and family members. Second, double-and-triple-duty caregivers' welfare is salient for others' welfare, as they are responsible for maintaining the safety and well-being of care recipients in the work and nonwork domains. In addition to being an indicator of their own health and well-being, sleep health may also be predictive of patient care or medical errors, motivation, problem-solving, memory lapses, information processing and judgment, reaction time, empathy, irritability or hostility, unintentional injury or accidents, and ability to detect and recognize the salience of minor changes in care recipients' health, all of which can jeopardize safe, effective care, and accrue significant costs for employers (Hughes & Rogers, 2004; Rosekind et al., 2010; Weaver, Stutzman, Supnet, & Olson, 2016).

Third, women predominately fill paid and unpaid caregiving roles (National Alliance for Caregiving (NAC) & American Association of Retired Persons Public Policy Institute (AARP), 2015; Paraprofessional Health Institute (PHI), 2016), thereby increasing the likelihood of concurrent participation in paid and unpaid care work (DePasquale et al., 2016). The female gender constitutes a predisposing risk factor for adverse changes in sleep, independent of caregiving, and is associated with more sleep-related problems (McCurry, Song, & Martin, 2015). Further, as women age, the likelihood of experiencing age-related sleep changes (e.g., sleep disturbances) and becoming a caregiver increases, implying that women often partake in caregiving when they are more likely to experience sleep problems (McCurry et al., 2015; NAC & AARP, 2015). Common features of and stressors associated with the caregiver role are also related to impaired sleep and sleep disturbances (McCurry et al., 2015). Given their susceptibility to sleep problems and multiple caregiving roles, double-and-triple-duty caregiving women may be particularly at risk of poor sleep health. Fourth, the convergence of paid and unpaid caregiving roles is projected to become more common in response to the increased care demands of an older population that is rapidly growing and living longer (United Nations, 2015). Learning about double-and-triple-duty caregivers' health will only become more imperative as this workforce segment expands.

Fifth, although population aging has wide-ranging implications for nearly every aspect of society, its most profound effects will be on the health care system (Centers for Disease Control and Prevention (CDC), 2013). The health care system is under tremendous pressure to supply a sufficient, skilled workforce to counter the increased demand for care driven by millions of adults approaching older ages (CDC, 2013; United Nations, 2015). However, maintaining a supply-demand balance of the health care workforce is easier said than done, especially in the long-term care industry, a key provider of paid care services for older adults (Stone, 2012). Presently, supply does not meet demand, nor is it expected to meet anticipated demand, even with excellent employment prospects (PHI; 2016; Stone, 2012). The long-term care workforce is already considered to be "in crisis" because of labor shortages, frequent turnover, recruitment difficulties, and concerns regarding high-quality care provision (Stone, 2012, p. 155). Unprecedented growth among the older population exacerbates these workforce challenges and may expose the existing workforce to extreme workload burdens and stress that compromise care-quality and result in further retention and recruitment difficulties (Stone, 2012). Targeting sleep health may represent a feasible intervention strategy that yields desperately needed individual- and organizational-level benefits.

Changes in Unpaid Caregiving Role Composition

The majority of evidence on unpaid caregivers' health and well-being has come from cross-sectional studies; yet, unpaid caregiving roles and health are dynamic (Barnett, 2015). Changes in unpaid caregiving roles and health are prompted, in part, by social interdependence and embedded in existing personal characteristics or circumstances, social structures, and situational imperatives (Moen & Wethington, 1999).

For example, double-and-triple-duty caregiving women possess a personal characteristic, gender, and personal circumstance, health care employment, that shape their life paths by delimiting the demands, opportunities, expectations, motivations, and constraints that affect unpaid caregiving role occupancy. With respect to gender, women's life pathways tend to be rooted in, and structured by, family members' actions, experiences, expectations, and beliefs, as well as broadly defined societal gender-role norms, at all life stages (Moen, Robison, & Dempster-McClain, 1995). Caregiving signifies women's response to family members' linked lives in that they often react to family members' onset of health problems or familial crises by occupying caregiving roles (Moen et al., 1995). Supporting such a notion, double-and-triple-duty caregiving women report that they are faced with, and influenced by, gendered expectations (e.g., caregiving is "women's work") to provide unpaid care; they attribute these expectations to traditional gender ideology regarding their innate capacity for caregiving and gender role norms attached to their other family roles (e.g., mother, Rutman, 1996, p. 90; Ward-Griffin et al., 2005, 2015). With respect to employment, double-and-triple-duty caregiving women's work role positions them as "the health professional in the family" (Ward-Griffin et al., 2005, p. 384). This personal circumstance is linked to pressure and expectations from family members and other health care professionals to provide unpaid care. Relatedly, double-and-triple-duty caregiving women often feel obliged to engage in unpaid care (Ward-Griffin et al., 2005).

Although double-and-triple-duty caregiving women may be particularly likely to experience changes in unpaid caregiving role composition, the frequency of these changes and their relation to changes in sleep outcomes remains unknown. One theoretical perspective that may explain the potential relationship between changes in unpaid caregiving role composition and sleep is the role scarcity hypothesis (Goode, 1960). According to this hypothesis, individuals possess finite role resources, such as time and energy, to expend in fulfilling multiple role obligations. Because each role requires some level of commitment and draws on the same zero-sum resources, occupying more roles increases the probability that scarce resources will be drained, leading to overload (i.e., excessive demands), strain (i.e., difficulty fulfilling duties), and conflict (i.e., role interferences), all of which can negatively affect health. In applying this logic to the present study, double-and-triple-duty caregivers will have poorer sleep outcomes relative to workplace-only caregivers due to their additional caregiving roles. Likewise, entries into and exits from double-and-triple-duty

caregiving roles will be associated with negative and positive changes in sleep outcomes, respectively.

The Present Study

This study draws on a sample of women working in U.S.-based nursing homes to achieve two objectives. The first objective entails tracking the frequency of changes in unpaid caregiving role composition over an 18-month period. The second objective is to examine how baseline unpaid caregiving role composition and postbaseline composition changes are related to subjective and objective sleep outcomes. Based on the role scarcity hypothesis, we expect that double-and-triple-duty caregivers will have poorer sleep outcomes than workplace-only caregivers at baseline. Longitudinally, we anticipate that entries into and exits from double-and-triple-duty caregiving roles will be associated with negative and positive changes in sleep outcomes, respectively.

Methods

Study Design and Participants

Data come from the Work, Family and Health study (WFHS), an initiative to understand long-term care employees' work, family, and health outcomes. Detailed descriptions of the WFHS protocol and recruitment have been published elsewhere (Bray et al., 2013). Study methods were approved by appropriate institutional review boards at WFHS sites.

Briefly, the WFHS involved 30 nursing home facilities spread across New England. Facilities were owned by the same company, had at least 30 direct-care employees, and were not acquired or purchased in the last two years. Eligible employees worked 22.5 or more hours per week, provided direct care, and did not do regular night work. Of 1,783 eligible employees, 1,524 (85.5%) were enrolled, 1,404 (92%) of whom were women. This study is based on the 1,135 (84%) women who provided subjective and objective sleep data at baseline.

The WFHS took place over an 18-month period between 2009 and 2012. None of the facilities attrited. Sleep data was collected at baseline and 6-, 12-, and 18-months postbaseline. Of the 1,135 women who provided subjective and objective sleep data at baseline, 827 (73%) provided data 6-months later; 670 (59%), 12-months later, and 695 (61%), 18-months later. At baseline, the average woman was 39 years of age (mean [*M*] = 38.65, standard deviation [*SD*] = 12.65), white (70%), had received a postsecondary education (60%), indicated being partnered/married (65%), reported an annual household income of $45,000–49,999, and worked 40 hours per week (*M* = 39.77, *SD* = 10.15) as a certified nursing assistant (69%). Fewer women identified as being foreign-born (25%) and reported caring for an ill or disabled child (11%). To explore possible missing data patterns, we compared women with one (n = 237, 21%), two (n = 225, 20%), three (n = 169, 15%), and all (n = 504, 44%) four waves of data on demographic variables. Women with all waves were significantly older (*M* = 41.63) than women with one (*M* = 35.47), two (*M* = 37.22), and three (*M* = 36.15) waves, $F(3, 1131) = 18.27$, $p < .001$. There were also proportionately fewer foreign-born women with one (*M* = 0.19) versus all (*M* = 0.28) waves, $F(3, 1131) = 2.93$, $p < .05$.

Sleep Measures

Subjective Sleep

Trained field interviewers administered face-to-face computer-assisted personal interviews (CAPI) in the workplace. Interviews lasted 60 minutes, on average, and employees received $20 on survey completion at each wave.

Self-reported sleep measures reflected sleep quantity (i.e., duration and time spent in bed) and quality (i.e., overall quality and sufficiency). Unless noted otherwise, these measures were adapted from the Pittsburgh Sleep Quality Index (PSQI; Buysse, Reynolds, Monk, Berman, & Kupfer, 1989) and pertained to the past month.

Sleep duration was assessed with the question, "How many hours do you think you actually slept each day?" Women reported sleeping an average of 6 hours and 7 minutes at baseline (*M* = 6.11, *SD* = 1.40). *Time spent in bed* was computed from the two times respondents identified in answering the following questions: "What time did you turn the lights off to go to sleep?" and, "What time did you usually get out of bed?" Women reported spending 7 hours and 17 minutes in bed at baseline, on average (*M* = 7.29, *SD* = 1.46). Overall *sleep quality* was measured with the following item: "How would you rate your sleep quality overall?" Response options ranged from *very good* (1) to *very bad* (4) and were reverse-coded. The average baseline sleep quality score was 2.64 (*SD* = 0.81), suggesting women slept "fairly good." *Sleep sufficiency* was assessed by asking respondents how often they got enough sleep to feel rested on waking (Buxton et al., 2009, 2012). Response categories ranged from *never* (1) to *very often* (5). The average baseline sleep sufficiency score of approximately 3 indicated women "sometimes" felt rested upon waking (*M* = 2.96, *SD* = 0.96).

Objective Sleep

Depending on participants' availability, objective sleep data collection began on the same day as or within 3 to 4 weeks of the CAPI. Objective sleep data was obtained using wrist-worn sleep monitors (Actiwatch Spectrum; Philips-Respironics, Murrysville, PA) or small, portable, wristwatch-like devices with an accelerometer inside to continuously monitor movement as a proxy for waking activity in a noninvasive manner. Employees were instructed to wear the device on their nondominant wrist at all times for one week, except in situations where it could malfunction or be damaged (e.g., excessive impact). The 1-week period

included work and nonwork days but excluded vacation and leave periods. Once the device was returned, employees received the $20 completion incentive (at each wave) and data was downloaded and telemetrically transferred. Step-by-step information about the standard algorithm used to determine the validity of and score participants' recorded days is published elsewhere (Marino et al., 2013; Olson et al., 2015). In short, objective data were only analyzed for subjects with at least three days of valid actigraphy recordings, a minimum criterion for reliable and valid data (Marino et al., 2013), and scored using the Actiware Sleep Scoring Program (version 5.71, Philips-Respironics, 2012). The following measures were calculated in accordance with prior research (Olson et al., 2015):

Total sleep time (TST), a sleep duration indicator, reflects the mean number of minutes slept per day, including main sleep intervals and naps. Average TST at baseline was 456 minutes (M = 455.99, SD = 59.67), or 7 hours and 36 minutes.

Wake after sleep onset (WASO), a sleep quality indicator, refers to the average amount of time spent awake after sleep onset and before sleep offset during nighttime sleep, in minutes, as previously validated versus polysomnography (Marino et al., 2013). At baseline, women spent nearly 47 minutes awake after sleep onset and before sleep offset, on average, during nighttime sleep (M = 46.99, SD = 16.27).

Double-and-Triple-Duty Caregiving Role Occupancy Measures

Baseline Unpaid Caregiving Role Composition

Consistent with prior research (DePasquale et al., 2016; Scott et al., 2006), we categorized participants into mutually exclusive *workplace-only* and *double-and-triple-duty caregiving* groups based on their unpaid caregiving role composition. *Double-duty-child caregivers* lived with children aged 18 years or younger at least four days per week. *Double-duty-elder caregivers* provided care (i.e., assistance with shopping, medical care, or financial/budget planning) for at least three hours per week in the past six months to an adult relative, regardless of residential proximity. *Triple-duty caregivers* fulfilled each double-duty caregiving criterion, whereas *workplace-only caregivers* did not fulfill either criterion. At baseline, double-duty-child and triple-duty caregivers resided with children aged 6.84 (SD = 5.22) and 8.31 (SD = 5.35), respectively. Although double-and-triple-duty caregivers' relation to adult care recipients was unspecified, qualitative data from the WFHS suggests that women frequently cared for parents in poor health (DePasquale et al., 2016). These double-and-triple-duty caregiving role classifications were converted into four dichotomous indicators to reflect baseline unpaid caregiving role composition.

As shown in Table 1, the majority (70%) of women were workplace-only or double-duty-child caregivers at baseline, followed by double-duty-elder (16%) and triple-duty (14%) caregivers. Compared to the workplace-only caregiving group, the double-duty-child and triple-duty caregiving groups were significantly younger. The triple-duty caregiving group was more racially diverse. Also, both groups differed from workplace-only caregivers, by definition, in that some lived with disabled children.

Unpaid Caregiving Role Composition Changes

Postbaseline changes in unpaid caregiving roles composition were examined by subtracting each above-mentioned

Table 1. Baseline Sample Characteristics by Women's Double-and-Triple-Duty Caregiving Role Occupancy

Characteristics	Workplace-only care, n = 398 (35%)	Double-duty-child care, n = 400 (35%)	Double-duty-elder care, n = 178 (16%)	Triple-duty care, n = 159 (14%)
Age (in years)	42 (14.84)	34 (8.30)***	43 (14.17)	36 (9.07)***
White	0.75	0.67†	0.75	0.61**
Postsecondary education	0.63	0.56	0.60	0.60
Annual household income	10 (3.25)	9 (3.33)	9 (3.00)	9 (3.27)
Partnered/married	0.62	0.70	0.55	0.69
Foreign-born	0.24	0.26	0.20	0.28
Certified nursing assistant	0.65	0.69	0.70	0.74
Total hours worked per week for up to two jobs	40 (10.18)	39 (9.90)	42 (10.89)	39 (9.52)
Child disability	—	0.19	—	0.29
Intervention condition	0.46	0.46	0.47	0.52

Note: N = 1,135. Means (and standard deviations) or proportions are shown. Analysis of variance tests with Tukey post-hoc tests were conducted to compare double-and-triple-duty caregiving women's characteristics to those of their workplace-only caregiving counterparts. Annual household income was measured on an ordinal scale ranging from *less than $4,999* (1) to *more than $60,000* (13). Income was equivalent to *$45,000–49,999* (10) for workplace-only caregivers and *$40,000–44,999* (9) for double-and-triple-duty caregivers.

†p < .10, *p < .05, **p < .01, ***p < .001.

baseline indicator from those at 6-, 12-, and 18-months. This approach produced a change score that ranged from –1 to 1 (–1 = exited baseline role, 0 = no postbaseline change, 1 = entered new role). These change scores are symmetric, meaning that a one-unit change can be interpreted as either entry into or exit from an unpaid caregiving role. Here, we interpret a one-unit change as entering an unpaid caregiving role that was not occupied at baseline.

Covariates

Consistent with other research on long-term care employees' sleep outcomes, we accounted for age, race, postsecondary education, annual household income, marital status, foreign-born status, occupation, and total work hours for up to one additional work role, if reported (Berkman et al., 2015). Additionally, we adjusted analyses for the presence of residential children with developmental disabilities or health problems given that such living arrangements have been linked to stress among women long-term care employees (DePasquale et al., 2016). Although not a focus of this study, a randomized, controlled workplace intervention that did not directly target unpaid caregivers or sleep was delivered in half of the facilities prior to 6-months follow-up. Detailed information about the WFHS intervention (Bray et al., 2013; Kossek, Hammer, Kelly, & Moen, 2014) and its null effects on sleep among long-term care employees have been published elsewhere (Marino et al., 2016). We addressed its potential impact on this study by considering whether participants worked in experimental or control facilities. All covariates were set to their baseline values.

Analytic Strategy

We examined sleep outcomes with a two-level multilevel modeling approach using the PROC MIXED procedure in SAS version 9.4 in which repeated measurements were nested within persons. Models included fixed and random effects for time (0 = baseline, 3 = 18 months), substantive predictors (baseline unpaid caregiving role composition indicators and postbaseline change scores), and covariates. In favor of parsimonious models, we removed nonsignificant covariates across subjective sleep quantity (annual household income, occupation, marital status, child disability, and intervention condition) and quality (total work hours, child disability, and intervention condition) models as well as those in each objective model (race, annual household income, occupation, child disability, and intervention condition across outcomes; marital and foreign-born status for TST; and total work hours for WASO).

Results

Descriptive Tracking of Unpaid Caregiving Role Stability, Entries, and Exits

Results from the descriptive tracking analysis of unpaid caregiving role stability, entries, and exits are displayed in Table 2. We limited this analysis to participants with 18-month trajectories (n = 504) to identify transition patterns more easily. This analysis indicated that stability, defined as no postbaseline change in unpaid caregiving role composition, was more common than role changes among baseline workplace-only (74% versus 28%) and double-duty-child (67% versus 35%) caregivers. The most frequent role entry made by workplace-only caregivers was to the double-duty-elder caregiving role, followed by the double-duty-child caregiving role. Double-duty-child caregivers entered the triple-duty caregiving role most frequently, followed by the workplace-only and double-duty-elder caregiving roles. Conversely, role changes were more common than stability among baseline double-duty-elder (74% versus 26%) and triple-duty (82% versus 26%) caregivers. The most frequent changes made by double-duty-elder and triple-duty caregivers were to workplace-only and double-duty-child caregiving roles, respectively.

Baseline Correlations Between Subjective and Objective Sleep Outcomes

Baseline correlations between subjective and objective sleep measures are displayed in Table 3. Subjective and objective

Table 2. Descriptive Tracking of Unpaid Caregiving Role Stability, Entries, and Exits

Baseline composition of paid and unpaid caregiving roles	*n*	Postbaseline composition of paid and unpaid caregiving roles				
		No change in composition	Workplace-only caregiver	Double-duty-child caregiver	Double-duty-elder caregiver	Triple-duty caregiver
Workplace-only caregiver	182	134 (74%)	—	9 (5%)	42 (23%)	0 (0%)
Double-duty-child caregiver	166	112 (67%)	9 (5%)	—	4 (2%)	47 (28%)
Double-duty-elder caregiver	91	24 (26%)	64 (70%)	1 (1%)	—	3 (3%)
Triple-duty caregiver	65	17 (26%)	3 (5%)	45 (69%)	5 (8%)	—

Note: N = 504 women with all four waves of subjective and valid objective sleep data. Percent totals may not add to 100% because postbaseline changes are not mutually exclusive. Workplace-only caregivers provide care for pay only. Double-duty-child caregivers provide care for pay and engage in unpaid child care. Double-duty-elder caregivers provide care for pay and engage in unpaid elder care. Triple-duty caregivers provide care for pay as well as engage in unpaid care for children and adults.

sleep measures were weakly correlated. Both subjective sleep quantity indicators were positively correlated with the objective sleep quantity indicator, TST, whereas only time in bed was positively correlated with the objective sleep quality indicator, WASO. None of the subjective sleep quality indicators were correlated with TST. Sleep quality was negatively associated with WASO.

Cross-Sectional and Longitudinal Associations Between Unpaid Caregiving Role Composition, Postbaseline Composition Changes, and Sleep

As shown in Table 4, cross-sectional analyses revealed that double-duty-child caregivers reported sleeping 17 minutes less, spending 29 fewer minutes in bed, and experiencing sleep of poorer quality and less sufficiency relative to workplace-only caregivers. Double-duty-elder caregivers reported sleeping nearly 13 minutes less than workplace-only caregivers. Additionally, triple-duty caregivers reported sleeping 29 minutes less and spending 38 fewer minutes in bed as well as experiencing sleep of lower quality and sufficiency compared to workplace-only caregivers. As shown in Table 5, double-duty-child caregivers had a shorter TST (by 10.05 minutes) and WASO (by 2.16 minutes) than workplace-only caregivers.

Longitudinal associations between postbaseline unpaid caregiving role composition changes and sleep were only detected for entry into the double-duty-elder caregiving

Table 3. Baseline Correlations Between Subjective and Objective Sleep Outcomes

Sleep measures	1	2	3	4	5	6
1. Subjective: Sleep duration (hours)	—					
2. Subjective: Time spent in bed (hours)	.49***	—				
3. Subjective: Sleep quality	.45***	.18***	—			
4. Subjective: Sleep sufficiency	.38***	.17***	.50***	—		
5. Objective: Total sleep time (minutes)	.17***	.25***	−.01	−.003	—	
6. Objective: Wake after sleep onset (minutes)	.004	.14***	−.06*	.01	.25***	—

Note: N = 1,135. Sleep duration and time spent in bed are measured in hours. Sleep quality was rated on a scale ranging from 1= *very bad* to 4 = *very good*. Sleep sufficiency was rated on a scale ranging from 1 = *never feel rested upon waking* to 5= *feel rested very often*. Total sleep time and wake after sleep onset were measured in minutes.
$^{\dagger}p < .10$, $^{*}p < .05$, $^{**}p < .01$, $^{***}p < .001$.

Table 4. Multilevel Models for Cross-Sectional and Longitudinal Associations Between Baseline Unpaid Caregiving Role Composition, Postbaseline Unpaid Caregiving Role Composition Changes, and Subjective Sleep Outcomes

	Sleep quantity		Sleep quality	
	Sleep duration	Number of hours in bed	Sleep quality	Sleep sufficiency
Variable	Coefficient (*SE*)	Coefficient (*SE*)	Coefficient (*SE*)	Coefficient (*SE*)
Fixed effects				
Intercept	7.02 (.19)***	8.56 (.21)***	2.41 (.08)***	2.57 (.09)***
Between person				
Double-duty-child caregiver (vs WOC)	−0.28 (.08)**	−0.48 (.09)***	−0.11 (.05)*	−0.18 (.06)**
Double-duty-elder caregiver (vs WOC)	−0.21 (.11)*	−0.18 (.12)	−0.07 (.06)	−0.11 (.07)†
Triple-duty caregiver (vs WOC)	−0.48 (.11)***	−0.63 (.12)***	−0.18 (.06)**	−0.31 (.07)***
Within person				
Time	−0.001 (.003)	−0.004 (.02)	0.05 (.01)***	0.03 (.01)*
Double-duty-child caregiving role changes	−0.16 (.16)	0.24 (.16)	−0.06 (.08)	−0.04 (.10)
Double-duty-elder caregiving role changes	−0.15 (.08)†	−0.16 (.08)*	−0.09 (.04)*	−0.04 (.06)
Triple-duty caregiving role changes	−0.08 (.17)	0.26 (.17)	0.003 (.09)	−0.002 (.11)
Random effects				
Intercept	0.87 (.08)***	1.16 (.09)***	0.33 (.03)***	0.38 (.04)***
Time	0.04 (.02)*	0.04 (.02)**	0.02 (.01)**	0.01 (.007)*
Residual	1.03 (.04)***	0.97 (.04)***	0.30 (.01)***	0.49 (.02)***
Number of observations	3,197	3,198	3,210	3,210

Note: N = 1,132 (participants). The sleep quantity models adjust for age, postsecondary education, and total hours worked per week for up to two jobs. The sleep quality models adjust for age, postsecondary education, foreign-born status, and marital status. All between-person effects were held at their baseline values. WOC = workplace-only caregiver.
$^{\dagger}p \le .10$, $^{*}p \le .05$, $^{**}p \le .01$, $^{***}p \le .001$.

Table 5. Multilevel Models for Cross-Sectional and Longitudinal Associations Between Baseline Unpaid Caregiving Role Composition, Postbaseline Unpaid Caregiving Role Composition Changes, and Objective Sleep Outcomes

	Sleep quantity: Total sleep time	Sleep quality: Wake after sleep onset
Variable	Coefficient (*SE*)	Coefficient (*SE*)
Fixed effects		
Intercept	476.28 (7.71)***	56.78 (2.10)***
Between person		
Double-duty-child caregiver (vs WOC)	−10.09 (3.53)**	−2.26 (1.10)*
Double-duty-elder caregiver (vs WOC)	−8.14 (4.59)†	−0.81 (1.38)
Triple-duty caregiver (vs WOC)	−7.86 (4.77)†	−0.72 (1.45)
Within person		
Time	−.87 (.68)	0.14 (.20)
Double-duty-child caregiving role changes	−7.52 (6.15)	1.79 (1.82)
Double-duty-elder caregiving role changes	−3.09 (3.30)	−0.50 (.97)
Triple-duty caregiving role changes	−5.33 (6.62)	1.49 (1.95)
Random effects		
Intercept	1701.92 (102.02)***	157.20 (9.17)***
Residual	1648.39 (50.97)***	141.81 (4.37)***
Number of observations	3,202	3,210

Note: N = 1,132 (participants); N = 3,202 (observations). All between-person effects were held at their baseline values. The sleep quantity model adjusts for race, total hours worked per week, postsecondary education, and foreign-born status. The sleep quality model adjusts for age, race, and annual household income. The random time effect was not significant in the total sleep time model and removed in favor of parsimony. The random time effect was unable to be estimated in the wake after sleep onset model and was subsequently excluded. WOC = workplace-only caregiver.
†$p < .10$, *$p < .05$, **$p < .01$, ***$p < .001$.

role. Entry into this particular role was linked to an approximate 10-minute reduction in the amount of time spent in bed and lower sleep quality. Unpaid caregiving role composition changes were not related to changes in objective sleep outcomes.

Discussion

This study marks the first investigation on the subjective and objective sleep consequences of unpaid caregiving role changes among women working in U.S.-based nursing homes. Our first objective was to track the frequency with which these changes occurred over an 18-month period. We found that women entered and exited the unpaid elder caregiving role most often. This finding complements prior research underscoring the "highly dynamic nature" of unpaid elder care (Marks et al., 2008; Seltzer & Li, 2000, p. 173). Of note, the transition frequencies documented here are similar to or higher than those reported in prior research on caregiving women despite our briefer tracking period (Marks et al., 2008; Seltzer & Li, 2000). One potential explanation for these differences is the less restrictive caregiving criteria used in the present study. Still, such frequent transitions may be partially attributed to women's health care expertise, as paid caregivers are ideal candidates for unpaid caregiving roles (Ward-Griffin et al., 2005, 2015).

Our second objective was to examine cross-sectional and longitudinal associations between unpaid caregiving role composition and subjective and objective sleep outcomes. At baseline, we detected several negative associations between unpaid caregiving role composition and subjective sleep outcomes. Consistent with the role scarcity hypothesis (Goode, 1960), double-duty-child and triple-duty caregivers reported shorter sleep quantity and lower sleep quality compared to workplace-only caregivers. Double-duty-elder caregivers reported sleeping for a shorter duration than workplace-only caregivers. Additionally, cross-sectional associations between unpaid caregiving role composition and objective sleep outcomes were only detected for double-duty-child caregivers. Longitudinal associations between postbaseline composition changes and sleep outcomes emerged for the double-duty-elder caregiving role and subjective sleep outcomes.

The above-mentioned associations suggest that double-duty-child and double-duty-elder caregiving roles were more different than similar in their links to subjective sleep outcomes, whereas double-duty-child and triple-duty caregiving roles were more similar than different. The role scarcity hypothesis (Goode, 1960) is quantity-based. According to this hypothesis, each double-duty caregiving role should have similarly affected the same outcomes because they both comprise one paid and one unpaid caregiving role. Differential findings invite questions about role multiplicity features that the role scarcity hypothesis overlooks, such as the nature or quality of roles. For example, similar findings for double-duty-child and triple-duty caregivers may be attributed to their mutual child care role.

In this study, dependent children lived with women for four or more days per week and ranged from newborns to teenagers, with an average age of 7.88 (*SD* = 5.51) at baseline. Caregiver sleep can be adversely affected by children across this age range. To illustrate, lack of sleep is a major concern for mothers of newborns (Brotherson, 2016). Further, most caregivers of infants (80%), toddles (70%), and preschoolers (64%) report being awakened at night by their child at least once a week (NSF, 2004). Sixty-four percent of caregivers of children aged 10 or younger report sleeping for less time than what they feel they need to be rested (NSF, 2004). Adolescents and teenagers can also interfere with sleep initiation and maintenance if caregivers schedule sleep around nighttime extracurricular activities or social events (Meltzer & Montgomery-Downs, 2011).

Although caring for an older adult was linked to shorter sleep duration, the lack of significant cross-sectional associations with other subjective sleep indicators, relative to the double-duty-child caregiving role, may be indicative of adaptation (Townsend, Noelker, Deimling, & Bass, 1989). The adaptation perspective suggests that initial health problems occur when adult care is initiated. Health problems are expected to stabilize as caregivers adjust to their role, familiarize themselves with its demands, and learn to cope with care recipients' needs over time. Unpaid elder caregiving roles were occupied for at least six months in this study, which may have afforded women enough time for adaptation. Moreover, caring for older adults at work could facilitate adaptation to unpaid elder care. The adaptation perspective is also congruent with our longitudinal findings for the double-duty-elder caregiving role, in that its novelty was linked to negative changes in sleep quantity and quality.

Another interesting aspect of the findings documented here is differences with respect to subjective and objective sleep outcomes. Double-duty-child care was the only role related to both outcomes. Whereas their subjective and objective sleep reports were concordant for sleep quantity (i.e., shorter sleep time), they were discordant for sleep quality (i.e., subjective and objective findings indicated lower and better quality compared to workplace-only caregivers, respectively). This discrepancy, along with double-duty-child and triple-duty caregivers' subjective sleep reports, suggests that double-and-triple-duty caregiving women perceive sleep problems that are not present. The lack of correspondence between perceived sleep and objective reality can likely be attributed to subjective and objective sleep measures assessing distinct phenomena (Kim & Rose, 2011). Subjective and objective sleep measures evaluate psychological and physiological components of sleep disturbance, respectively, with each having different psychological and biological correlates (Kim & Rose, 2011; Jackowska et al., 2016). For example, the subjective-objective sleep quality mismatch for double-and-triple-duty caregivers may be driven by psychological factors stemming from caregiving situations, like anxiety, burden, distress, worry, or rumination (Byun et al., 2016; McCurry et al., 2015). We encourage further consideration of and underlying mechanisms in differences between double-and-triple-duty caregivers' subjective and objective sleep data in future research, with particular attention to modifiable caregiver symptom experiences or psychological variables, as negative sleep appraisals may be powerful enough to perpetuate actual sleep problems like insomnia (Espie, 2007).

Limitations and Future Research Directions

Several study limitations warrant mention. First, the frequency of unpaid caregiving role changes was relatively low. Future research should use larger base samples and longer study durations to yield greater change frequencies. Second, the sample was homogenous in terms of gender and long-term care employment, thereby controlling for possible gender and work context effects but limiting generalizability of study findings. This study should be replicated with men and health care employees in other positions and work settings to investigate potential gender and work context differences. Another possible future research direction includes a comparative analysis with nonhealth care workers; this analysis could test whether the findings reported here uniquely relate to women's double-and-triple-duty care experience or are generalizable and broadly reflect how unpaid caregiving role changes affect sleep, regardless of the nature of their paid work role. Similarly, results are specific to long-term care employees who worked mainly on the day and/or evening shifts. We encourage inclusion of primary night shift workers moving forward given that they are key players in the continuity of health care delivery but struggle with sleep problems and the management of work, family, and social activities (Vitale, Varrone-Ganesh, & Vu, 2015).

Third, the use of one-item sleep measures limited our ability to examine measurement reliability. Studies that incorporate multiple-item measures may benefit from enhanced measurement accuracy and reliability. Fourth, it is possible that unmeasured factors such as health status contributed to unpaid caregiving role and sleep changes over time. Researchers should account for covariates that we did not possess to minimize possible selection and confounding effects. Finally, the WFHS was not intended to examine unpaid care and thus lacked detailed information about family care situations. As in previous studies (DePasquale et al., 2016; Scott et al., 2006), we constructed double-duty-child and double-duty-elder caregiving measures that operationalized care differently. Child care was implied by a child's age and shared living arrangements, whereas elder care required actual care provision. Further, we did not possess information regarding events that prompted unpaid caregiving role composition changes (e.g., institutionalization). More nuanced family care measures as well as information about the circumstances prompting and exact timing of unpaid caregiving

role changes would enable researchers to better contextualize and interpret study findings, adjust for other potential confounders, avoid caregiver misclassification, and capture change processes more precisely.

Practical Implications

Findings suggest that double-and-triple-duty caregivers' sleep health constitutes a worthwhile intervention target with potential benefits at the individual- and organizational-levels for the long-term care industry. Because sleep health reflects "how well an individual is doing" (Buysse, 2014, p. 9) and perceptions of sleep quantity and quality were most affected by multiple caregiving role occupancy, sleep health could be targeted with initiatives that support double-and-triple-duty caregivers' nonwork demands. Initiatives that increase or provide general and work/non–work-specific supervisor support; support for work/nonwork issues within the broader organizational culture; schedule control and job autonomy; alternative work arrangements; and dependent care supports may facilitate double-and-triple-duty caregivers' management of unpaid caregiving roles and enable them to allot more time for self-care and good sleep health (Hammer, Demsky, Kossek, & Bray, 2016; Kelly et al., 2008). Improved overall health and sleep health at the individual-level can positively impact the organizational-level, as double-and-triple-duty caregivers' health status could affect their work performance, productivity, absenteeism, presenteeism (i.e., attending work while ill), and retention; coworkers' work performance, productivity, absenteeism, and presenteeism by means of illness transmission; care recipient welfare; and high-quality care provision (Hughes & Rogers, 2004; Rosekind et al., 2010; Weaver et al., 2016; Widera, Chang, & Chen, 2010).

Long-term care organizations could also target sleep directly by promoting sleep hygiene, or making behavioral and environmental recommendations that may ameliorate sleep health (Irish et al., 2015). For example, they can disseminate sleep health promotion messages in the workplace, provide sleep hygiene education via different types of media, and implement sleep-focused wellness programs (Irish et al., 2015). While promoting sleep hygiene in the workplace has potential benefits for all employees, such initiatives could become more relevant for double-and-triple-duty caregivers by accounting for unique circumstances that affect sleep in different caregiving situations (McCurry et al., 2015).

Moreover, findings suggest that initiatives to improve double-and-triple-duty caregivers' sleep health may be most appropriate, cost-effective, or efficacious when targeting entry into unpaid elder care. Because unpaid caregiving role changes cannot always be anticipated, earlier intervention is not always possible. Nonetheless, attempts to target long-term care employees prior to the onset of unpaid elder care may buffer adverse sleep effects associated with entry into this role.

Finally, from a research perspective, results underscore the importance of concurrently assessing subjective and objective sleep data. Simultaneous use of both measures is useful for confirming or refuting sleep appraisals (Kim & Rose, 2011). The discrepancies that arise between these measures can also be used to inform researchers about appropriate courses of intervention or support needed (e.g., cognitive behavioral therapy, Kim & Rose, 2011).

Conclusion

This study illustrates the dynamic nature and sleep consequences of unpaid caregiving roles among women long-term care employees. Additional research is needed to advance understanding of the explanatory processes behind and the sleep effects of unpaid caregiving role changes in varying health care positions and settings. Obtaining knowledge about these processes and consequences may facilitate the development of targeted intervention strategies to improve double-and-triple-duty caregivers' sleep health.

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Conflict of Interest

None reported.

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