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Elliane Irani
Case Western Reserve University, exi26@case.edu

Fei Wang
Case Western Reserve University, fxw125@case.edu

Stephanie Griggs
Case Western Reserve University, sag153@case.edu

Ronald L. Hickman
Case Western Reserve University, rlh4@case.edu

Author(s) ORCID Identifier:

Fei Wang

Elliane Irani

Stephanie Griggs

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Resilience as a Moderator of Role Overload and Sleep Disturbance Among Caregivers of Persons with Dementia

Elliane Irani, PhD, RN [a, *], Fei Wang, MSW [b], Stephanie Griggs, PhD, RN, FAAN [a], Ronald L. Hickman Jr, PhD, RN, ACNP-BC, FNAP, FAAN [a]

[a] Frances Payne Bolton School of Nursing, Case Western Reserve University, Cleveland, OH, USA

[b] Jack, Joseph and Morton Mandel School of Applied Social Sciences, Case Western Reserve University, Cleveland, OH, USA

***Corresponding Author:**

Elliane Irani, PhD, RN

Frances Payne Bolton School of Nursing, Case Western Reserve University

10900 Euclid Avenue, Cleveland, OH 44106-4904

e-mail: elliane.irani@case.edu

Phone: 216-368-0437

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Abstract

The purpose of this study was to examine if resilience moderates the association between role overload and sleep disturbance among caregivers of persons with dementia. This was a secondary analysis of data on 437 informal caregivers (mean age=61.77 years, SD=13.69) of persons with dementia in the United States. Data from the 2017 wave of the National Study of Caregiving were analyzed using multiple regression with interaction terms to evaluate the moderation effect of resilience, while controlling for caregivers' age, race, gender, education, self-rated health, caregiving hours, and primary caregiving status. Higher role overload was associated with greater sleep disturbance and this association was attenuated among caregivers with higher levels of resilience. Our findings highlight the stress-buffering effects of resilience in the context of sleep disturbance in dementia caregivers. Interventions to improve caregivers' ability to recover, resist, and rebound during challenging situations may mitigate role overload and optimize sleep health.

Keywords: caregivers, dementia, caregiver burden, sleep disturbance, resilience

Introduction

Over 11 million individuals in the United States served as caregivers of persons with dementia, providing an estimated 16 billion hours of unpaid care in 2021.[1] The need for instrumental assistance in the community is indispensable for persons with dementia who require various types and levels of care at different stages of the illness trajectory. Caregivers of persons with dementia are a high-risk, high-need group and would benefit from sleep evaluation and interventions, especially that they experience high levels of role overload and may be vulnerable to nighttime awakenings of the person with dementia.[2,3] Caregivers of persons with dementia report poor sleep health outcomes, with 50 to 70 percent of caregivers experiencing sleep disturbance, which includes difficulty initiating or maintaining sleep.[4] Additionally, caregivers of persons with dementia are found to have poorer sleep quality and lower sleep duration compared to age-matched non-caregiver controls.[5] More importantly, based on the findings of a recent meta-analysis,[5] caregivers of persons with dementia have significantly less hours of sleep than the minimum sleep duration for adults (i.e., 7 hours per night) as recommended by the National Sleep Foundation.[6] This has profound health implications given that sleep disturbance and short sleep duration (defined as habitual sleep duration of less than 6 hours[7]) are associated with an increase in markers of inflammation[8] and risk for cardiometabolic disease.[9,10]

Caring for persons with dementia is a complex role often shared with other family members and characterized by high levels of role overload.[11] Role overload is the subjective experience of caregiving stressors where the demands exceed the caregiver's personal resources.[12] Role overload is associated with sleep disturbance among caregivers in general,[13] and caregivers of persons with dementia in particular.[14] Caregivers of persons with dementia generally report higher levels of overload over longer periods of time, compared to caregivers of persons with other health conditions.[11] Therefore, it is important to evaluate modifiable factors to mitigate the influence of role overload on disturbed sleep and subsequently improve caregiving experiences and sleep health among caregivers of persons with dementia.

Psychological resilience is the process of successfully adapting and recovering in the face of stress and adversity and is associated with positive health outcomes.[15,16] In the context of dementia caregiving, resilience has been positively associated with subjective well-being and quality of life.[17,18] Additionally, resilient characteristics such as personal mastery were found to attenuate the detrimental effect of negative life events on cardiovascular risk among spousal caregivers of persons with dementia.[19] However, research on the effect of resilience on caregivers' physical health, notably sleep health is limited. According to the care partner resilience behavioral framework, there are four behavioral domains related to resilience among dementia care partners: problem-response, self-growth, help-related, and learning-related behaviors.[20] Self-growth behaviors encompass self-care and other strategies that caregivers use to maintain their overall health and well-being.[20] Therefore, a cargiver's level of resilience can affect their ability to engage in self-care behaviors, such as sleep health maintenance, despite caregiving challenges.

Resilience is positively associated with sleep quality (as measured by the Pittsburgh Sleep Quality Index) among a representative sample of adults in the United States[21] and has been established as a moderator for the association between stressful life events and sleep quality among college students.[22] Despite caregivers of persons with dementia experiencing different stressful situations as compared to college students, we anticipate that resilience may moderate the relationship between caregiver role overload and sleep disturbance among caregivers of persons with dementia. Caring for a person with dementia is associated with a host of challenges and adverse health implications for the caregiver and other family members.[11] Therefore, resilience may buffer the impact of caregivers' role overload on sleep disturbance by enabling better coping strategies with caregiving challenges, resulting in protective health benefits.

The purpose of this study was to assess the moderating role of resilience on the relationship between role overload and sleep disturbance among caregivers of persons with dementia. We hypothesized that resilience would buffer against the effect of role overload on sleep disturbance. The findings highlight resilience as a psychological resource that can be targeted in sleep health interventions to attenuate the stress of caregivers and improve their sleep health outcomes.

Methods

Data Sources and Sample

This was a cross-sectional secondary analysis of data from the 2017 wave of the National Study of Caregiving (NSOC), which included family and unpaid caregivers of participants in the 2017 National Health Aging Trend Study (NHATS)—a nationally representative study of Medicare beneficiaries aged 65 and older. NSOC is a nationally representative study of family and other unpaid caregivers to older persons living with limitations in daily activities in the United States.[23] The goal of NSOC is to provide insight into caregiving responsibilities and experiences of family and unpaid caregivers in the United States.

Eligible participants for the NSOC study were identified using a two-stage screening process. First, Sample Persons were selected from NHATS if they were receiving help in the last month with mobility activities, self-care activities, or household activities for health or functioning related reasons. Eligible Sample Persons were asked to identify all caregivers who assisted them with any of the aforementioned activities. A maximum of five caregivers per NHATS participants were eligible. For those with more than five caregivers, five were randomly selected. Second, caregivers were eligible to participate in the NSOC study if they were: (1) assisting an eligible NHATS Sample Person with mobility activities, self-care activities, household activities, or other activities (e.g., physician visits), and (2) either related to the Sample Person whether paid or not, or unrelated to the Sample Person and not paid to help. The screening process was described in detail in the NSOC I-III User Guide Version 5.0.[23] Eligible

NSOC participants completed a 30-minute telephone interview and answered questions about their experiences including care activities, duration and intensity of care, interactions with healthcare providers, availability of support, effects of caregiving on health and wellbeing, and demographic information.

For the current secondary analysis, we included a subset of NSOC participants who provided care in the last month before data collection to a living NHATS Sample Person with dementia (base sample: *N* = 541). At the time of this analysis, the most recent data available to the public was from the third round of the NSOC (NSOC III), which included caregivers identified in NHATS Round 7 in 2017. We used the 2017 NHATS data and followed published recommendations and STATA programming statements to construct the dementia status variable for NHATS participants and merged the variable with the NSOC dataset.[24,25] We adopted the narrow definition of dementia for our constructed variable (0 = "no dementia or possible dementia" and 1 = "probable dementia") to identify caregivers of persons with dementia for the current analysis. The final sample consisted of 437 caregiver participants who had valid data on variables of interest. There were no significant differences in any of the variables included in the model when comparing the included 437 cases to the excluded 104 cases.

Measures

Sleep disturbance was assessed using a single self-report item about the frequency of trouble maintaining sleep over the past month. Response options were 1 (every night), 2 (most nights), 3 (some nights), 4 (rarely), to 5 (never). This item was reversed coded, with higher scores indicating greater sleep disturbance.

Perceived role overload was assessed using three self-report items derived from the Role Overload Scale.[12] Participants answered each of the following items on a 3-point Likert scale (1 = *very much* to 3 = *not so much*): 1) "You are exhausted when you go to bed at night," 2) "You have more things to do than you can handle," and 3) "You don't have time for yourself." Items were reverse-coded and a total score was calculated (range 3-9), with higher scores reflecting higher levels of perceived role overload. The Cronbach's alpha of the Role Overload Scale for the current study sample was 0.77, indicating acceptable reliability.[26]

Psychological resilience was assessed using the 2-item Connor-Davidson Resilience Scale (CD-RISC-2)[27]—a brief version of the 25-item Connor-Davidson Resilience Scale.[28] Participants were asked to what extent they agree with the following statements: 1) "I have an easy time adjusting to changes" and 2) "I get over (recover from) illness and hardship quickly." The responses were recorded on a 4-point Likert scale, ranging from 1 (agree strongly) to 4 (disagree strongly). These items were reverse-coded, and a total score was computed, with a range of 2-8. Higher scores reflected higher levels of resilience. The Spearman-Brown reliability estimate (recommended for two-item scales) was 0.71.

Covariates included demographic, caregiving, and health status characteristics chosen *a priori* based on prior research of their association with caregiver sleep disturbance.[14] Demographic characteristics included age, which was measured continuously, gender (0 = male, 1 = female), education (0 = high school or below; 1 = some college or Bachelor's degree; 2 = Master's degree or above), and race (0 = racial minorities, 1 = White). Racial minorities included African Americans, Indian Alaska Natives, Asians, and Native Hawaiian Pacific Islanders. Caregiving characteristics included caregiving hours, primary caregiving status, and co-residence (i.e., living with the care recipient). Caregiving hours per month were calculated based on caregiving hours per day, number of days of care per week, and number of days of care per month. Primary caregiving status (0 = no, 1 = yes) was determined based on caregiving hours per month; among all the participants who provided care to the same individual, the participant who provided the highest number of caregiving hours per month would be considered the primary caregiver. Co-residence was measured using the question "How long does it normally take you to get to the care recipient's home from where you live?" Participants reported "-1 legitimate skip" were coresident caregivers whereas participants who reported actual minutes and/or hours were not living with the care recipient.[23] Lastly, we controlled for participants' self-rated health, which was measured with one item (1 = excellent to 5 = poor). This item was then reversed coded, with higher scores reflecting better self-rated health.

Data Analysis

Descriptive statistics were used to summarize the characteristics of the sample and evaluate the distribution of the study variables. Pearson correlation coefficients were estimated to assess relationships between study variables. Next, the absolute values of skewness and kurtosis for all variables included in the model were examined and met the recommended criteria (skewness < 2 and kurtosis < 7).[29] The linear regression assumptions were also tested and met. Point biserial correlations, tolerance, and variance inflation factor (VIF) were used to assess for multicollinearity. Multiple linear regression was then used to estimate the association between perceived role overload and sleep disturbance, and an interaction term (role overload x resilience) was used to examine the moderation effect of resilience on the association. In order to facilitate the interpretation of the results, role overload and resilience were mean-centered.[30] Lastly, the significant interaction was plotted to compare the predicted values of sleep disturbance and model slopes by levels of resilience. Statistical significance was set with a *p*-values < .05 and with 95% confidence intervals (CI) not including 0. Survey weights for the participants were applied to generate the population estimates. All analyses were conducted using STATA 17.0.

Results

We present sample characteristics in Table 1. Participants were on average 61.77 (SD = 13.69) years old. Close to two-thirds of participants (62.46%) were female and a majority were White (78.81%). Most participants (54.64%) had some college education or a college degree. Over half of participants (58.11%) were primary caregivers and approximately two fifths of participants lived with the care recipient (40.38%). The mean caregiving time was 114 hours per month and the mean score of self-rated health was 3.35 (SD = 1.04), suggesting fair-to-good health. Participants reported low levels of perceived role overload (M = 4.94, SD = 1.85) and moderate-to-high levels of psychological resilience (M = 6.29, SD = 1.55). The mean levels of sleep disturbance participants reported were low to moderate (M = 2.47, SD = 1.08).

We present the correlation coefficients among our study variables in Table 2. Being female, longer caregiving hours, poorer health, higher levels of perceived role overload, and lower levels of resilience were associated with higher sleep disturbance. Being female, longer caregiving hours, primary caregiver status, and poorer health were associated with higher levels of perceived role overload. Higher levels of education, better health, and lower levels of perceived role overload were associated with higher levels of resilience. Given that the magnitude of all correlations, indicated by the absolute values of coefficients, ranged from .09 to .38, there was no violation of collinearity at the bivariate level.[31]

The multivariate regression analysis with the interaction term indicated that higher perceived role overload was associated with higher sleep disturbance ($B = 0.113$, $p = .001$), while controlling for caregivers' age, gender, race, education, caregiving hours, co-residence (i.e., living with the care recipient), primary caregiver status, and self-rated health (Table 3). We found a significant association on the two-way interaction of role overload x resilience ($B = -.030$, 95% *CI*: -.060, -.000), indicating that the association between role overload and sleep disturbance varied based on levels of resilience. The significant interaction effects of resilience are illustrated in Figure 1. Compared with caregivers who had high levels of resilience, caregivers with lower levels of resilience had a stronger positive association between perceived role overload and sleep disturbance. In other words, at higher levels of resilience, the association between role overload and sleep disturbance is attenuated.

Discussion

The purpose of this paper was to examine the moderating effect of resilience on the relationship between perceived role overload and sleep disturbance among caregivers of persons with dementia.

The findings helped elucidate determinants of sleep disturbance among caregivers of persons with dementia, and particularly identify resilience as a modifiable target for intervention to improve sleep health outcomes for this population.

Our finding that role overload is associated with sleep disturbance is in line with several other studies from various caregiving populations.[13,14] It is well established that psychological distress such as increased stress, depression, and role overload can precipitate sleep problems among caregivers.[32,33] Additionally, caregiving responsibilities often prevent caregivers from engaging in self-care such as sleeping promoting behaviors. Caregivers of persons with dementia have heightened experiences of role overload when managing behavioral and psychological symptoms of dementia (including nighttime awakenings), which are often a determining factor to transfer the person with dementia to an institution.[34] Therefore, caregivers of persons with dementia are in urgent need for interventions to address their sleep.

We also found that resilience has health benefits in the context of dementia caregiving, specifically in attenuating the effect of role overload on sleep disturbance, which can play a role in preventing the additional health complications associated with sleep disturbance, such as the increased risk of cardiometabolic conditions. [9,10] The protective effect of resilience also has implications for other areas of caregivers' functioning, such as their decision-making abilities given that sleep disturbance can affect caregivers' cognition,[35] subsequently influencing the quality of care that persons with dementia receive from their caregivers. The role of resilience in positively influencing caregiver outcomes has been established in the literature but has predominantly focused on psychological wellbeing.[36] Our findings further expand the role of resilience to sleep health outcomes, which has implications for sleep interventions.

The importance of adequate sleep duration and timing (i.e., sleep health) has been widely recognized. Sleep experts are calling for a reform to place a greater emphasis on sleep health in education, research, and clinical practice across care settings.[37] Sleep disturbance may shorten sleep duration or lead to inappropriately timed sleep and wake. Therefore, it is important to provide tailored interventions to address sleep disturbance based on caregivers' needs and access to community and individual resources. Clinicians should first assess caregiving responsibilities and associated role overload to personalize care and professional recommendations. Sleep interventions for caregivers of persons with dementia is an emerging area of science.[38] While cognitive behavioral therapy for insomnia (CBT-I) is the gold standard treatment for sleep disturbance resulting from insomnia,[39] it may not be an ideal intervention for caregivers of persons with dementia because it consists of the promotion of behavioral change through the use of sleep restriction and stimulus control,[40] which may be difficult if the caregiver is awakened by the person with dementia. There are likely several caregiving interventions that address other contextual factors and resources that would be beneficial to a caregiver's sleep. For instance, interventions aimed at improving caregivers' ability to handle stressful situations can be used in conjunction with sleep promotion interventions (i.e., relaxation strategies) to maximize improvement in sleep health outcomes among caregivers of persons with dementia.

This study is a secondary analysis of existing data and has some limitations that need to be considered. First, the study concepts were assessed using short and single-item measures. More comprehensive measures can provide a broader understanding and description of the problem. Additionally, we relied on a self-report measure of sleep disturbance, which can be subject to recall and social desirability bias. Future research is needed to evaluate objective measures of sleep and other sleep health dimensions as outcomes. Second, there may be other factors contributing to sleep disturbance such as the stage of dementia diagnosis, and whether caregivers have a bed partner. Last, although our data were derived from a national study with complex sampling methods, our results are limited to the population that we studied— family or unpaid caregivers of Medicare beneficiaries aged 65 and older who have dementia. Caregivers of older adults residing in countries other than the United

States may have different experiences and perspectives on role overload, resilience, and sleep disturbance. Despite these limitations, our study is among the first to identify resilience as a potential target for interventional work that can improve sleep for caregivers of persons with dementia.

Role overload is associated with sleep disturbance among caregivers of persons with dementia. This relationship is attenuated among caregivers who have high levels of resilience, as compared to those with lower resilience levels. Interventions that target caregivers’ ability to manage stress coupled with sleep promotion strategies can help maximize improvement in caregivers’ experiences and sleep health outcomes.

Figure & Tables

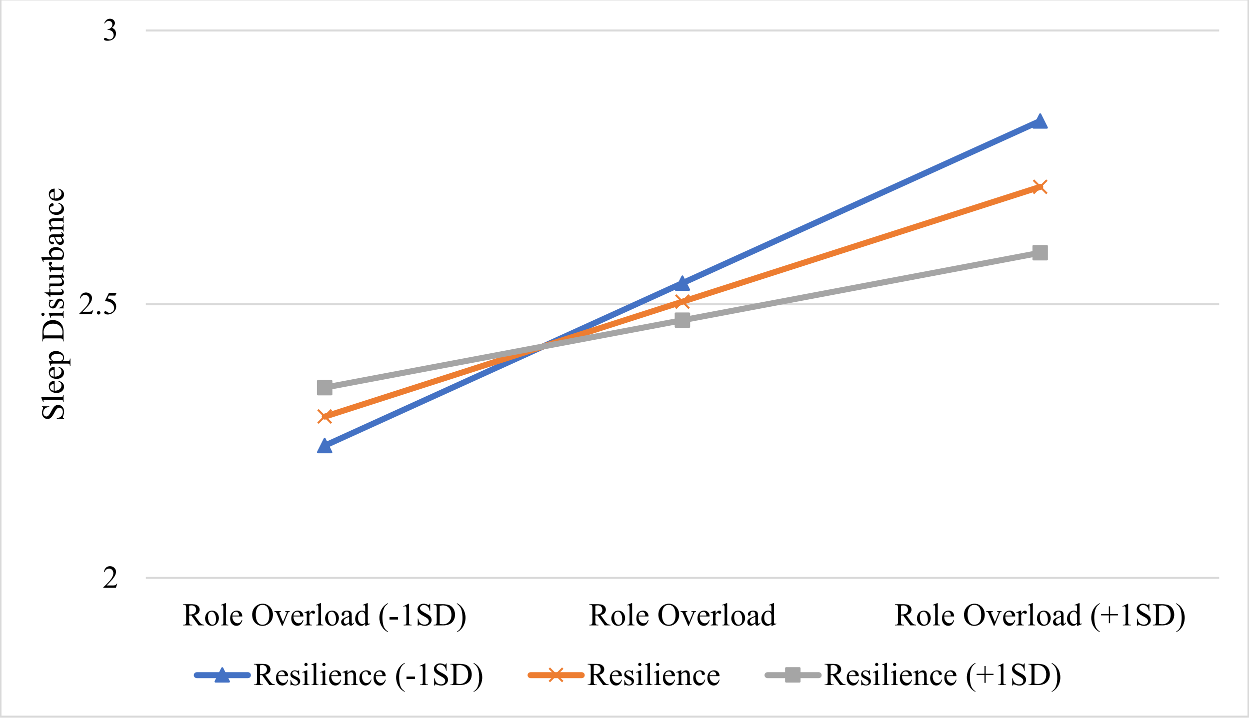

Figure 1. A visual representation of the conditional effects of perceived role overload on sleep disturbance among caregivers with relatively low (*1 SD below mean*), moderate (at mean), and high (*1 SD above mean*) levels of resilience.

Table 1

Sample Characteristics and Distribution of Study Variables (N = 437)

	n (%)	M (SD)
Age (in years)		61.77 (13.69)
Gender		
Men	168 (37.54)	
Women	373 (62.46)	
Race		
White	305 (78.81)	
Racial minorities	197 (21.19)	
Education		
High school or below	197 (34.90)	
Some college or college degree	273 (54.64)	
Above college degree	54 (10.46)	
Primary caregiver		
No	221 (41.89)	
Yes	320 (58.11)	
Co-residence		
No	271 (59.62)	
Yes	251 (40.38)	
Caregiving hours per month		114.10 (145.50)
Self-rated health (1-5)		3.35 (1.04)
Perceived role overload (3-9)		4.94 (1.85)
Psychological resilience (2-8)		6.29 (1.55)
Sleep disturbance (1-5)		2.47 (1.08)

Note. Percentages and *n* are presented for categorical variables. Means and standard deviations are presented for continuous variables. Percentages are weighted and frequencies are un-weighted.

Table 2

Bivariate Correlations Among Study Variables

	1	2	3	4	5	6	7	8	9	10	11
1. Sleep disturbance	--										
2. Age	.02	--									
3. Gender	.13**	.05	--								
4. Race	.05	.16***	-.08	--							
5. Education	-.01	-.04	-.03	.11*	--						
6. Caregiving hours	.10*	-.08	.13**	-.13**	-.01	--					
7. Primary caregiver	.05	.19***	.10*	.06	-.04	.32***	--				
8. Co-residence	.02	.14**	-.01	-.09	-.09	.38***	.21***	--			
9. Self-rated health	-.28***	-.09*	-.08	.13**	.13**	-.18***	-.12**	-.06	--		
10. Perceived Role overload	.28***	-.03	.18***	-.01	.01	.27***	.10*	.07	-.30***	--	
11. Psychological resilience	-.17***	-.02	-.07	-.07	.15***	-.04	-.03	.02	.27***	-.21***	--

*$p < .05$, **$p < .01$, ***$p < .001$

Table 3

Regression Analysis of Sleep Disturbance among Caregivers of Persons with Dementia (N = 437)

	Sleep Disturbance
	B (95% *CI*)
Perceived role overload*Psychological resilience	-.030 (-.060, -.000)*
Perceived role overload	.113 (.047, .179)***
Psychological resilience	-.021 (-.096, .052)
Age	-.000 (-.009, .008)
Gender (ref=Male)	--
Female	.226 (-.053, .504)
Race (ref=racial minorities)	--
White	.270 (.029, .511)*
Primary caregiver (ref=no)	--
Yes	.024 (-.240, .287)
Co-residence (ref=no)	--
Yes	-.071 (-.341, .200)
Education (ref=high school or below)	
Some college or college degree	.126 (-.144, .395)
Above college degree	-.198 (-.543, .148)
Caregiving hours	-.000 (-.001, .001)
Self-rated health	-.167 (-.290, -.043)**
Intercept	2.72 (1.86, 3.58)
Complex design *df*	52

Note. *B* = unstandardized coefficient; CI = confidence interval.

p* < .05; ** *p* < .01; * *p* < .001

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