The Hidden Cost of Caregiving

The Association Between Self-Assessed Caregiving-Related Awakenings and Nighttime Awakenings and Workplace Productivity Impairment Among Unpaid Caregivers to Older Adults in the US

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Objective: To evaluate whether caregiving for older adults is associated with insomnia symptoms and diminished workplace productivity. **Methods:** We analyzed data collected from caregivers to older adults in the US. Participants self-reported awakenings from sleep (caregiving-related or spontaneous) and workplace measures (presenteeism, absenteeism, and productivity impairment). We conduct generalized linear modeling to examine the relationship between awakenings and workplace outcomes, controlling for confounders. **Results:** Two hundred fifty-eight caregivers to older adults reported current employment and met our inclusion criteria. Adjusted analyses found that reporting caregiving-related awakenings was associated with presenteeism (OR = 1.27, 95%CI: 1.16 to 1.40), absenteeism (OR = 1.10, 95%CI: 1.06 to 1.15), and productivity impairment (OR = 1.41, 95%CI: 1.25 to 1.58). Adjusted analyses found that spontaneous nighttime awakenings were associated with absenteeism (OR = 1.05, 95%CI: 1.01 to 1.08) and productivity impairment (OR = 1.12, 95%CI: 1.02 to 1.124) but not presenteeism. **Conclusions:** Caregiving-related awakenings are a risk factor for workplace productivity impairment. Future studies should examine means for improving caregiver sleep.

Keywords: caregiving, dementia, older adults, sleep, workplace productivity

The number of older adults (age 65 y and above) has reached 46 million in the United States (US), and is projected to reach 74 million by 2030.[1] Nationally representative research in the US has shown that approximately 50% of older adults require care from an unpaid family or spouse caregiver to assist with various functions, ranging from routine household tasks to mobility.[2] A higher proportion (70%) of older adults who have a chronic condition, such as Alzheimer's disease, require assistance with daily tasks.[3] Older adults are expected to live on average 19 years longer than the life expectancy of similarly aged individuals living 30 years ago,[4] presenting a growing and enduring need for caregivers. Caring for an older spouse or family member can be stressful and challenging due to the lack of predictability, often with little respite from caregiving responsibilities, and somtimes requiring physical exertion.[5] The responsibilities of caregiving may impact other areas of the life of the caregiver, including their workplace productivity.

Insomnia is a common problem.[6] Symptoms of insomnia include: (1) difficulty initiating sleep; (2) nighttime awakenings (characterized as frequent awakenings from sleep or trouble returning to sleep after waking); and (3) early morning awakenings with the inability to fall back asleep, with attendant daytime

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Clinical Significance: Caregiving poses challenges to sleep among those providing care. Sleep interruptions among caregivers employed outside the home may adversely impact caregiver productivity at work. Our study demonstrates an association between caregiving-related awakenings from sleep and adverse workplace outcomes, suggesting an opportunity for workplace interventions to improve sleep among caregivers.

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consequences (eg, daytime sleepiness, fatigue, low energy).[7] Insomnia has been examined among general employee populations and found to have adverse workplace implications. Specifically, employed individuals who report severe insomnia symptoms have significantly worse productivity and performance compared to employees without such symptoms, and cost an additional $1967 annually in terms of accidents, illness, and presenteeism,[8] which refers to showing up to work but under-performing on the job.[9] Global economic analyses have shown that, in the aggregate, insomnia symptoms and insufficient sleep duration among employees extracts a $ 411 billion toll worldwide due to productivity losses, accidents, and injuries.[10]

Research shows that insomnia symptoms are common among caregivers.[11,12] According to Flaskerud et al, difficulties initiating sleep were reported by 61%, 60%, and 46% of caregivers to individuals with AIDS, dementia, and cancer respectively, and nighttime awakenings were reported by 53%, 61%, and 76% of caregivers to individuals with AIDS, dementia, and cancer, respectively.[12] According to a meta-analysis, caregivers of older adults with dementia lost between 2.5 and 3.5 hours of sleep each week due to caregiving and demonstrated significantly lower self-reported sleep quality, according to the validated Pittsburgh Sleep Quality Index,[13] compared to non-caregiving adults.[14] In the study conducted by Flaskerud et al, insomnia symptoms were also associated with significantly higher levels of depression and anxiety among caregivers.[12] Similarly, Carter and Chang found that insomnia symptoms among caregivers to cancer patients were strongly associated with clinically relevant depression.[11] Furthermore, caregivers to older adults diagnosed with Alzheimer's disease may be at particularly high risk for poor health outcomes associated with insufficient or fragmented sleep. Specifically, research conducted by Mills et al found that male caregivers to older adults with advanced Alzheimer's disease spent significantly more time awake after sleep onset (an objective marker of the insomnia symptom pertaining to sleep difficulty maintaining sleep) than female caregivers to older adults with advanced Alzheimer's disease and more time awake after sleep onset than non-caregivers.[15] Also, Mills et al found that male caregivers to older adults with advanced Alzheimer's disease were at significantly higher risk for inflammation and cardiovascular disease than their female as well non-caregiver counterparts.

In addition to poor health outcomes, one study found that caregiving was associated with adverse workplace outcomes to those caregivers who were employed outside the home. Giovannetti et al found that caregivers of older adults with multiple chronic conditions reported losing, on average, 1.5 days in an average work week due to caregiving.[16] While research has examined the relationship between insomnia symptoms and workplace productivity in employees of all ages,[8] it has not been investigated extensively in caregivers. Further, research has examined workplace consequences of caregiving[16] and insufficient sleep among unpaid caregivers[14] separately, yet little attention has been paid to insomnia symptoms, specifically awakenings (either caregiving-related or spontaneous), and adverse workplace outcomes among caregivers. In this study we examine nighttime awakenings, either caregiving-related or spontaneous, and the toll these awakenings present in terms of workplace and career outcomes for unpaid caregivers. This study draws on nationally representative, population-based data collected among caregivers identified by older adults requiring assistance in a linked nationally representative survey of Medicare beneficiaries. We evaluate caregivers' self-reported awakenings (caregiving-related or spontaneous) and their relationship to their self-reported workplace productivity.

MATERIALS AND METHODS

Participants

The data for this study were obtained from the 2011 National Health and Aging Trends Study (NHATS) and the National Study of Caregiving (NSOC), two linked nationally representative surveys. First, the NHATS is a nationally representative sample of Medicare beneficiaries aged 65 and above in the US. NHATS participants complete an annual telephone interview where they are asked a variety of questions assessing daily activities and health. There is no cognitive requirement for participation. Instead, if a participant were unable to provide responses, a proxy respondent would respond to the survey on their behalf. Second, the NSOC study is a nationally representative survey of family members and other unpaid caregivers providing care to NHATS participants. NSOC participants were identified by NHATS respondents, who were asked to identify up to five individuals who live in their community and provide them with assistance in personal care or household tasks.[17] All caregivers identified by NHATS participants were contacted by study personnel and invited to participate in the NSOC. Those helpers who agreed to participate comprised the NSOC cohort.

Among the 7609 NHATS participants, 2007 caregivers responded in 2011 and were thus included in the NSOC cohort (26% response rate). Telephone interviews of NSOC participants lasted approximately 30 minutes. Because we were interested in workplace productivity, we limited the caregiver NSOC sample to caregivers who reported current employment. In addition, because we were interested in the caregiving interruptions from sleep as well as spontaneous awakenings from sleep, we limited the sample to caregivers living with the older adult ($n = 258$). The publicly available data examined in this study did not include individual identifiers, and were thus exempt from IRB review.

Measures

We examined caregivers' demographic and health characteristics, including gender, marital status, education, work schedule, income, and caregiving burden (ie, number of hours per day of care provided to the older adult).

Two sleep-related variables were available in the NSOC study. First, caregiving-related awakenings were measured by a single item. Participants were asked "In the last month, how often was your sleep interrupted due to caregiving?" on a scale from 1 ("never") to 2 ("rarely"), 3 ("some nights"), 4 ("most nights") and 5 ("every night"). Second, spontaneous nighttime awakenings, which are one symptom of insomnia, were measured consistent with the approach taken in the National Health and Nutrition Examination Survey (NHANES).[18] Participants were asked: "In the last month, how often did you wake up early and had difficulty falling back asleep?" on a scale from 1 ("never") to 2 ("rarely"), 3 ("some nights"), 4 ("most nights") and 5 ("every night").

Workplace productivity was measured with the Work and Productivity and Activity Impairment (WPAI) questionnaire. The WPAI has several components, including presenteeism, absenteeism, and total productivity impairment. This instrument, developed by Giovannetti et al, was designed to assess caregiving-related work productivity impairment.[16] WPAI includes questions for caregivers related to their work in the previous work. Participants who reported rotating shift work schedules or other alternative schedules (ie, non-regular daytime shifts) were asked to report on their work during the "last week they worked."

Presenteeism was measured by asking caregivers to report the extent to which caregiving affected productivity while at work in the past week on a number from 1 ("made your work a little harder") to 10 ("made your work a lot harder"). Participant responses were divided by 10 and multiplied by 100 to create a proportion from 0 to 100%.

Absenteeism was measured by asking participants to report the number of hours of work missed due to caregiving using a one-month period. Caregivers were also asked the number of hours that they "typically" work in a week and the hours they "actually worked," which was then standardized to a month by multiplying by

4.33, and served as the denominator in the calculation of absenteeism to report missed time from work due to caregiving in a typical month. Absenteeism was calculated as the proportion of hours missed from work due to caregiving divided by the hours missed due to caregiving and the hours actually worked.

A composite measure of total productivity impairment (WPAI) was created with the below equation[19]:

$$\text{WPAI} = \text{Absenteeism} + [(1 - \text{Absenteeism}) \times \text{Presenteeism}]$$

Statistical Analyses

Descriptive statistics were used to summarize participant characteristics. We then performed analysis of variance (ANOVA) to compare awakenings (caregiving-related awakenings and spontaneous awakenings) across workplace productivity factors. We also performed an ANOVA to compare workplace productivity factors (presenteeism, absenteeism, and WPAI) by type of work (day work vs non-day work). We found that presenteeism ($F = 0.8$, $P = 0.349$) and total workplace productivity impairment ($F = 2.9$, $P = 0.088$) did not vary by work type, but absenteeism did vary by work type ($F = 1.25$, $P = 0.0169$). As only one workplace variable differed by work type, we retained both day and non-day workers in the analytic sample. Further, sensitivity analyses were performed to examine sleep disruptions and workplace outcomes in the sample when restricted to only day workers (Supplemental Table 4, http://links.lww.com/JOM/A978) using generalized linear modeling. The pattern of findings was similar to that when the sample is retained in full, though the sample size for these sensitivity analyses is limited.

The two awakening variables were categorized as: 0 (''never'' or ''rarely''), 1 (''some nights''), and 2 (''most nights'' or ''every night''). Generalized Linear Modeling (GLM) with maximum likelihood estimation, a normal distribution, and identify link was used to examine the relationships between caregiving-related awakenings and each workplace productivity outcome, including presenteeism, absenteeism, and total productivity among caregivers. Similarly, we conducted several GLMs to examine the relationships between nighttime awakenings and each workplace productivity outcome. Finally, we conducted GLMs with both caregiving-related awakenings and spontaneous nighttime awakenings as predictors in the same models of each workplace outcome to determine if each sleep variable contributes unique variance.

The distribution of the data was assessed to ensure assumptions for all hypothesis testing were met (ie, normality of residuals and homogeneity of variance according to the Bartlett test in the case of ANOVA). All models controlled for potentially confounding factors including education, gender, relationship status, and self-reported health. All tests were two-sided with alpha set at 0.05. All analyses were performed in Stata (Version 16, College Station, TX).

RESULTS

Table 1 displays descriptive statistics summarizing the study sample. Average age of participants ($n = 258$) was 60.0 years old (SD = 11.5 y). Caregivers were mostly female (69%) and married (35%). Approximately half of the sample (49%) had a college or graduate degree. The majority of caregivers also had a day work schedule ($n = 195$, 75%), as opposed to a non-day schedule (eg, rotating or night shift schedule). Caregivers reported on average 4.0 hours (SD = 4.1 h) per day.

Figure 1 shows descriptive statistics summarizing awakenings reported by the sample. Regarding caregiving-related awakenings, 78.3% ($n = 202$) reported never/rarely, 14.3% ($n = 37$) reported some nights, and 7.4% ($n = 19$) reported most/every night experiencing this awakening. Regarding spontaneous nighttime awakenings, 60.4% ($n = 156$) reported never/rarely, 26.4% ($n = 68$) reported some nights, and 13.6% ($n = 35$) reported most/every nights experiencing these awakenings.

TABLE 1. Demographics of Study Sample ($n = 258$)

Variable	N	(%)
Age (mean = 60.0 y; SD = 11.5 y; range: 26–98 y)		
Sex		
Male	80	31%
Female	179	69%
Relationship status		
Married	72	35%
Living with partner	10	5%
Separated	8	4%
Divorced	46	22%
Widowed	8	4%
Never married	63	30%
Self-reported health		
Poor	4	2%
Fair	39	15%
Good	74	29%
Very good	92	36%
Excellent	48	19%
Household income		
<$29,000	43	17%
$29,000–$49,999	35	14%
$49,000–$79,000	34	13%
>$79,000	147	57%
Education		
Less than high school diploma	9	4%
High school diploma	50	24%
Some college	49	23%
College degree	68	34%
Graduate degree	31	15%
Work schedule		
Day workers	195	75%
Other schedule (non-day work)	64	25%

Average daily caregiving time (mean = 4.0 h, SD = 4.1 h; range = 1–24).

In the sample, presenteeism averaged 7.6% (SD = 18.4%), absenteeism averaged 2.1% (SD = 9.8%), and total productivity impairment averaged 9.7% (SD = 24.0%). The amount of presenteeism varied with the frequency of caregiving-related awakenings ($P < 0.001$), but not by reports of spontaneous nighttime awakenings ($P = 0.648$). The amount of absenteeism varied with the frequency of caregiving-related awakenings ($P < 0.001$), but not by reports of spontaneous nighttime awakenings ($P = 0.106$). There was a statistically significant difference in productivity impairment by caregiving-related awakenings ($P < 0.001$), but not spontaneous nighttime awakenings ($P = 0.390$). Descriptive statistics summarizing workplace productivity factors by sleep are shown in Table 2.

Covariate-adjusted GLM analyses results are shown in Fig. 2A to C. Figure 2A displays the GLMs after adjustment for potentially confounding factors examining caregiving-related awakenings and workplace outcomes. Reporting caregiving-related awakenings most or every night was associated with a 27% increase in presenteeism (OR = 1.27, 95%CI: 1.16 to 1.40) compared to those reporting never or rarely experiencing these awakenings. Reporting caregiving-related awakenings most or every night was associated with a 10% increase in absenteeism (OR = 1.10, 95%CI: 1.06 to 1.15) compared to those reporting never or rarely experiencing these awakenings. Finally, reporting caregiving-related awakenings most or every night was associated with a 41% increase in productivity impairment (OR = 1.41, 95%CI: 1.25 to 1.58), as

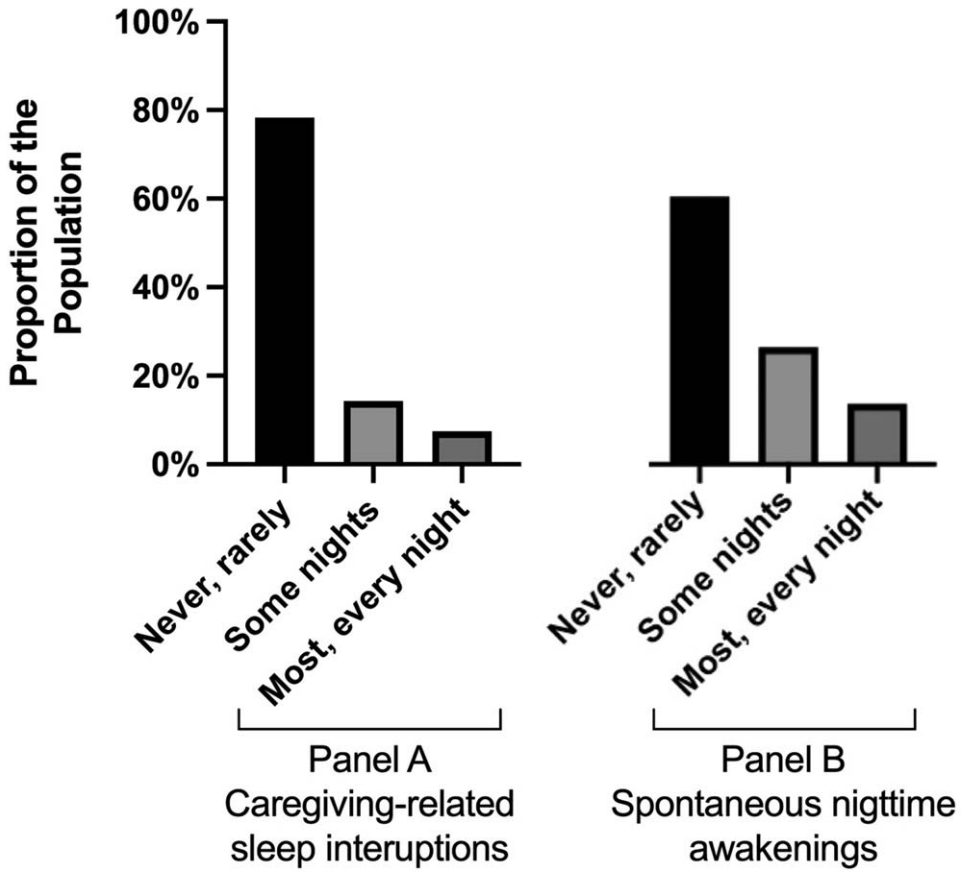

FIGURE 1. Proportion of caregivers employed outside the home reporting caregiving-related awakenings (Panel A) and spontaneous nighttime awakenings (Panel B).

TABLE 2. ANOVA Comparing Sleep Difficulty (Caregiving-Related Awakenings or Nighttime Awakenings) and Workplace Outcomes

	Mean	SE	*F* Statistic	*P* Value
Presenteeism				
Caregiving-related awakenings			14.0	0.000
Never, rarely	5.6%	1.0%		
Some nights	8.6%	3.6%		
Most nights, every	27.9%	7.6%		
Nighttime awakenings			0.4	0. 648
Never, rarely	6.7%	1.4%		
Some nights	8.7%	2.1%		
Most nights, every	9.4%	3.9%		
Absenteeism				
Caregiving-related awakenings			19.5	0.000
Never, rarely	0.9%	0.1%		
Some nights	2.4%	1.0%		
Most nights, every	14.8%	7.4%		
Nighttime awakenings			2.26	0.106
Never, rarely	1.8%	0.1%		
Some nights	1.2%	0.1%		
Most nights, every	5.3%	3.1%		
Productivity impairment				
Caregiving-related awakenings			23.0	0.000
Never, rarely	6.4%	1.1%		
Some nights	11.0%	4.1%		
Most nights, every	42.7%	12.5%		
Nighttime awakenings			0.9	0.390
Never, rarely	8.6%	1.7%		
Some nights	9.9%	2.2%		
Most nights, every	14.8%	6.6%		

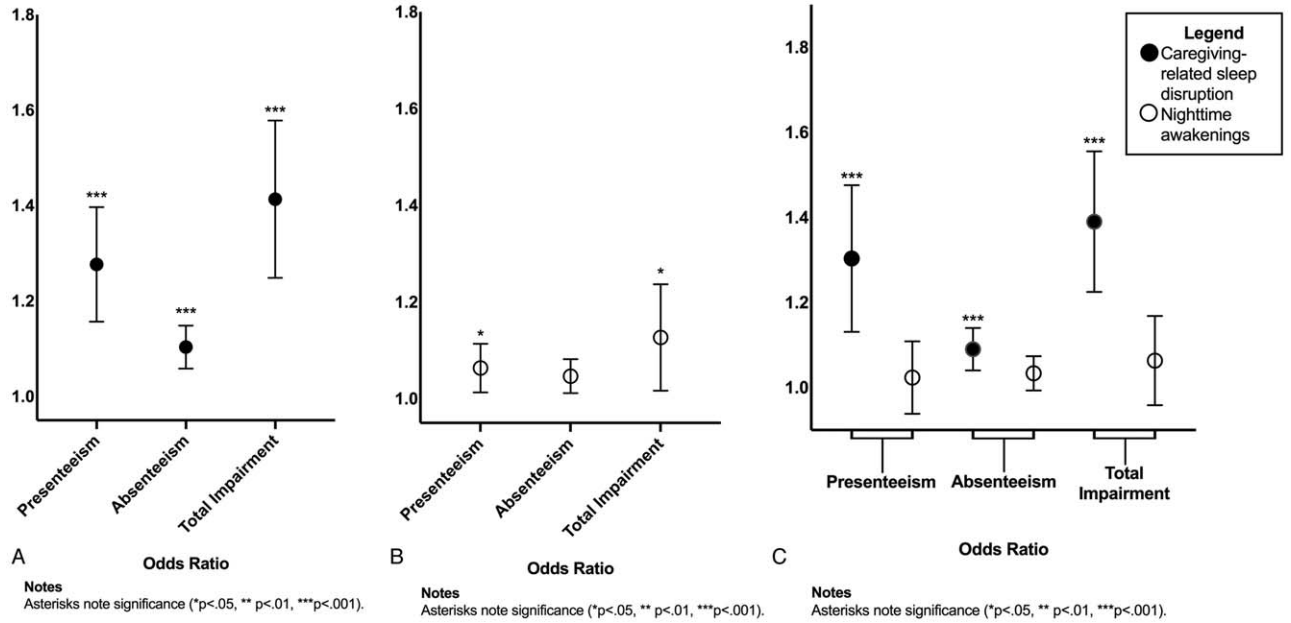

FIGURE 2. (A) Covariate-adjusted generalized linear regression models examining caregiving-related awakenings most or every night and workplace outcomes, compared to those not reporting these awakenings. (B) Covariate-adjusted generalized linear regression models examining nighttime awakenings most or every night and workplace outcomes, compared to those not reporting these awakenings. (C) Covariate-adjusted combined generalized linear regression models examining caregiving-related awakenings and non-caregiving spontaneous awakenings most or every night and workplace outcomes, compared to those not reporting these awakenings.

compared to those not reporting these awakenings. Supplemental Table 1, http://links.lww.com/JOM/A978 features the full regression results.

Figure 2B displays the GLMs after adjustment for potentially confounding factors examining spontaneous nighttime awakenings and workplace outcomes. Reporting spontaneous nighttime awakenings most or every night was not associated with presenteeism. Spontaneous nighttime awakenings were associated with a 5% increase in absenteeism (OR = 1.05, 95%CI: 1.01 to 1.08), compared to reporting no awakenings. Reporting spontaneous nighttime awakenings most nights or every night was associated with a 12% increase in productivity impairment (OR = 1.12, 95%CI: 1.02 to 1.24) compared to reporting no awakenings. Supplemental Table 2, http://links.lww.com/JOM/A978 features the full regression results.

Figure 2C displays the GLMs after adjustment for potentially confounding factors examining, in a combined model, both caregiving-related awakenings and spontaneous nighttime awakenings as predictors of workplace outcomes. Reporting caregiving-related awakenings most or every night was associated with a 27% increase in presenteeism (OR = 1.27, 95%CI: 1.15 to 1.40) compared to those reporting never or rarely experiencing these awakenings. Spontaneous nighttime awakenings were not related to presenteeism in the combined model in predicting workplace outcomes. Reporting caregiving-related awakenings most or every night was associated with a 9% increase in absenteeism (OR = 1.09, 95%CI: 1.04 to 1.14) compared to those reporting never or rarely experiencing these awakenings. Spontaneous nighttime awakenings were not related to absenteeism in the combined model. Reporting caregiving-related awakenings most or every night was associated with a 38% increase in total productivity impairment (OR = 1.38, 95%CI: 1.23 to 1.56) compared to those reporting never or rarely experiencing these awakenings. Spontaneous nighttime awakenings were not related to total workplace productivity in the combined model. Supplemental Table 3, http://links.lww.com/JOM/A978 features the full regression results.

DISCUSSION

Results from this cross-sectional study of unpaid caregivers for older adults requiring assistance in the US demonstrate a strong, positive association between reported caregiving-related awakenings and adverse workplace outcomes, including presenteeism, absenteeism, and productivity impairment. Specifically, our results show that among those caregivers experiencing routine caregiving-related awakenings ''most'' or ''every'' night, these individuals were 27% more likely to demonstrate presenteeism, 10% more likely to be absent from the workplace, and 41% more likely to be impaired in their overall productivity. On the other hand, caregivers who reported spontaneous nighttime awakenings ''most'' or ''every'' night were approximately 5% more likely to demonstrate absenteeism in the workplace and 12% more overall productivity impairment. Finally, in models that included both caregiving-related awakenings and spontaneous nighttime awakenings, the odds of workplace impairment for those reporting caregiving-related awakenings was similar, while the relationship between spontaneous nighttime awakenings and workplace impairment were no longer significant.

Kessler et al., found that insomnia disorder, which has a prevalence among employed adults in the US of 23% is associated with $63.2 billion per year in lost productivity.[20] Our results show that caregiving-related awakenings ''most nights'' or ''every night'' were reported by 22% of employed caregivers. The prevalence of spontaneous nighttime awakenings ''most nights'' or ''every night'' in our study was reported by approximately 40% of the population, yet, despite the higher prevalence of spontaneous awakenings, our data show that the caregiving-related awakenings were more consequential in terms of workplace productivity than the spontaneous awakenings.

Although spontaneous nighttime awakenings were more common than caregiving-related awakenings in our study, caregiving-related sleep disturbances were associated with greater than 40% increased odds of workplace impairment. In comparison, spontaneous nighttime awakenings were associated with modest impairments to workplace performance when looked at individually, and were not associated with workplace performance after controlling for caregiving-related awakenings. There are several plausible mechanisms for this discrepancy. First, previous research has shown that spontaneous arousals from sleep, such as awakening to use the bathroom, commonly last only a few minutes in duration,[21] whereas awakenings due to caregiving likely last longer and, lead to greater arousal, making it more difficult to return to sleep. Specifically, although we did not have information pertaining to how long caregiving-related awakenings lasted, it is possible that such caregiving-related awakenings from sleep may also be more stressful than spontaneous nighttime awakenings that arise from natural causes (eg, noise in the bedroom environment), particularly if the person requiring care is affected by dementia. Research shows that disorientation and confusion are heightened at night among those affected by this condition.[22] Thus, an awakening to calm an older individual with dementia is likely particularly stressful as the patient may be disoriented, confused, or upset—a circumstance from which the caregiver is likely to struggle to calm down and return to sleep.

With an aging population, caregiving for an older family member or friend has become increasingly common among the population.[23] Our data highlight an underexplored manifestation of caregiving-related sleep awakenings, which is the toll on caregiver workplace performance. In documenting a strong association between routine caregiving-related awakenings and lower productivity, our study offers several important clinical and practical implications. First, research has shown that insomnia symptoms in the older adult for whom care is being provided are among the most common reasons older individuals are placed in care facilities.[24,25] Although this literature has emphasized these issues from the perspective of the older adult needing care, our study highlights the awakenings experienced by caregivers. If caregiving-related awakenings affect the caregivers' work and career, they may be more likely to institutionalize the older adult for whom they care. Second, particularly concerning from the standpoint of the health and well-being for the older caregivers is that chronic sleep disruption has been shown to increase risk for cognitive decline, potentially interfering with the capacity of the caregiver to provide care safely and effectively, potentially interfering with the capacity of the caregiver to provide care safely and effectively.[26,27] Third, research has shown that poor sleep among caregivers, which may impair caregiver performance even among those not experiencing cognitive decline was associated with adverse outcomes for transplant patients receiving care.[28] Fourth, our findings suggest a clear opportunity for future researchers and practitioners to design interventions to improve sleep among caregivers and older adults requiring assistance. Unfortunately, few employers focus on sleep enhancement programs for employees. Specifically, whereas nutrition and physical activity programs are reported by between 20 and 25% of employers, fewer than 10% of worksites in the US report a sleep enhancement or fatigue reduction program for employees.[29] Future research might include the design workplace interventions, such as nap rooms or blue light therapy, for caregivers experiencing adverse daytime consequences and productivity impairment. Interventions could also be designed to improve sleep for the older adult requiring assistance so as to reduce the number of awakenings the older adult and the caregivers experience. By way of example, previous research has shown that daytime bright light therapy is beneficial for nighttime sleep among older adults affected by dementia.[30] This would reduce the older adults awakenings and may reduce the caregiver-related awakenings. Moreover, recent evidence collected among unpaid caregivers during the COVID-19 pandemic suggests that these caregivers are at particularly high risk for sleep difficulties and associated mental health consequences while caring for others during the pandemic.[31] Future research that aims to design interventions to improve sleep among caregivers in workplace settings so as to buffer against adverse mental health consequences in addition to workplace considerations may be particularly important given these conditions.

Limitations

Our study used a national, population-based sample of caregivers of older adults receiving assistance in the US. Our study was limited in that the only two metrics of sleep measured in this NSOC study were caregiving-related awakenings and spontaneous nighttime awakenings. Other sleep issues that would have been useful to describe caregiver sleep, but were not included in the data set include difficulty initiating sleep as well as sleep duration. However, the specific attention to caregiving-specific awakenings offered insight in our study into the specific awakenings due to caregiving. It is a limitation that we neither had access to more comprehensive insomnia symptom or diagnosis information nor quantitative measures of sleep (eg, via actigraphy) among participants. Insomnia information would have been informative in this sample of caregivers, as the average age was 60 years old and insomnia is more common among older adults.[32] Nevertheless, it is interesting that after controlling for nighttime awakenings, one symptom of insomnia, the odds of adverse workplace outcomes among those reporting caregiving-related awakenings remained high. Also, objective measures of sleep may be informative and considered in future research. Another limitation pertaining the higher mean age of the sample in this analysis is that the caregivers were not screened for cognitive impairment, which may have limited their ability to accurately recall their symptoms.

It should also be noted that our sample of caregivers living with an older adult and employed outside the home represented 13% of the full caregiver sample in the NSOC study. It may be that the productivity and performance of caregivers who are not employed outside the home was also impaired by caregiving-related awakenings; however, productivity data were not collected from those individuals. It is possible that caregivers employed outside the home who have severe insomnia symptoms and time constraints with multiple personal, family, and professional obligations, may have been more likely to have been non-responsive to the survey. However, in separate and combined models, caregiving-related awakenings had a profound and highly statistically significant adverse effect on workplace outcomes among caregivers employed outside the home whereas nighttime awakenings had in most cases a much smaller or no impact on those parameters. Thus, it is unlikely that sampling bias could account for these results. It is a limitation, however, that we do not have access to different types of caregiving. For instance, a caregiver who is caring for an older adult with dementia may face significantly higher caregiving intensity than someone caring for an older adult without such cognitive impairment. Finally, although the response rate on the NSOC was 26%, multiple studies have indicated that surveys with a response rate of approximately 20–30% yield results that are comparable to those with a 60% response rate.[33,34]

CONCLUSION

Our results from this sample of family and unpaid caregivers of older adults show that those caregivers who reported routine caregiving-related awakenings also demonstrated adverse workplace performance outcomes, including more presenteeism and absenteeism, and productivity impairment. In contrast, whereas spontaneous nighttime awakenings from non-caregiving sources were also associated with presenteeism, their impact on workplace

outcomes was much less pronounced in comparison to caregiving-related awakenings. Our findings suggest the need for greater attention to sleep among caregivers of older adults requiring assistance so as to avoid the professional handicap that may result from caregiving.

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